

Cycle

SEPTEMBER 1969 • 50 CENTS

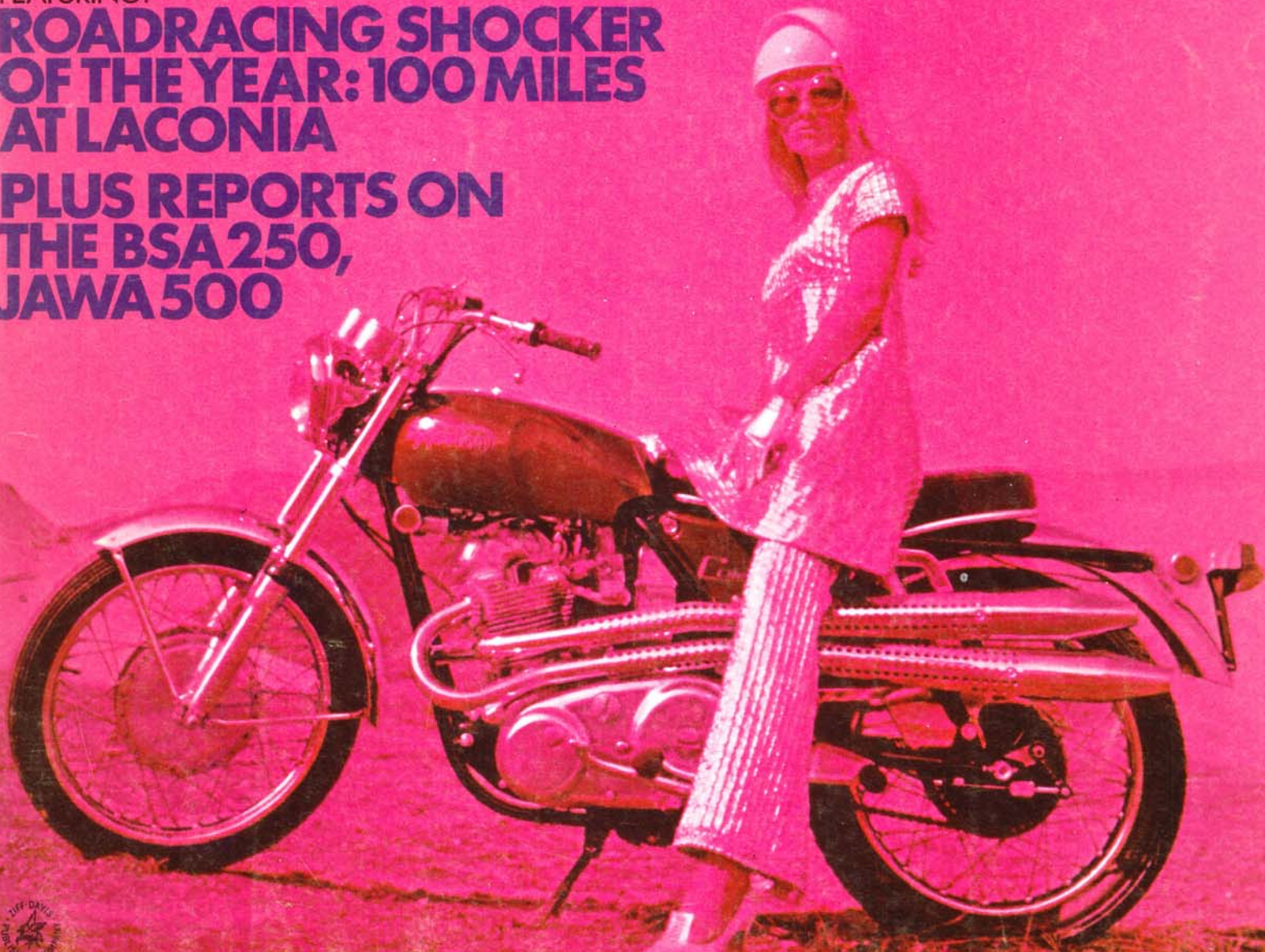
TESTING:

NORTON 750 COMMANDO'S' SUPER BIKE

FEATURING:

ROADRACING SHOCKER
OF THE YEAR: 100 MILES
AT LACONIA

PLUS REPORTS ON
THE BSA 250,
JAWA 500



CYCLE ROAD TEST

Norton 750cc Commando S

For the high-performance street-sport rider,
here's a slenderized, stylized, high-pipe version of Norton's
famous 58 bhp Commando—complete with "floating drive."



