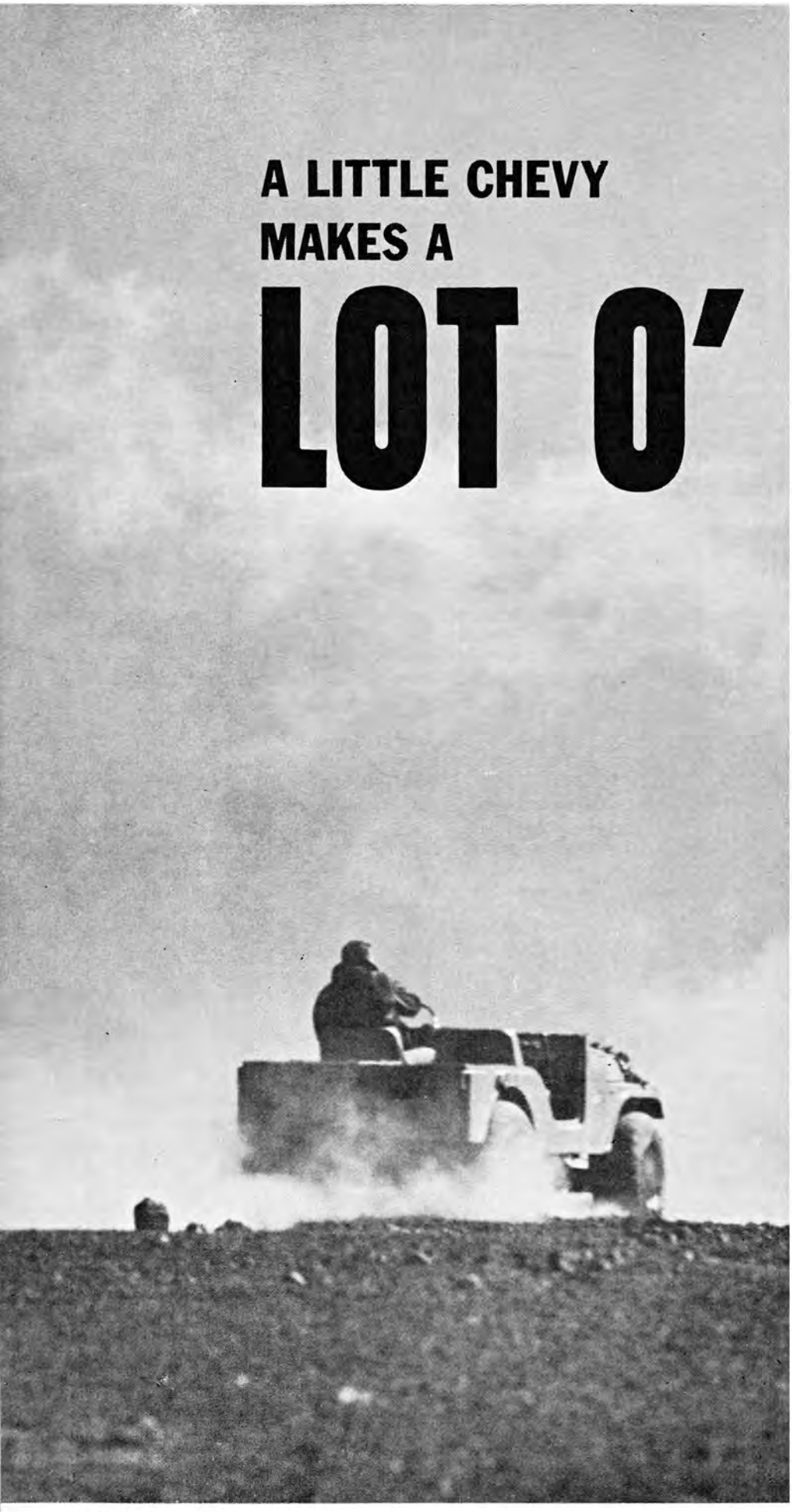
A LITTLE CHEVY MAKES A LOT O' JEEP

Here's a how-to-do-it with a wallop: 327-inch Chevy V8 to Jeep bolt-in

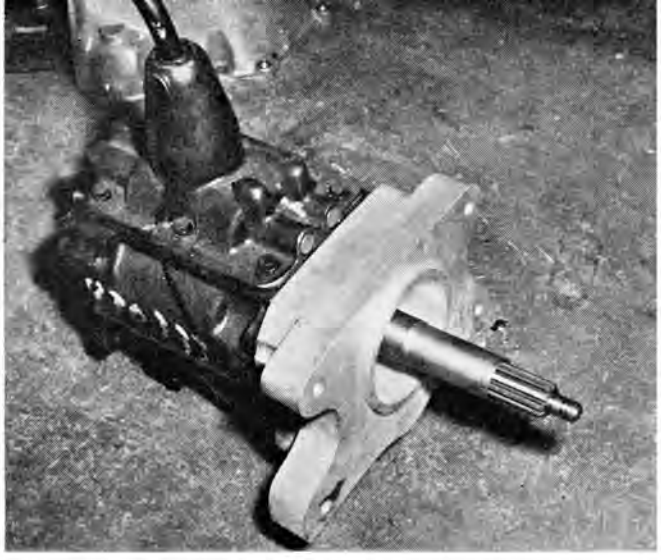
by Don Francisco

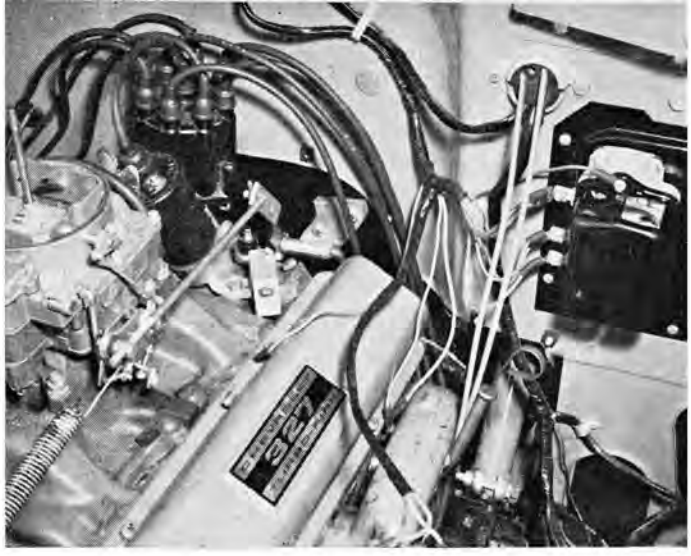


Since World War II, when photographs in newspapers and national magazines showed it flying through the air with all four wheels dangling and slogging through hub-deep mud, no one has devised a commercially available vehicle as efficient as the Jeep for driving over rough terrain. With its narrow body and tread, short wheelbase, high road clearance, four-wheel drive, low gear ratios, and rugged construction, the Jeep became a natural after the war for hunters, fishermen, and persons who just like to drive where ordinary cars can't go. Thousands of Jeeps have been sold as war surplus and in civilian versions, and a good percentage of these are still in daily use. Most of them still have their little four-banger engine but others have been modernized by the installation of an overhead valve V8.

Chances are the fellows who swapped engines in their Jeeps would still be running the four-bangers if they hadn't become increasingly bolder in the places they went and hadn't used their Jeeps to drive to the places where they started their off-highway trips. For some of their mountain climbing they needed more horsepower than the four-bangers could deliver and they definitely needed faster and more effortless highway cruising speeds. A V8 filled both these

Mauna Kea today—tomorrow the Moon! Powdered lava takes traction, traction takes horsepressure, the kind Pflueger got by dropping a Chevy V8 in a Jeep.

