A lotta us mechanics have the habit of thinkin' that certain noises are always caused by the same thing. Just because we hear a noise in the transmission, for example, is no reason to go ahead and take down the transmission. Maybe the noise is caused by bad driving habits, or something else outside of the transmission.

This month we're givin' you a bang-up film on how to track down these noises and fix 'em. You're gonna find out the WHY of a lotta things; things you can explain to the car owner. There's been some changes made, too. This film brings you up-to-date on a lotta questions you've been asking. Here's what we're talkin' about this month:
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**KEEP THIS BOOK HANDY!**
HYDRAULICALLY OPERATED TRANSMISSION

SLOW UPHSHIFT

Slow or sluggish upshifts are usually caused by something which is easily remedied, once the cause is located. A lot of us have the tendency to blame the transmission for slow or sluggish upshifts. Actually, most cases of slow or sluggish upshift aren’t caused by the transmission at all. Here is what usually happens:

The engine idle speed is too fast to allow the transmission to make the shift at the correct time. This means that the engine doesn’t slow down enough to relieve the torque on the gears so that the shift can be completed as promptly as the owner thinks it should.

In some cases, this condition is caused by sticking throttle linkage. In other cases, it is caused by too high an engine idle speed. Suppose we take them one at a time and see how these conditions can be corrected.

YOU CAN LICK’EM ALL
...ONE AT A TIME!
Sticking Throttle Linkage—Sticking throttle linkage has been overlooked by a good many of us as a cause of slow upshift. A lot of mechanics have the habit of thinking that oil makes things work better, and just can’t resist oiling the connections of the throttle linkage. As a result, dirt and dust collect in the connections, and slow up the free action of the linkage.

As a result, when the owner lifts his foot from the accelerator to make the upshift, the sticking linkage doesn’t permit the engine to drop to idle speed quickly. Therefore, the upshift doesn’t take place as quickly as it should.

Once the condition has been pinned down to sticking linkage, the correction is simple. Clean the linkage thoroughly with a good solvent. Then blow out the dirt, oil and solvent with compressed air. Check the engine idle speed, and be sure it is right. WARNING: Do not oil the throttle linkage!

Idle Speed Too Fast—Even though the throttle linkage is free, the upshift will be slow if the engine idle speed is set too fast. So, the first thing to do is to check engine idle speed and set it to specifications whenever you are checking for slow or sluggish transmission upshifting performance.

Don’t Blame the Oil Pump

Some mechanics are apt to point to the oil pump, or to the electrical units as possible causes of sluggish upshift. This, on the surface, seems to be a logical theory. However, here are some reasons why these units are not apt to be the cause of slow or sluggish upshift.
You want to remember that the oil pump delivers many times the oil pressure necessary to operate the direct-speed piston which makes the upshift possible. Therefore, the oil pump isn't apt to be the cause of this condition. It could lose a lot of its pressure output and still have enough left to make the upshift.

**Don't Blame the Electrical Units**—Here's why the electrical units aren't apt to be a cause of slow upshift. Take the governor, for example. All that the governor does is prepare the transmission for the upshift. If the upshift starts at all, even though its completion is delayed due to sticking throttle linkage or fast engine idle, it proves that the governor is doing its job. So, if the upshift is eventually completed, it proves that the electrical units are all right. This leaves us with two points to check in order to correct slow or sluggish upshift:

1. Clean the throttle linkage.
2. Check engine idle speed, and adjust if necessary.

**SHUTTLING IN NEUTRAL**

A lot of car owners have developed the habit of moving the shift lever into neutral and coasting to a stop. When this is done at speeds over thirteen miles per hour, a noise is apt to take place. This noise is apt to make the owner think something is wrong in the transmission.

The noise is produced by the direct-speed clutch sleeve as it moves back and forth between upshift and downshift positions. This is a condition known as “shuttling” and is not the fault of the transmission.
We all know that coasting with the transmission in neutral is not proper driving practice. Not only does the driver lose the braking effect of the engine, but he also loses the safe control of the car.