PHOTOGRAPHY: HERMANN BACHMANN

● Last season Norton's Commando was just about the only interesting new bike in the big bore, snort, grunt and sprint category. It was a real intimidator, with a 750cc engine and a performance capability that included quarter-mile times in the 13-second bracket. It was big and it was fast, and those things alone would have made it interesting.

But the Commando had more than speed and size: it offered, in addition, an ingenious frame and engine-mounting package conceived around the sensible but often ignored notion that big-bike riders don't want to pay for big performance with big amounts of vibration. No matter how sweet it is to have a bike with lots of lunge, sooner or later you have to settle down to a nice, steady cruise, and nobody wants to find that this cruising speed brings on the familiar, hated buzzing of handlebar grips, foot pegs, etc..

Norton found an answer, and applied it in the Commando, their new fiberglass-paneled successor to the famous Atlas. In the Commando, they have suspended the engine and gearbox in large-diameter rubber bushings. It was revolutionary, and it worked. The bushings stopped the transmitting of engine vibration to the motorcycle (and its rider) and made the Commando not only fast, but smoother than smooth.

That was last year, the last season before the arrival of the BSA, Triumph, Kawasaki and Honda multis. These bikes solved the vibration problem by adding cylinders (which reduces the shaking at its source—the engine) and have completely transformed the big bike scene. And Norton's Commando couldn't care less. In an almost arrogant assertion that it had won the game before the other players arrived, the Commando made its appearance

this year in very near original form. There is a high-pipe version Norton has named the "Commando S", but they must feel that the basic machine, which was the first modern Superbike, is adequate to meet the multi's challenge. They are probably right, for if a bike gives you performance and smoothness, it matters little how it is acquired.

No one at Norton has said what the significance of "S" in the designation Commando S might be, but it probably stands for Sport. Not that you can fault the standard Commando for sportiness in how it behaves, but it is somewhat low key in its looks, what with conservative dark green paint and all. The S, by contrast, is all polished aluminum alloy, glittering chrome, and brilliant metal-flake-red paint. It's a dazzler.

Besides flashier paint and upswept pipes, the Commando S (as compared to the straight

If you have doubts about handling from a cush mounted swingarm, forget them. The Commando S feels light, tracks superbly, and corners with precision.



Commando) has a smaller fuel tank, more slender fenders, less paneling and ungaitered fork tubes in the naked-leg Real Racer tradition. Its engine, in "stage one" tune, is identical to those in other Commandos except for a few detail improvements that are to be incorporated in all models.

Most of the improvements only a longtime rider of Nortons would notice. Like the tachometer drive, which has for years been mounted outside the timing case cover, and always got knocked off when you dropped the bike. This item has been moved around to the inboard side of the timing chest and is safely out of harm's way. Now, in the same space at the end of the camshaft, you will find the ignition's contact points, which are in a recess covered by a stout metal plate. These points were previously around behind the cylinders in a small canister. They are much more accessible in their new location.

None of the changes have affected power output. They do make the engine a bit cleaner (albeit left with a superfluous bulge on the timing chest) and easier to service. The styling revisions won't make the bike go any faster either, but they add a kind of *pizzaz* we found appealing. They remind us of the old red and black Atlas, which was once the fastest thing on the road and was, in addition, always a mean-looking motorcycle.