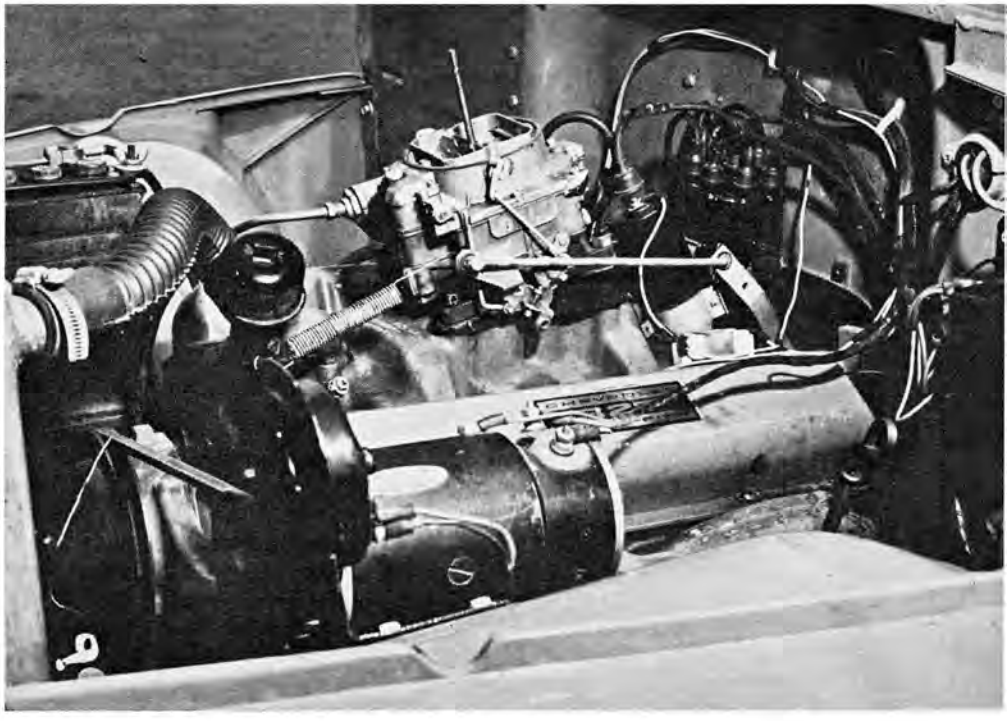




ABOVE – Six-cylinder Jeep gearbox, fitted with an aluminum adaptor plate and a reworked front bearing retainer made by Dale and Paul Auto Services, Colorado Springs, Colorado, is ready to bolt to a Chevrolet V8 bellhousing.

ABOVE RIGHT – Special bellcrank for throttle linkage bolted to Jeep's floorpan. Mounting the Chevy generator regulator on the left side of the firewall enabled stock wiring to be used.

RIGHT – With exception of the wedge under the carburetor, the finished installation of the 327 Chevy V8 in the Jeep looks like a factory job. Reason for the wedge was that without it the carburetor wouldn't deliver fuel to the engine's cylinders when the Jeep was on a steep grade. Only place in the engine compartment where clearance had to be provided for the engine was behind the ignition distributor's cap, and this was only a fraction of an inch.



requirements very nicely. Because of its small exterior dimensions, comparatively light weight, and excellent performance, the small Chevy V8's became favorites for these swaps. With the necessary equipment to adapt it to the Jeep transmission, a Chevy can be installed fairly simply.

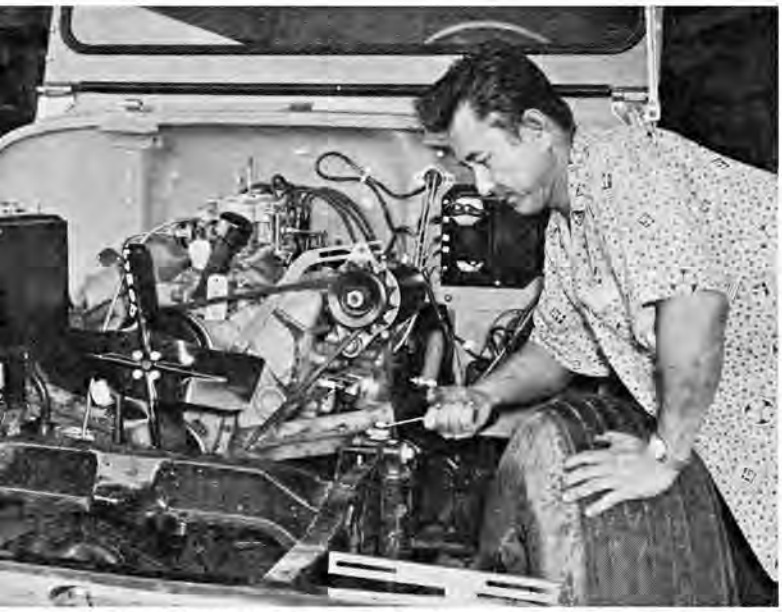
Jimmy Pflueger, who lives in Honolulu, Hawaii, wasn't interested in highway performance when he decided to install a 327 Chevy engine in his '63 Jeep. Once each year for the four previous years he had tried to drive a Jeep to the top of Mauna Kea, an extinct volcano on the island of Hawaii. Mauna Kea is 13,796 feet high. A road makes driving fairly easy to the 10,000-foot level, just above a camp maintained by the United States Forestry Service, but there is only a foot path from this point to the summit, 6½ miles away. On his last try Jimmy had driven to within a quarter of a mile of the summit, which was farther than anyone else had gone with a wheeled vehicle. Because of the altitude, the steepness of the last cinder cone that had to be climbed to reach the summit, and the cinder cone's soft surface, the Jeeps just hadn't been able to pull themselves to the top. Jimmy figured that with a little more horsepower he could do the job (*Mauna Kea Hillclimb,* April '63 HRM).

