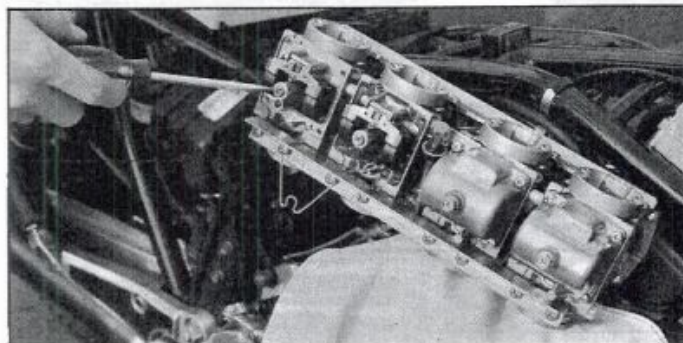
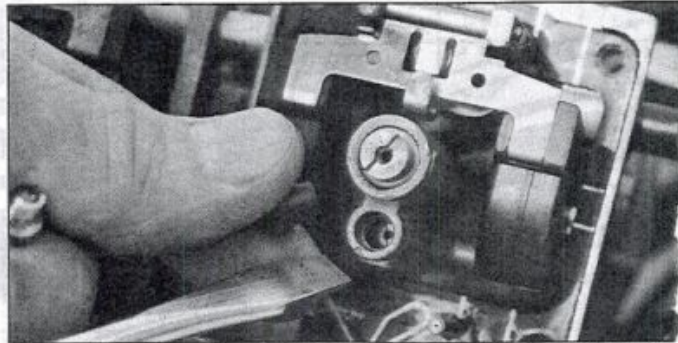


Figure 1 RUN 1				RUN 2			RUN 3		
RPM	POWER (Horsepower)	CO (Percent)	SFC (lb./hp.-hr.)	POWER (Horsepower)	CO (Percent)	SFC (lb./hp.-hr.)	POWER (Horsepower)	CO (Percent)	SFC (lb./hp.-hr.)
3500	33.3	5.4	.54	32.9	6.6	.56	33.8	6.2	.56
4000	38.7	6.8	.55	39.5	7.4	.56	40.7	6.0	.52
4500	44.3	7.6	.53	42.6	8.2	.56	44.0	6.5	.52
5000	49.9	8.2	.56	48.8	9.8	.55	46.5	9.0	.56
5500	54.1	9.4	.58	53.0	10.0	.59	53.3	8.6	.57
6000	62.3	9.4	.58	60.8	10.0	.58	61.4	8.4	.56
6500	69.2	8.0	.57	68.9	8.6	.55	69.6	5.2	.51
7000	73.2	8.5	.57	73.3	8.8	.58	74.5	5.0	.50
7500	76.9	8.8	.59	77.3	9.2	.60	79.0	5.6	.52
8000	80.6	8.6	.62	80.6	9.4	.62	83.0	5.0	.55
8500	80.6	9.0	.66	81.6	9.6	.66	84.7	5.4	.55
9000	78.4	9.4	.71	80.4	9.6	.67	83.7	5.4	.58

(1) Baseline—Stock Motorcycle. (2) Kerker KR with small Comp-2 baffle substituted for stock exhaust. (3) Kerker KR, airbox lid off, 122.5 main jets in place of stock main jets. (4) Kerker KR, individual K&N filters in place of airbox, 30 pilot jet, 165 main jet, jet needle dropped .052 in.



After taking off the rack of carburetors, the float bowls can be removed. The screwdriver shows the main jet of the number one cylinder.



Closeup view shows the pilot jet normally covered by the rubber plug.

In Search of the Free Lunch

While an exhaust pipe may cost \$200, the next change tried on the dyno cost \$6 for four new main jets, and produced more of a power increase. The lid for the airbox was removed; because this reduces the pressure drop in the intake system for a given flow level, larger main jets were installed to richen the mixture. The result was one dip of 3 hp, at 5000 rpm, and increases at the top of the rev scale. With this modification and the KR pipe, power at 9000 rpm was 5 bhp up on the stock engine; and 3bhp up on the bike with only the KR pipe. CO measurements indicated that the air-fuel ratio was better throughout the range, and was even slightly lean at peak revs.

These results correspond with theoretical expectations. Fuel is pulled up from the float bowl in carburetors because the pressure in the carburetor throat is lower than the pressure in the float bowl. Usually the low pressure is created by the venturi effect; when air is accelerated through the carburetor throat, the pressure drops. However, a restriction upstream of the carburetor throat, such as a small opening to an airbox, will also drop the pressure everywhere downstream. So this additional pressure drop, acting along with the pressure drop from the venturi effect, will require smaller main jets to be used

to maintain the same amount of fuel flow. Remove the restriction and the main jet size has to be increased to compensate. Because the pressure drop from the restriction is greatest at peak flow conditions, and may hardly be noticeable with less than peak flow, the main jet may be the only carb circuit affected. That seems to have been the case here, and the power increase came from easing the restriction, allowing more air into the engine, and from the more accurate jetting. Perfect jetting for such a low density day isn't perfect jetting for all conditions; on a more typical higher density day it would be too lean. That's the compromise the manufacturer has to live with when setting up the carburetion in the first place: the jetting can't give an overly lean air-fuel ratio on the coldest, densest air the motorcycle will ever see, and therefore the mixture will be fairly rich under low air density conditions.

For the fourth run the airbox was removed and individual K&N air filters were put in its place. This modification gave the greatest power increase we saw while using the stock carburetors, and also required such a severe change in jetting that we question the ability of most motorcycle owners (including ourselves) to accomplish it without spending days or weeks of trial-and-error parts sub-

stitutions. With a \$100,000 dyno installation and the aid of people who make their living doing this, we spent most of a day coming up with the combination that produced the results shown for run four. The low speed circuits were dead rich with the air box off and the air filters in place, and the high speed circuits were deadly lean. The pilot jet was dropped from the stock 45 to a 30, and the needle was dropped by .052 in. (This was achieved by reversing the nylon and steel washers on the needle, and reassembling the needle in the slide with the spring pushing it down against the bottom of the slide instead of up against the stop.) The main jet went from the standard 110 to a 165! Considering that these jets come in increments of 2.5, that's a jump of 22 jet sizes. With this combination carburetion was not perfect but power was up substantially over stock at every engine speed above 6500 rpm. The drop in power at 3500 almost certainly came from an overly lean mixture at this speed. The drop at 4000 and 4500 rpm is a mystery, but certainly was there. The 5 percent power increase over stock from 7000 to 9000 rpm is the direct result of a less restrictive intake system, but looks less impressive when compared to run three, which produced only slightly less power with fewer changes.