But don't let anyone tell you that the Atlas was a better motorcycle than the Commando. It was a lot heavier, and not nearly as smooth because it didn't have Norton's new, patented engine-isolation system. We'll give you the details, because they are interesting, but the most important thing to be said about the system is that it works, and works very well. At any engine speed above 2000 rpm, we didn't get *any* engine-induced shaking through the frame. You would think from rid-

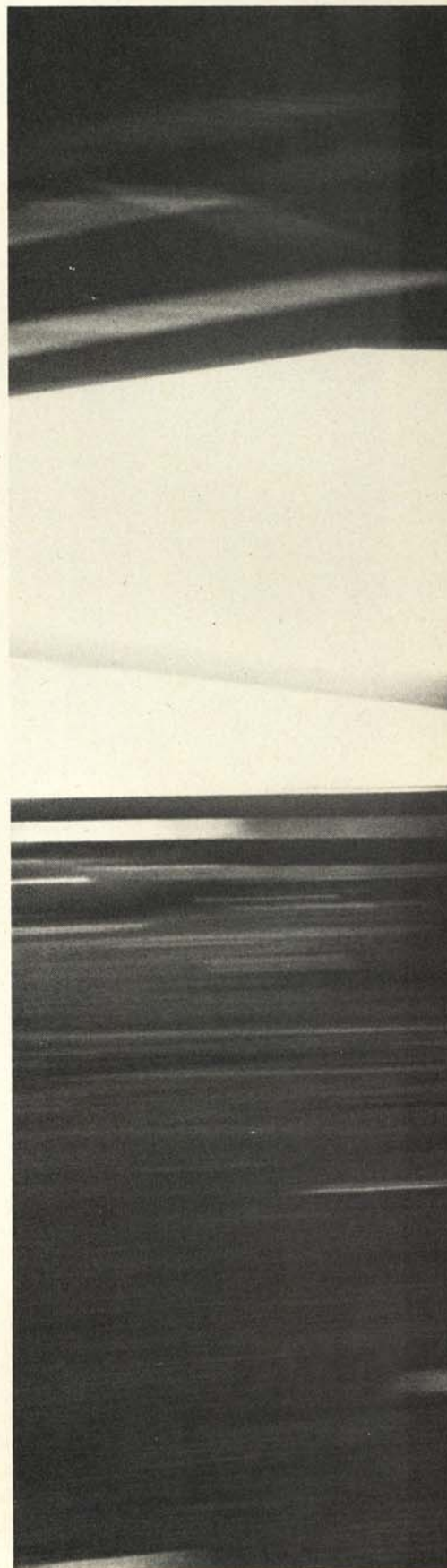
ing the bike that the engine didn't vibrate—and in so thinking you would be wrong. The Commando's engine began life as a long-stroke 500, and a series of slight increases in bore (and considerable increases in stroke) have brought it to its present 73mm x 89mm dimensions. As in all British vertical twins, the Norton's crankpins fly around in formation and the pistons whiz up and down together, which provides for evenly spaced firing impulses, but leaves the engine in a bad state for primary balance. And in the Norton, friends, those pistons are making three and a half inches at every pass through their cylinders. The engine shakes; it would require repealing a few physical laws to make it otherwise.

The shaking is there, but it is stopped before it can get very far, and what is used to stop the vibration is so simple it is hard to imagine why someone has not done it before. As you may know, the Norton has its transmission separate from the engine, and the two are tied together by a pair of plates in the old Atlas. In the Commando, the transmission is bolted into an encircling cradle, and the cradle is bolted very solidly against the back of the engine's crankcase. Another smaller cradle is bolted to the front of the engine, and this one carries only a short, large-diameter tube. Look carefully, and you will see a similar tube at the upper, rearmost corner of the gearbox cradle. These two tubes provide the only connection between the engine and the frame, and they are stuffed full of rubber bushings, spacers and shim washers. Before vibration can get to the frame, it must travel across those rubber bushings—and it can't.