The installation was a bit of a hurry-up affair as only three days were alloted for it. By taking a little more time it possibly could have been done a little better. It was sort of a group project because involved in it at some point or other were Ray Brock, Jimmy Pflueger, Edward Kau, George Inamura, Freddy Matsushima and his brother George, Dyke Kagihara, and I.

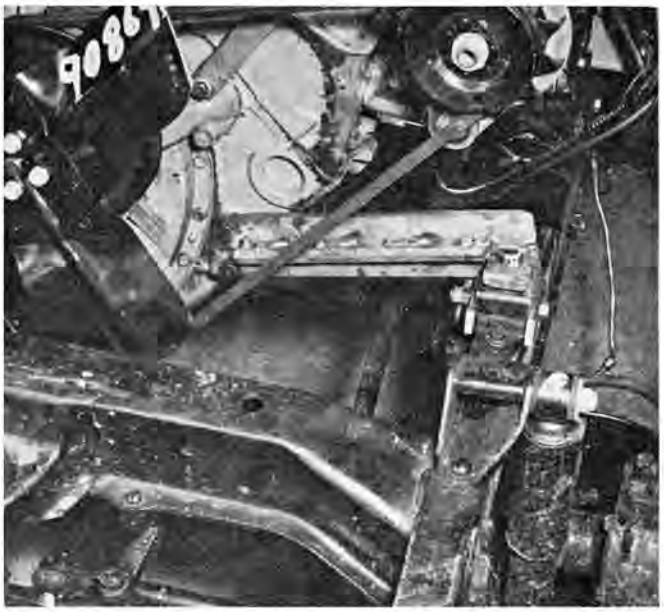
The job was started at the Von Hamm-Young Jeep agency in Honolulu, where the stock engine was pulled out of the chassis and the Chevy bolted to the transmission, then the car was towed to Freddy's Motor Works where front motormounts were made and other heavy work done, and then to George Inamura's Kapiolani Service, a Union Oil station, for the final work.

Before leaving the mainland Ray Brock had arranged for Dale and Paul Auto Services, in Colorado Springs, Colorado, to ship the necessary engine-to-transmission adaptor equipment, which they manufacture, to Hawaii. This equipment included an aluminum adaptor to fill the gap between the Chevy bellhousing and the Jeep transmission, a front bearing retainer for the transmission with the correct diameter to support a Chevy clutch throw-

continued on following page



Freddy Matsushima, of Freddy's Motor Works in Honolulu, built the front motormount brackets for the Chevy and did cutting and welding necessary for the installation. Freddy's shop is one of few in Hawaii where this sort of work is done.



Motormount brackets were cut from ¼-inch flat stock and bolted to the engine. Their outer ends rested on Jeep motormount insulators bolted to the top of the frame rails. Left insulator was fitted with a clamp to stop lateral movement.

CHEVY MAKES A LOT O' JEEP continued

out bearing, and a pilot bearing for the Chevy crankshaft that would support the Jeep transmission's clutch shaft. With these were a special bellcrank assembly for the throttle linkage, some clutch linkage parts, and some U-fab front motormount supports. Not with the parts when the time came for the installation were an instruction sheet and some photographs that showed various details of the job.