**Setting the Stage for Shuttling**—Let's review what takes place inside the transmission that can bring about this shuttling condition.

When the driver shifts into neutral, he moves the manual clutch gear sleeve so that neither the first nor the third gears are connected to the mainshaft. In other words, the rear wheels are driving the mainshaft without turning any of the other gears.
Since the engine is running at idle speed, and is driving the main drive pinion, the countershaft gear is also running at engine idle speed. This means that the governor points are closed because the governor is being driven by the countershaft gear at engine speed. Since the governor points are closed, the solenoid is energized and the ball valve is open. This dumps the oil pressure, and lets the piston return spring push the clutch sleeve back off the main drive pinion.

With the movement of the clutch sleeve, the constant-mesh gear control sleeve moves back. When the control sleeve is in this position, the constant-mesh gear can drive the countershaft gear, but the countershaft gear can't drive the constant-mesh gear because of the overrunning type clutch located in the constant-mesh gear. That means that the countershaft gear can overrun, or turn faster than, the constant-mesh gear.

The fact that the countershaft gear can run faster than the constant-mesh gear seems unimportant at first thought because there appears to be no way in which power can be applied
to the countershaft gear that would cause it to overrun the constant-mesh gear.

Keep in mind—the transmission is in neutral. The first- and third-speed gears are free-running on the mainshaft. So, even though the mainshaft is being driven by the rear wheels, and at a speed faster than engine idling speed, the mainshaft gears would appear to be unable to transmit power to the countershaft gear. But there are a couple of other factors that have to be considered, and they are oil drag and friction of other parts.

This oil drag, and friction of other parts has a tendency to let the mainshaft pick up the first- and third-speed gears and drive them at close to the same speed as the mainshaft. These gears will then drive the countershaft gears faster than the engine idle speed.

When this happens, the governor, which operates off the countershaft, is driven fast enough to open the points. When the points are opened, the solenoid is de-energized, the ball valve closes, and oil pressure builds up behind the piston, causing it to push the direct-speed clutch sleeve forward.
When the direct-speed clutch sleeve is pushed forward, the third-speed gear is coupled to the main drive pinion. This means that the third-speed gear now drives the countershaft gear at engine idling speed. The countershaft gear slows down, and the governor points again close. Oil pressure is dumped, and the sleeve is pushed off the drive pinion. That means that the third-speed gear quits driving the countershaft gear at engine idle speed. In other words, you're right back where you started from.

Under certain conditions, this direct-speed clutch sleeve might shuttle back and forth several times before the car coasted down to a speed below about twelve miles per hour.

At this speed, the governor points are closed, so the hydraulic system doesn't operate, and shuttling stops. As you can see, the upshift doesn't actually put the transmission in gear. The transmission remains in neutral, where the driver has shifted it. What the driver actually hears is the sound of the direct-speed clutch sleeve moving from upshift to downshift position and back again.
TRANSMISSION INTERRUPTER SWITCH

Owners of cars equipped with the hydraulically operated transmission occasionally report a condition of engine stalling, and say that they are unable to get the engine started again. This condition has sent many a good mechanic on a wild goose chase through the engine ignition system in an effort to locate the cause.

While there are a number of conditions which will cause the engine to stall, the one least likely to be suspected is the operation of the ignition interrupter switch in the transmission electrical circuit. You know, this switch interrupts the engine ignition momentarily during a downshift, to relieve torque on the gears so the downshift can be completed.
However, if the points in the interrupter switch should stick in the closed position, the coil primary circuit remains grounded. When this happens, the engine ignition system is dead, and it is impossible to start the engine.

This condition is most apt to occur when the switch and the transmission are thoroughly warmed up, and will take place following a downshift. The thing that makes this a difficult condition to locate is the fact that the switch is quite apt to operate all right when it cools off.

If you get a case of this kind, remove the blue wire from the resistor in the interrupter switch circuit. This resistor is contained in the transmission circuit breaker unit mounted on the air cleaner brace.

