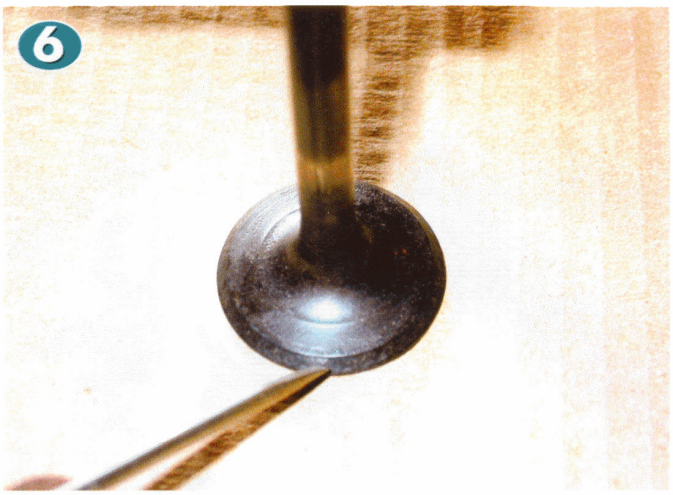

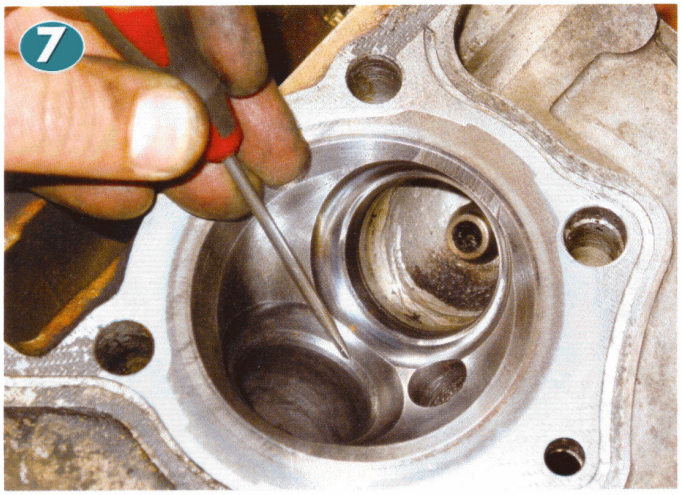

help gas flow and should be removed while the valves are out.

Picture six: The valves need to have a good compression seal in the cylinder head. After many thousands of miles the valve sealing surface, indicated here, will begin to develop small pits as the metal suffers from constant wear and heat. Running the engine with incorrect valve clearances will also contribute to rapid valve pitting.

Picture seven: The valve seats in the cylinder head suffer in exactly the same way. With the combustion chambers cleaned up some pitting is evident in the seats. This is the area to watch carefully on older engines designed to be run on leaded fuel. Modern unleaded petrols do not have the additives required to protect these vulnerable areas and a professional unleaded conversion will include the fitting of new valve seats and new valves made from higher grade hardened steel.

Picture eight: In my experience most Japanese engines, even quite old designs, will cope quite happily with unleaded petrol. However, the hardened steels are tough to recondition by hand and traditional valve grinding methods don't usually make much of an impression.

Before sending the head out for reconditioning I decide to try the traditional method of valve grinding using a wooden stick fitted with a rubber sucker. With a little grinding paste smeared on the valve seat I can then rotate the valve by hand, lapping the valve head into its seat.

Picture nine: Lo and behold the traditional method works a treat, producing a splendid matt grey ring around the valve head and its matching seat. Two or three applications of grinding paste are sufficient to remove all traces of pitting and I can finish off by carefully washing the valves and seats with petrol.

However, the ease with which I lapped in these valves makes me suspicious of running this engine on unleaded fuel and I'll be recommending Lorenzo to use a fuel additive like Wynns Valve Guard when running the rebuilt engine.

Picture ten: The XS650 follows a traditional sohc design and has four rocker arms held captive in the rocker cover. With the large diameter chromed plug removed, the rocker pivot pin should simply slide out and allow the rocker to pull free.

In practice, the pivot pins are quite a tight fit in the rocker cover but Yamaha have thoughtfully drilled and tapped each one so that an M6 screw can be wound in to help remove it. I found that by packing washers against the side of the casing I could progressively wind an M6 Allen screw into each pin to withdraw it.

Picture 11: The rocker arms have the valve clearance adjuster at one end and the cam follower at the other. Each follower rides over its respective cam lobe whilst the engine is running and is susceptible to wear, particularly if oil changes have been missed.

Some slight scuffing is evident here but doesn't warrant the price of fitting a replacement. Heavy wear would mean replacement and possibly a new camshaft to boot. Check the valve clearance adjusters too, these are prone to pitting on the XS650 motor and might need to be replaced.

Picture 12: To remove the ravages of corrosion and years of baked-on dirt we have opted to have the head, rocker cover and barrels bead-blasted. This is a specialist job and needs to be done with care. It's all to easy to get tiny amounts of grit into engine oilways, leading to horrors once the rebuilt engine is started up.

I entrusted the parts to Paul Coward at Bikerworld, who once again carefully masked up all the vulnerable surfaces before producing a splendid finish. The next step is to thoroughly wash the parts in paraffin and