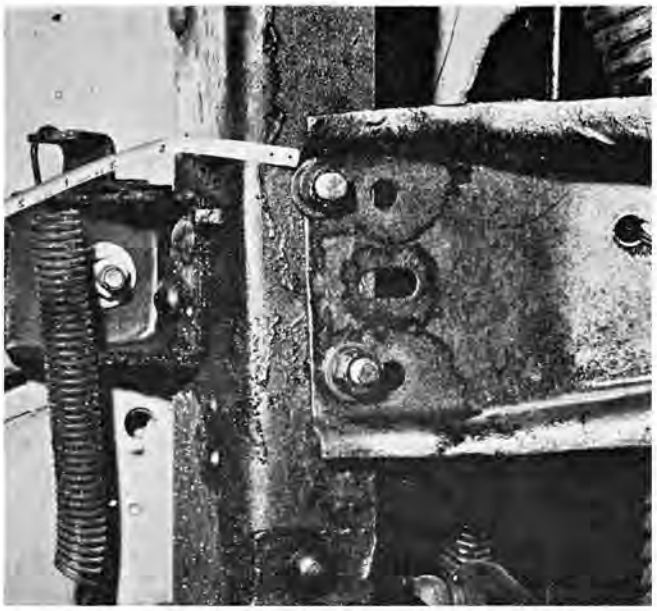
The Chevy pilot bushing was replaced with the special bushing without any difficulty but when the engine, adaptor, and transmission were bolted together we found that the adaptor was too thick for the Jeep transmission's clutch shaft length and the clutch shaft's splined portion was too small for the opening in the Chevy clutch disc. After examining different clutch shafts that matched the Chevy disc and were the correct length (but had a different gear and bearing diameter than a shaft that was supposed to be the same as the one in the transmission) another transmission with the correct shaft was found in Von Hamm-Young's parts department. The number of this transmission was 93033. It was a three-speed, the same as the one in the Jeep, but it was for a six-cylinder Jeep station wagon. It replaced the original transmission without any modifications and the adaptor and Chevy bellhousing bolted to it perfectly. However, before the Chevy could be positioned in the frame, the battery box, which was welded to the right frame rail, had to be removed. This was done with a cutting torch.

Because of interference between the pad at the left rear of the Chevy block for the full-flow oil filter and the pitman arm on the Jeep's steering gear, the engine couldn't be centered in the frame. The center of the crankshaft's nose was finally placed about 1¼-inch to the right of the frame's longitudinal center line and the rear crossmember was moved to the right approximately ¾-inch. New holes were drilled through the crossmember's right end to match the holes in the frame's lower flange. One new hole was drilled through the crossmember's left end to match one of the holes in the frame and another hole was drilled through both the crossmember and the frame. The crossmember was bolted to the frame with the original bolts and nuts.

The U-fab plates that were to be welded together to form motormount brackets for the engine's front end were designed for standard Chevy motormount insulators. But because the brackets were designed to be welded to the frame rails and we thought the clearance between them and the front axle housing might not be adequate for the rough going up the mountain, they weren't used. We didn't want to weld anything like motormount brackets to the frame because after the Jeep went up the mountain its original engine might have to be replaced.

A Corvette front motormount bracket, which bolts to the face of the block in the water pump area and extends out from the engine's sides, would have made a good mounting means but one of them couldn't be found. The bracket would have needed modifying on its outer ends but this wouldn't have been difficult. As a second choice, we removed the standard front brackets from the engine and replaced them with a pair of arms cut from ¼-inch thick flat steel and long enough to extend from the block to points above the top of the frame rails on each side of the engine. Because of the engine's position, the engine ends of the arms were a little lower than the frame ends. The inner end of each arm was bolted to the block with the two cap screws used for the original bracket. The arms' outer ends were fitted with pads, welded in place, and a stiffening rib was welded to each arm's forward side. The pads rested on a pair of standard Jeep motormount insulators that were secured to the top of the frame by drilling through the frame's upper flange and threading the openings. Bolts and nuts would have been used here if the portions of the frame involved hadn't been boxed.

Jeep motormount insulators consist of two U-shaped steel members separated by a thick layer of resilient rubber. Their design is such that their top member will move in relation to their lower member in the direction parallel with the center line through the open sides of the U's. Movement of the members in relation to each other in the direction perpendicular to the center line is practically nil. We made the mistake of mounting both insulators on the frame, merely because they fit this way, so their direction of movement was perpendicular to the frame rails. When the engine brackets were secured to them, the front end of the engine



Rear motormount crossmember was moved to right and pivoted slightly to move the oil filter flange on the left rear of the cylinder block away from steering linkage. New holes were drilled in crossmember and frame for mounting bolts.