If the engine will start with the blue wire removed from the resistor, you can be pretty sure the points in the interrupter switch are stuck in the closed position. So, replace the interrupter switch.
DOUBLE UPHIFT

It is usually possible to hear the automatic upshift as it takes place when the driver lifts his foot from the accelerator. In fact, the driver may report that sometimes he hears two noises—one just after he lifts his foot, and another as he presses down on the accelerator. This leads him to believe he is getting what might be called a double upshift.

You know, of course, that when the driver lifts his foot from the accelerator, the automatic upshift starts. That means the direct-speed clutch sleeve moves into engagement with the main drive pinion. How complete the engagement is, however, depends to some extent on how fast the driver is trying to make the upshift.

If the car has been accelerating rapidly, and the engine is suddenly dropped down to idle speed, there is a very short time interval between the time the engine driving load is relieved from the transmission gears and the engine braking load is applied. It is during this period that the upshift takes place.
If this period is shortened by the driver trying to hurry the shift, the direct-speed clutch sleeve may enter into only partial engagement with the main drive pinion. Then, when the engine speed is increased and the torque load is shifted from engine braking to engine driving, the clutch sleeve will complete full engagement with the drive pinion. This produces a second shift noise, and is the noise the owner means when he mentions that there appears to be a double upshift.

You can explain this to the owner, and point out that if he will allow time enough for the shift to be completed, he won't hear this second noise, but will get a smooth upshift.
MANUALLY OPERATED
TRANSMISSION

GEAR CLASH WHEN SHIFTING INTO LOW OR REVERSE

Some Plymouth owners have reported gear clashing when they shift into low or reverse. Usually these drivers are the type who are in too big a hurry to get into gear and on their way. The chances are that a road test will prove to you that there is nothing basically wrong with the transmission. There is the chance, however, that you might assume that the condition was intermittent; that it occurs only on certain occasions. Don’t let this assumption let you take down the transmission. You will usually find that by waiting a few seconds after you push in the clutch you are able to shift into reverse or low without gear clashing. This waiting allows the countershaft gear time enough to slow down before you shift, eliminating gear clashing.

Now and then you will find an owner who will insist on shifting into low at the same time that he pushes in the clutch pedal. As a result, he gets gear clashing. Aside from explaining the cause of this noise to the owner, there is something else you can do.

Change Transmission Lubricant — Changing to a heavier transmission lubricant will, in most cases, tend to reduce the possibility of clashing during shifting.

A light lubricant allows the “flywheel action” of the clutch to spin the main drive pinion and the countershaft gears for a few seconds after the clutch is disengaged. You’ll find that
SAE 80 gear lubricant is just enough heavier than the SAE 10-W engine oil so that it offers more resistance and slows the gears down a little quicker. So, if you find an owner who can’t change his driving habits, drain the SAE 10-W engine oil from the transmission and fill with SAE 80 gear lubricant. In most cases, you’ll find that this lubricant change will help slow the gears down to allow shifting.

**BRAKE SHOE ALIGNMENT**

Several methods have been used in an effort to reduce the possibility of brake noise. These changes affect cam pin height in one way or another, since cam pin height is the most important factor in controlling brake shoe alignment. Let’s review the effect of shoe alignment on brake operation, and then learn what changes have been made in the brake set-up.

**Correct Cam Pin Height**—Let’s look at a cam pin that is just the right height. Notice that the guide spring holds the web of the shoe against the end of the cam pin so that the cam pin acts as an aligning guide to keep the brake shoe square with the drum. This makes for even wear on the brake lining, and insures longer life of the lining.
Cam Pin Too Short—Now let’s look at a cam pin that is too short. Notice that the guide spring pushes on the web of the shoe, twisting the shoe until it rests on the end of the cam pin. This twisting of the shoe causes the shoe to be cocked. So, when the brake is applied, the outside edge of the shoe will contact the drum first. Of course, pressure on the shoe will eventually force the shoe flat against the drum, but this action moves the web of the brake shoe away from the cam pin so that the pin cannot act as a guide or support. This action tends to permit brake shoe vibration, resulting in noise.