There is another big crosstube in the back of the gearbox cradle, and this contains the rear-suspension's swing-arm pivot. That's right, the rear suspension is hinged on the engine/gearbox assembly so that it, too, is isolated from the frame.

Give any experienced road racer just that much information, and he'll either turn ghastly pale or fall to the ground, howling and cackling with laughter. In the bad old days there were several bikes around that had swing-arms more or less flexibly mounted not by intent. It was just faulty understanding of structure. Handling, in such cases, was abominable.

To get good handling, you must have wheels that remain in alignment; a swing-arm wiggling back and forth did terrible things to the way a bike tracked around corners. Like we have said, this was a matter of bad design, and was done inadvertently; Norton provided the flexibility by intent, and were careful that all of the flexing occurred in a plane that would not upset handling. Those rubber bushings we talked about have a great deal of "give" in a fore and aft, or vertical plane. Shim washers are used to hold the sideplay to no more than .010 of an inch. The engine and swing-arm,





The Commando's long-stroke twin engine descends directly from the Atlas: it is and always was a real torquer. Now a twin-leading-shoe brake adds stopping power.

can move—but only in a plane that can't influence handling.

While on this subject, we should mention that there have been conflicting reports about the Commando's handling. Some have found it delightful; others have compared it with the old Atlas' handling in most unfavorable terms. Those who have been critical of the Commando have attributed it to the rubber engine/gearbox/swing-arm mounting. No doubt they are right, for if the mounts have any perceptible sideplay, the handling suffers. Excessive side clearance in some machines would account for the adverse opinions. We just want everyone to know that this point is critical, and the Commando owner who notes any instability in his machine should check the clearance. No mention of this is made in the owners' manual; details are to be found in the workshop manual.

With or without the "floating drive", the Commando's frame would rate special discussion. It is a very simple design layout, with a large-diameter "backbone" tube extending back from the steering head to a point under the seat, where it ends in a crosstube to which the rear shocks are connected. A pair of support tubes sweep down from the steering head, level off under the engine/gearbox assembly, and then sweep back up and terminate at the upper shock-mounting points. The structure is completed by a pair of diagonal tubes that extend down from the middle of the backbone to a point just above the gearbox, where loads from the rearmost engine/gearbox/swingarm mounting are fed into the frame. It all looks too simple to be effective, but it isn't. In fact, it is a far more rational structure than the old "Manx" frame that

gave Norton a reputation for fine handling: at least as rigid—and much, much lighter. To be exact, the Commando's frame is 28 pounds lighter than the "featherbed" frame that held the Atlas together.

Even though the basic powerplant and gearbox haven't been changed much from Norton's Atlas, the system used for getting the drive from one to the other is vastly better. With the previous single-row primary chain, fairly frequent adjustments and replacements were required, and the old clutch inclined to slip when you wanted it to hold and drag when it should have been disengaged. All that has been changed. The drive now travels down a triple chain and into a clutch that is the best we have seen in many moons. This clutch is conventional to the extent that it has multiple, alternate plain and friction material faced plates. It is unconventional in having fewer, thicker plates and a diaphragm spring to provide the pressure. The thick plates do not have that slight warp one always finds in their thinner counterparts, and that gives the clutch a very "solid" feel. The diaphragm spring, like all of its kind, has an "overcenter" action that provides a lot of pressure on the plates when the clutch is engaged, but becomes weaker as you squeeze in the clutch lever. The total result is a clutch that is wonderfully light yet positive, and not likely to slip once fully engaged. We aren't alone in thinking that it is an especially good clutch: Helmut Fath chose to use the same clutch in his 78 bhp URS four.

This new clutch and primary drive are housed in a new cast aluminum case, which is a big improvement over the old pressed steel one. The gear change mechanism has changed

for the better (perhaps we should say, redesigned for there wasn't much wrong with how the Norton's gearbox worked before).