The distance between the bolts that secure the rear motormount crossmember's right end to the frame and their original holes shows how much the member was moved (about ¾ inch) to provide clearance for the new engine.

could be moved from side to side what seemed to be a considerable distance. This made the motormount installation entirely too flexible.

We could have eliminated the front motormount movement quite easily by welding a pad to the frame under one of the insulators and rotating the insulator 90 degrees. This would have been a good arrangement as one insulator would then restrict fore and aft movement and the other would restrict side movement. However, because we didn't have a lot of time and from all indications the engine installation was to be temporary, we made a quick clamp from two lengths of ¼-inch thick strap iron 1¼-inch wide and a 5/16-inch bolt of suitable length and secured it to the left insulator by placing one of the straps on each of the insulator's sides and pulling them together with the bolt. This restricted some of the insulator's up and down movement, which is its normal action, but eliminated all side movement.

The front motormount arrangement provided maximum clearance between the motormount assembly and the car's front axle housing and would have been entirely satisfactory for normal driving. But, unfortunately, the rough use the Jeep got in the rock fields on the side of Mauna Kea caused its front end to bounce up and down so much that the inertia forces created in the engine assembly when the front end came down caused each of the brackets bolted to the front of the engine to pivot on one of its cap screws and shear the other cap screw. This allowed the engine's front end to drop down. The brackets worked o.k. after new cap screws were installed but a fellow using brackets of this type would be wise to connect them in some manner, possibly with a large U-shaped piece of flat steel that would pass under the crankshaft's snout and be securely welded to them. Such a member would combine both brackets into a single member. This would prevent cap screw shearing.

The only point of interference between the Chevy and the Jeep's engine compartment sheet metal was between the distributor's cap and the firewall. The cap didn't actually hit the firewall but it was so close that it would have if the engine had moved back a fraction of an inch on its mounts. Ample clearance was gained by placing one end of a two-by-four about six feet long against the firewall in the area directly behind the distributor and hitting its other end a couple of solid blows with a sledge hammer. Not what you might call meticulous body work but effective.

There was a clearance problem between the engine's full-flow oil filter and the steering linkage. The filter's housing extended down from the engine in the way of the steering linkage pitman arm and the drag link assembly. Our solution to this was to eliminate the filter and replace its housing with one of the by-pass plates the factory installs on engines that aren't equipped with a filter as standard equipment. This wouldn't be recommended for a permanent engine installation because a full-flow filter can lengthen engine life considerably. The thing to do would be to mount a full-flow filter at some point in the engine compartment and connect it to an adaptor plate on the engine with suitable hoses. Filters and adaptor plates for installations of this type are available.

There weren't any problems with the clutch assembly and its release linkage as they consisted of standard Chevy parts. However, the Jeep's clutch release shaft was reworked to actuate the throwout bearing's arm. This involved welding a new lever to the shaft in correct alignment with the opening in the arm's end and making a rod to connect the lever and the arm. Also, because the rear end of the engine and transmission had been moved to the right about ¾-inch, a spacer ¾-inch thick was fitted between the frame and the flange on the shaft's end.

The Jeep radiator, which was supported by a flange on the rear face of a shroud that was part of the Jeep's grille assembly, couldn't be used in its stock location because it would have interfered with the front end of the engine. It couldn't have been used even without the shroud because it would have had to be mounted directly above the frame's front crossmember and this would have raised it so high that the hood wouldn't have closed. We weren't hot about using the Jeep radiator anyway because it didn't appear to have enough capacity to cool the Chevy.

continued on following page

The radiator was built by Dyke Kagihara, left, who runs a radiator repair shop in Honolulu. As the radiator cooled the Chevy without any problems, Dyke had reason to be proud of his work. With the exception of the steering gear and its linkage, shown at right, a Jeep engine compartment has enough room for almost any automobile-type V8. Because of the way it is mounted, the steering gear is difficult to move. For the Chevy installation the engine was moved instead and the oil filter left off.