Cam Pin Too Long—Now let’s have a look at a cam pin that is too long. Too long a cam pin tends to push the shoe out of alignment, against the action of the guide spring. This means that the inside of the brake shoe will contact the drum first when the brake is applied. This action also cocks the shoe and may be a cause of brake noise.
The first thing to do to correct a case of brake noise is to check the height of the cam pin. If it is too high, you'll have to file a little off the end. If the pin is too low, you may have to replace the support plate.

Suppose we review the methods used to eliminate brake noise. Most of us can save time and trouble if we know which parts are used in the different models, and the changes that have been made right up to the present production.

ANTI-SQUEAK WASHERS

In 1950, a rubber anti-squeak washer (Part #1327054) was made available to insulate the end of the cam pin from the web of the shoe on front brakes. This washer was used to eliminate a noise called a "pinch-out squeak," which occurs just before the car comes to a complete stop. Incidentally, this washer can be used for this purpose on models from 1946 up to 1950.
1951 PRODUCTION

Early in 1951, thicker support plates were introduced to give greater stability to the brakes. At the same time, plastic anti-squeak buttons (Part #1327047) were used in the ends of the cam pins on both front and rear brakes.

Later, a steel anti-squeak button (Part #1404973) was introduced for use in the cam pins of Plymouth and Dodge Wayfarer rear wheel brakes only. The steel buttons were used to overcome a howl which developed in the rear brakes of these models.

REAR BRAKE SUPPORT
A still later change was made in the rear brake support of the Plymouth and Dodge Wayfarer models only, to raise the cam pin boss and eliminate the need for cam pin buttons.

The new rear brake support (Part #1404983), found on the present production Plymouth and Dodge Wayfarer, can be readily identified by a raised circular section approximately 1/6-inch high and 3/8-inch in diameter. You'll find this raised section just below the guide spring attaching rivets.
CAUTION

Don’t try to put the plastic or the steel buttons in the cam pins of this new rear brake support plate. If you do, it’ll make the cam pins too high, and throw the shoes out of alignment.

Wire Brush Noise—Occasionally a combination of factors will result in a brake noise which we call “wire brush” noise. You are most apt to hear this noise as you are coming to a stop. This “wire brush” noise can be effectively eliminated by the use of a brake drum damper spring (Part #1142316). The brake drum damper spring is installed around the outside edge of the drum to help reduce any objectionable vibration in the brakes.

STOP LIGHT SWITCH INSTALLATION

There has been some discussion about whether it makes any difference how a stop light switch is connected into the circuit—whether the red wire is connected to one part or the other.
The latest information on this subject is that the red wire should be connected to the long terminal of the switch. This will prolong the life of the switch.

**REAR ENGINE MOUNT**

A noise that seems to be found mostly in Plymouth cars, and a noise that can easily be confused with upper control arm noise, loose front-end sheet metal, loose brake backing plate, loose rear wheel hub or some internal brake noise is one that is difficult to locate.

One of the clues that will help you locate this particular noise is the fact that it is most likely to occur during a quick stop. You’ll be quite apt to find it in the rear engine mounts, and it is caused by the flanged washer directly under the mount shifting in its hole in the frame crossmember. Here is what happens:

Clearance between the flanged part of the engine mount washer and the hole in the crossmember allows the washer to move back when the car is accelerated rapidly. Then, on a quick stop, the washer moves forward in the hole, causing the dull snapping sound.
To locate this noise, put the car on a lift. With a pry bar, shift the engine and mount backward in the frame member. Then, hold your finger on the edge of the flanged washer and shift the engine forward quickly with the bar. You will feel the "break-away" snap of the washer as it shifts forward. Test each rear mount separately, to see if the noise is present in both mounts.

To correct this noise, shim between the flanged washer and the hole in the frame member. To do this, remove both engine rear mount bolts and jack up one side of the engine with a jack placed just in front of the engine mount. As soon as you get all of the weight off the mount, you can move the flanged washer back and forth to check the amount of clearance.