The Commando's engine, more than somewhat long of stroke, does not rev as freely as it might if its bore/stroke dimensions were reversed. However, it does deliver the power—about 58 bhp—and that is really all that matters. The power peak is a 6500 rpm, and the bike we had for testing began to feel strained above 7000. But then, that gives you almost 100 mph in third gear, so you need not feel shortchanged.

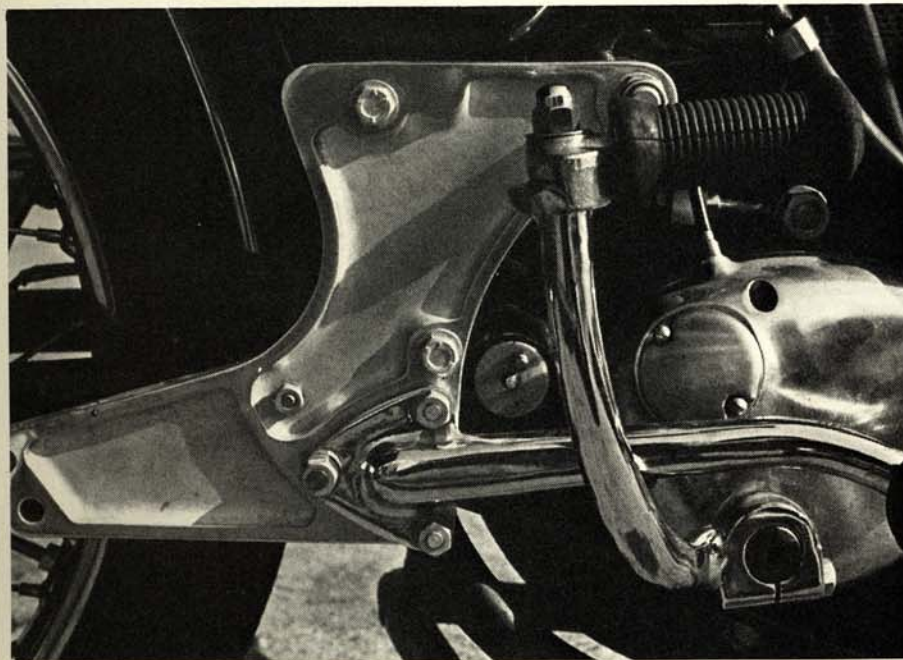
If the Commando's rev range does not extend very far, it at least allows you to use what it has without shaking your fillings loose. The engine sits down there, joggling quietly by itself, while you perch above it, largely unaware of its trembling unless you look around the tank to see what it is doing. Idling at perhaps 1000-1200 rpm, the engine is below the frequency range at which the rubber cushions are absolutely effective, so you can feel a few tremors coming up through the frame. Take your hands off the bars and they will quiver slightly, as do the forks—but you only notice this because of the contrasting utter smoothness above 1800 rpm.

But idling and watching the handlebars move are just not where it's at. Pull in the clutch, snick the gearbox into first cog, ease the lever forward and wind on throttle. Right then you will discover where the Commando lives. You could get pitcher's elbow from the way it snaps your arms straight, but the only thing you get from the engine besides that mad surge forward is a slight tremble from the right footpeg. The Commando loves to sprint—and it is as polite about the whole thing as an Edwardian butler. (And as appealing, to those with a taste for the luxurious.)