CHEVY MAKES A LOT O' JEEP continued

Dyke Kagihara, who has a radiator shop in Honolulu, made a new cross-flow radiator that could be mounted on top of the crossmember and allow the hood to close and that was as wide as restrictions in the engine compartment allowed it to be. The radiator was 2½ inches thick. Suitable fittings were provided in its tanks to match the fittings on the engine and it was connected to the engine with flexible hoses. It proved to be entirely satisfactory.

To provide clearance for the radiator, the shroud on the rear of the grille assembly was shortened by removing a section approximately 5 inches wide from its rear end. The cut was made in line with the rear end of the reinforcing member on the shroud's lower side. Brackets soldered to the radiator's tanks supported it on the frame and a flange soldered to its upper surface was secured to the top of the shroud with sheet metal screws.

The engine didn't have a fan but we found one with four blades in Von Hamm's parts department that had a hub pattern that matched the flange on the Chevy's water pump. The fan bolted to the pump without any trouble but its blades were too long. Because of the Chevy engine's length, the blades would have hit the front crossmember as the fan rotated. This was corrected by shortening each blade one inch. Care was taken during the shortening to be sure the same amount of material was removed from the tip of each blade to preserve the fan's original balance.

The throttle lever bellcrank included in the installation parts was bolted to the firewall so one of its levers could be connected to the rod from the accelerator pedal and its other lever would be in line with the carburetor's throttle arm. A rod was made to connect the carburetor to the bellcrank.

The Jeep's standard ¼-inch fuel line was removed and its opening in the bottom of the fuel tank plugged. The line would probably have been large enough for the way the engine was to be run but to be on the safe side a larger one was installed. This consisted of a length of 5/16-inch inside diameter Aeroquip neoprene hose long enough to connect a fitting screwed into the drain fitting in the bottom of the fuel tank with a suitable fitting screwed into the fuel pump. Aeroquip swivel-type fittings that are installed by merely slipping the hose over them were used in both the hose's ends. The hose was secured to the body and frame at several points with Adel clamps.

As the Jeep wasn't to be driven on city streets, there wasn't any use worring about a quiet exhaust system. Also, there was some concern about mufflers being damaged or knocked off by the big rocks that would have to be climbed and bounced over on the trip up the mountain. A length of flexible steel exhaust tubing, with a flange that matched the flange on the standard exhaust manifold brazed to one of its ends and long enough to reach the rear end of the Jeep's body, was bolted to each manifold. Strangely enough, with this setup the exhaust was almost as quiet as if the exhaust system had been fitted with mufflers.

The battery box's brackets were shortened to lower the box so it would clear the engine and rewelded to the frame to place the box in approximately the same fore and aft position it occupied before. The Jeep's battery ground cable was connected to the engine and the other cable was connected to the battery post on the Chevy's starting motor solenoid. The solenoid actuating wire from the ignition switch was lengthened to reach the Chevy solenoid. Another wire was made to connect the solenoid's ignition coil terminal with the coil side of the coil's resistor. The purpose of this wire is to conduct battery voltage from the solenoid to the coil when the starting motor is cranking the engine. By-passing the resistor in this manner increases the voltage in the coil's primary circuit and improves engine starting. The ignition circuit was completed by connecting the wire from the ignition switch to the battery side of the resistor.

The Chevy water temperature transmitter was replaced with the one from the Jeep so the transmitter would match the gage in the instrument panel. The standard wire from the gage was lengthened to reach the more forward position of the transmitter in the Chevy

intake manifold. As both the Jeep and Chevrolets use indicator lights rather than gages for oil pressure indications, the wire from the Jeep's indicator light was connected to the standard Chevy unit.

The Jeep's generator regulator was removed and one that matched the Chevy generator was secured to the firewall above and to the right of the steering gear column with sheet metal screws. With the regulator in this location, the Jeep's generator and regulator wires were long enough to reach it and the generator.

After returning to Los Angeles we called Dale Brinkmeir of Dale and Paul's Auto Services to get the straight story on the transmission clutch shaft trouble we had had. He said that what we should have done was install a shaft made for a '55 through '63 "Four-by-Four" 6-cylinder Jeep station wagon in the original transmission. This shaft is interchangeable with the one in the transmission but is longer and larger in diameter. He changes the shaft without pulling the transmission out of the Jeep. First, he removes the front bearing retainer and then the lock ring that holds the bearing on the shaft and pulls the bearing off the shaft. Then he loosens the cap screws that secure the transfer case to the rear of the transmission housing and pries the top of the case away from the housing to lift the front end of the mainshaft and the clutch shaft. This allows the clutch shaft to be pulled out of the transmission. The new shaft is installed by reversing the procedure.