**Making the Shim**—Cut several strips of five or six thousandths thick soft shim stock about one inch long and three-quarters of an inch wide. Make three cuts about five-eighths of an inch long in each strip. Bend the shim at right angles to the cut. The cut sections will allow the shim to conform
to the curvature of the hole in the crossmember. Now, lift the mount and washer up, and put the uncut part of the shim in place at the rear of the hole in the crossmember.

Add shims until the flanged washer is so tight in the hole that you can't seat the mount tight against the frame crossmember with hand pressure. Then lower the engine to seat the mount.

**NOTE:** The noise is most often located in the left mount. However, both mounts should be tested, and shimmed if necessary.
ORIFLOW SHOCK ABSORBERS

OPERATION

The Oriflow shock absorbers used on current models are a departure from the shock absorber we have had on past models. A number of questions have come up concerning replacement, and certain sound characteristics encountered with this shock.

Oriflow shocks, as you know, operate in an entirely different manner than previous ones. The Oriflow shock operates with low resistance when compressed slowly and offers high resistance when moved at high speeds. The action of the Oriflow shock is not governed by car speed, but rather by the severity and speed of the up-and-down wheel movement.

In order to give these good ride characteristics, the orifices, or passageways in the piston of the shock, have been reduced in size and used to control the flow of fluid from one side of the piston to the other. This reduction in size of the orifices causes an increase in the speed of the fluid as it passes from one side of the piston to the other.
Noise—Sometimes the speed of the fluid, as it passes through the orifice, is so great you can actually hear it. If this swishing sound is present, you'll probably notice it as you pass over an unusually rough spot in the road. You can explain to the owner just HOW this swishing noise is created and that it is a normal condition. There's nothing you can do to eliminate the noise, and it will never harm the shock absorber, or affect its operation.
Inspection and Test—You may notice, on inspecting an Orilflow shock absorber, that fluid appears to be leaking out of the shock. Usually this isn’t leakage, but surplus fluid that has remained on the piston rod during assembly, and has now worked down on to the lower tube. Sometimes you’ll find this lower tube covered with dirt and oil, but still working all right. Therefore, don’t jump to the conclusion that the shock absorber is defective.

In order for you to tell whether this is an actual leak, or merely surplus fluid, it will be necessary for you to test the shock. The only effective way of checking the Orilflow shock absorber is a road test. Drive the car over different types of road to compare it with other cars of the same model. If the shocks give you a uniformly good ride on all types of roads, you can be sure that the shock absorbers are operating correctly.

THAT'S ALL!
QUESTIONNAIRE

TEST YOURSELF
WITH THESE QUESTIONS:

1. Slow upshift in a car equipped with a hydraulically operated transmission is usually caused by some failure in the transmission itself.  RIGHT □  WRONG □

2. Throttle linkage should be oiled thoroughly with SAE 10-W engine oil.  RIGHT □  WRONG □

3. The "shuttling" noise, sometimes heard when coasting in neutral with a car equipped with a hydraulically operated transmission, is the back-and-forth movement of the direct-speed clutch sleeve.  RIGHT □  WRONG □

4. It is normal for the gears in the three-speed transmission to spin momentarily after the clutch is disengaged.  RIGHT □  WRONG □

5. Putting SAE 80 gear lubricant in the three-speed transmission will help to reduce gear spinning.  RIGHT □  WRONG □

6. You can identify the new rear brake support plates used on the Plymouth and the Dodge Wayfarer by circular raised sections located just below the guide spring attaching rivets.  RIGHT □  WRONG □

7. The anti-squeak buttons that fit into the end of the cam pin must not be used on the rear brakes of cars equipped with the new rear brake support plates.  RIGHT □  WRONG □

8. If the interrupter switch sticks in the closed position, the engine will stall.  RIGHT □  WRONG □

9. A ride test is the only sure way of testing performance of the Oriflow shock absorber.  RIGHT □  WRONG □

10. Rear engine mount noise can often be eliminated by placing a shim between the flanged washer and the hole in the frame member.  RIGHT □  WRONG □