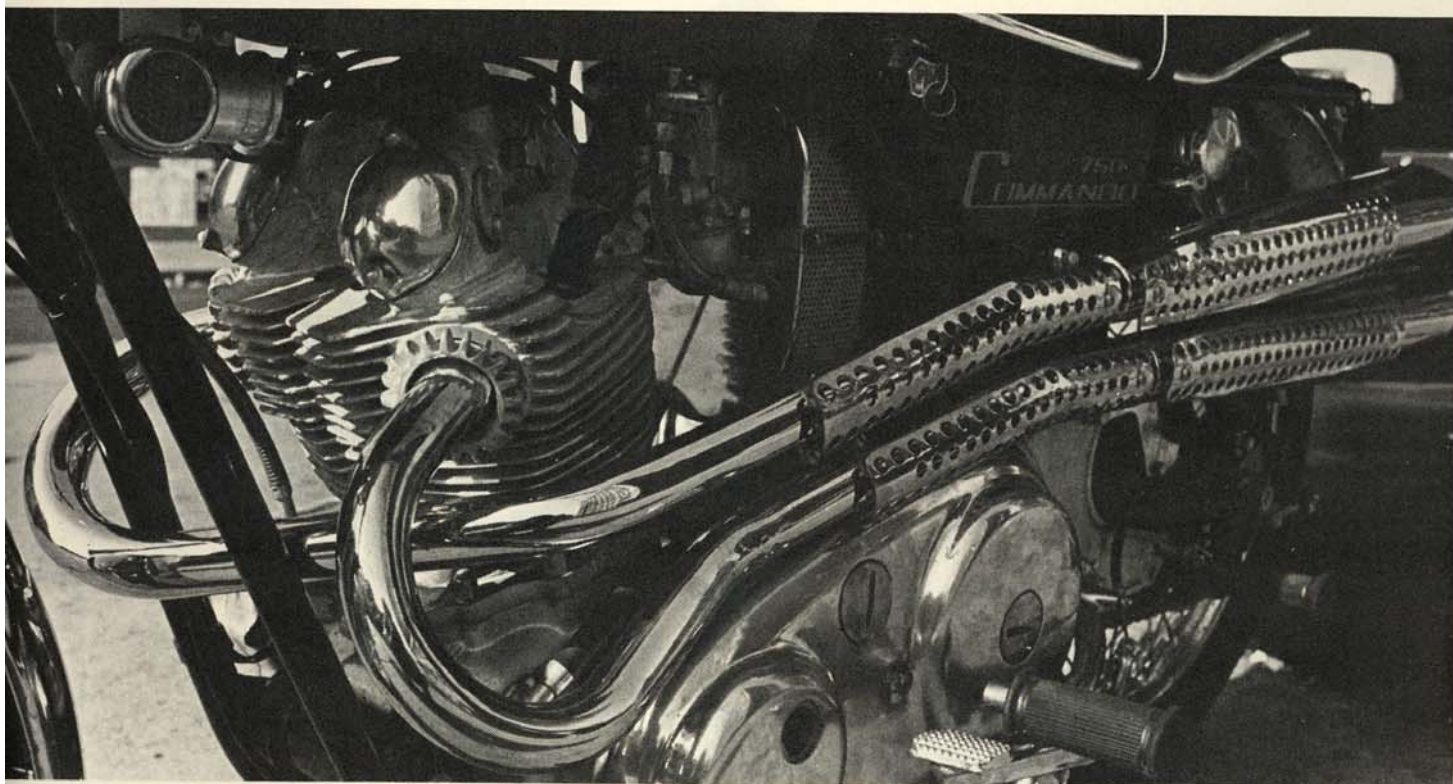
A big luxury, in a curious way, is the necessity for riding by the tach. You don't have to do that with any other big twin: when the vibration begins to make your ribs rub together, it's time to change up a notch. Not a big problem out on the open road, but in traffic you find yourself running up and down through the gears just to keep the engine out of its resonant phases. And to give you the thrust you need for openings in traffic.

None of this applies to the Commando. You just leave the thing in second or third and do everything with the throttle. You have to keep an eye on the tach to make sure the revs don't go completely out of sight, but at anything between 2500 and 6500 rpm you get all the acceleration you can comfortably use, and you can hold a steady speed anywhere between without giving yourself a vibromassage.