To provide oil filter clearance, the steering gear pitman arm is heated and bent to move the drag link away from the engine. Bending a pitman arm is risky business unless the job is done by someone who understands metal and its limitations, and even then I don't recommend it. If done incorrectly the arm may be weakened to the point where it will break during normal use. This could cause a serious accident.

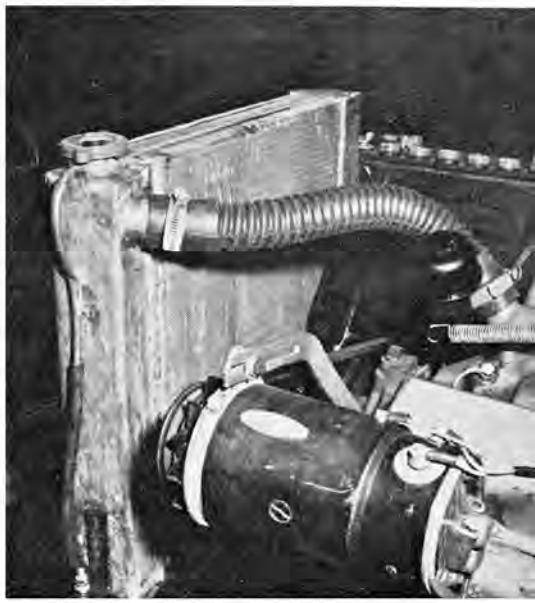
A 1949 Chrysler New Yorker straight-eight radiator core that has been shortened 4½ inches is used. This core has a large number of fins per inch and does a good cooling job. It is placed as far forward as possible, almost against the headlights, after the complete shroud has been removed from the grille. This location gives ½-inch clearance between the radiator and the fan, which so far has been enough. Dale and Paul use a four-blade fan but some fellows use a five-blade type made for an air-conditioned Chevy or Cad.

The Chevy engine changed Pflueger's Jeep from not-too-much to quite-a-bit. It ran more like an automobile than the chug-chug it had been before. But when Pflueger tried it on a steep hill, he found that the engine would stop running as soon as the Jeep assumed the hill's angle. What proved to be happening was that the floats for the Carter four-throat carburetor's primary throats were raising the fuel control needle and stopping the flow of fuel into the bowl when there wasn't enough fuel in the bowl to run the engine. The simplest solution to this seemed to be to tip the carburetor forward so it would be near its normal operating position when the Jeep was on such hills. This was done by installing a wedge between the carburetor and the intake manifold. The wedge used was borrowed from the Chevy engine in a ski boat. It had an angle of approximately 12 degrees. With it in place, the engine ran well on both the level and on steep hills. A standard oil bath air cleaner was used on the carburetor.

Friday, December 28, the Jeep was taken up Mauna Kea for a trial ride. Before leaving the camp at the 9,200-foot level the standard jets in its carburetor were replaced with some that had considerably smaller orifices to lean the air-fuel mixture delivered by the carburetor. Jets rather than metering rods were changed because rods that would make the mixture lean enough weren't available.

The 6½-mile ride from the base camp to the last cinder cone, which was the last obstacle between the Jeep and the summit, took about two hours because of the extremely rough terrain. After making a few futile dashes up the cone that got the Jeep within about 100 yards of the top, we returned to the base camp to wait for the official try the following day. The Jeep performed perfectly during both the ascent and descent and the Chevy had ample power at the 13,000-plus elevation.

Saturday morning, bright and early, we started up the mountain again... but that's the story you read in last month's HRM.



TOP – After removing standard pilot bushing from the Chevy's crank, the special bushing for the Jeep transmission, which was supplied with the adator equipment, was driven into place.

CENTER – Because Chevy engine was longer than Jeep engine the only place for radiator was over frame's front crossmember. This created clearance problems between radiator and hood that were solved with special radiator.

BOTTOM – Radiator was supported by brackets soldered to its tanks. The battery support was lowered to provide engine clearance and rewelded to the frame close to its original position.