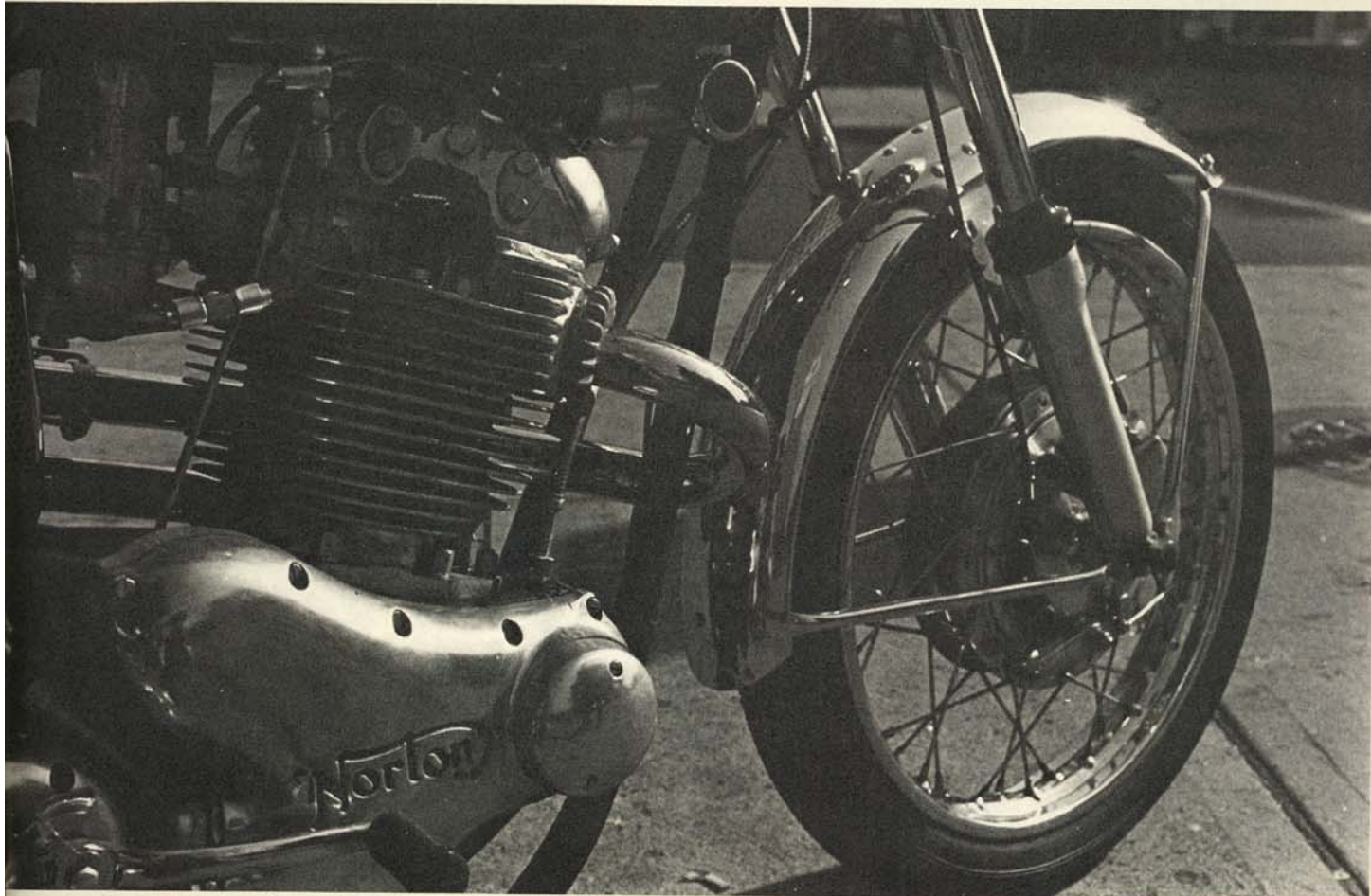
If one applies racing standards to the Commando, it must be said that the handling falls just short of perfect. There's a touch of fuzziness in the way it tracks around turns when



Massive alloy casting mounts footpegs to backbone type frame, also serves as heat-sink for diode.



High pipes on Commando "S" model curve up and tuck neatly out of the way. Engine-gearbox-swingarm unit is astonishingly smooth above 2000 rpm.



Breaker-point assembly on the new "S" model is now easily accessible on timing case. Tachometer drive has been moved inboard and out of the way.

**A big motorcycle is often fast but not quick.
 Watch the Commando S rap out a quarter-mile in 13.1 sec
 with 102 mph at the traps—a real sprinter!**

you are working it hard. As compared to the best racing bikes it has this one flaw, but the Commando stands well above all other touring or road-sport motorcycles in every other regard. The others have at least as much flexing at the swing-arm, and they lack the Commando's rigid handlebar mounting. Rubber handlebar mounts and big, squishy grips may be necessary to keep vibration away from your hands; they don't do a thing for precision in handling. The Commando bars are solid; its grips are firm; the connection between hand and fork is precise and direct. Those forks, incidentally, despite the clean, all-metallic look, are basically the same "roadholder" forks of yore. These acquired their considerable good-handling reputation largely on the basis of Norton's racing successes, but even the forks on production street bikes were superior to most of those on

Norton's competitors. The metering principle is somewhat complicated in execution, but damping has been sorted out very well for hard street use. Damping on compression is uniform and light, although the spring rate is progressive. On extension, the Commando's forks provide stiffer as well as fully progressive damping. As the forks extend, an internal piston squeezes oil through a series of orifices. The greater the extension, the fewer are the orifices that remain above the piston, and hence the stiffer action. The result is a very durable fork that will track beautifully over the most corrugated pavement you'll ever find. To slow you down when needed, the Commando has a new twin-leading-shoe brake at the bottom of those forks. It is as good as most competitors of similar design, but it will fade if worked hard enough. In all other things, the Commando scores

well. It carries two-up quite well, with reasonable comfort for both rider and passenger, and without a drastic decrease in performance. With the present ignition system, starting is much easier than back in the Norton's magneto era. It still takes a good, healthy swing of the kickstart lever to make it all happen—but it will start. It is, with the new double-leading-shoe front brake and improved performance, a much better sprint and stop machine than the old Atlas—and it is a vastly improved tourer. The S model's small tank is a tourer's embarrassment, however, as it offers a cruising range of scarcely more than a hundred miles. If long hauls are your style, get the "pure" road version with the bigger tank. Maybe you should get the bigger tank—whatever you plan to do. That Commando is so much fun to ride you won't want to stop even for fuel. ©



NORTON 750 COMMANDO S

- Price suggested retail East Coast, POE \$1479
- Tire, front 3.00 in x 9 in.
- rear 3.50 in. x 19 in.
- Brakes, front Twin leading shoe 8.0 in. x 1.25 in.
- rear Single leading shoe 7.0 in. x 1.25 in.
- Brake swept area 59.6 sq. in.
- Specific brake loading 9.89 lb/sq. in.
- Engine type Four-stroke push rod, vertical twin
- Bore and stroke . 2.875 in. x 3.503 in., 73mm x 89mm
- Piston displacement45 cu. in., 745cc
- Compression ratio 8.9 : 1
- Carburetion (2) 30mm, Amal Concentric
- Air filtration Paper element
- Ignition Battery and coil
- Bhp @ rpm About 58 @ 6,500
- Mph/1000 rpm, top gear 16.1
- Fuel capacity 20pt.
- Lighting Alternator, 120 watts
- Battery 12 v, 9 ah
- Gear ratios, overall (1) 12.4 (2) 8.25
 (3) 5.9 (4) 4.84
- Wheelbase 56.75 in.
- Seat height 31 in.
- Ground clearance 6 in.
- Curb weight 415 lb.
- Test weight 590 lb.
- Instruments Speedometer, tachometer
- 0-60 mph 5.6 seconds
- Standing start ¼ mile 13.18 seconds—101.69 mph
- Top speed 110 mph

