TUNING.—GENERAL.

The tuning sequence of the G.P. Carburetter follows the well established Amal principles, inasmuch as there is a main jet (15) controlling the fuel supply at full throttle, a needle jet (1) the emission from which is controlled by the position of the taper needle (11) in same and at the lower throttle openings by the cut-away of the throttle valve (23) in question, an independently adjustable pilot fuel needle (24) controlling the mixture strength for idling. There is a new adjustment in the form of an air jet (2) which controls the amount of air which primarily atomises the fuel as it comes out of the needle jet (1) before going into the spray tube (12) and thence to the heart of the choke. This latter air jet (2) is a form of depression control for the main jet, and from normal experiences would appear to require a ·1″ diameter air jet for choke sizes of up to $1\frac{1}{16}$″ and ·125″ diameter for choke sizes in excess of this figure. Normally speaking, this air jet would be fitted by the Factory when the Carburetter was supplied, and would not be considered a likely component to change, but remembering that the main jet depression can be increased by fitting a smaller air jet, it may sometimes, for special purpose tuning, be found an asset to try a larger or smaller air jet according to which one is already fitted.

The **NEEDLE** control covers a range of the throttle opening from about one-third throttle up to seven-eighths throttle opening. The needle grooves in the G.P. needle will be found to number five instead of seven as previously on the T.T. instruments, due to the fact that the needle control of the G.P. Carburetter is rather more sensitive than on other types. Two types of needle (11) are available, what we call a standard taper needle and a much weaker taper needle. The needles in both Type 15 and Type 10 G.P. instruments are the same length. Consequently, the standard taper needle in these two instruments is known as the G.P. Needle : the weaker taper needle in these two types of instruments is known as the G.P. 6 Needle.

With regard to the large Type 5 G.P. Instrument, this needle is a longer one than in the two smaller types, and the standard taper is known as Type 5 G.P. Needle : the weaker taper needle is designated the Type 5 G.P.6.

Where megaphone exhausts are concerned, it will be found invariably advisable to use the weaker types of needle, and generally these can also be run at a fairly low position, namely,—needle position 1 or 2—that is, the first or second groove from the top of the needle.

It will then be found that the stability on the megaphone is much improved and any tendency towards weakness at the bottom of the throttle opening can, of course, be rectified by fitting a fairly low numbered throttle valve.

MAIN JET.

Always bear in mind, however, that whatever the type of needle used, or the position in which it is fitted, there will be no affectation of the main jet (15). This should be arrived at by fitting the jet which gives the best possible power on the bench or, on the other hand, the highest possible R.P.M. on the road, and once this has been obtained, under no circumstances should it be altered.

The main jet (15) can be very readily removed by taking off the hexagon cap (20) at the base of the Carburetter Mixing Chamber. The jet size is marked on the side of these jets, and represents the flow in c.c. per minute on our Amal Calibrating Machines at the Works. These jets are made in 10 c.c. increments, that is, for instance—250, 260, 270, etc.—up to and including 600, when, after this, 20 c.c. increments become standard.

It should be noted that on the G.P. range of Carburetters smaller main jets than usual are fitted. This is due to the fact that a higher depression main jet system is employed. For rough guidance, therefore, the following jet sizes should be approximately correct for the choke sizes in question :—

Using 80 Octane or Petrol Benzol Fuel.

15 G.P., $\frac{7}{8}$″ choke—Jet 180.	10 G.P., $1\frac{1}{16}$″ choke—Jet 210.	5 G.P., $1\frac{1}{4}$″ choke—Jet 270.
15 G.P., 1″ choke—Jet 200.	10 G.P., $1\frac{7}{32}$″ choke—Jet 260.	5 G.P., $1\frac{3}{8}$″ choke—Jet 310.

with, of course, the intermediary choke sizes, using a proportionate sized jet.

The rest of the throttle range should then be dealt with absolutely individually in steps by means of the needle adjustment, throttle valve cut-away alteration and pilot adjustment, with a possible check on the air jet fitted.

The **THROTTLE VALVE** (23), of course, which surrounds the choke adaptor (22) in the Carburetter, controls with its leading edge the amount of air entering the throttle bore at the lower throttle openings, at least that is up to the point where the cut-away starts to disappear up the Mixing Chamber bore, which, naturally, varies slightly with each number of throttle valve that is fitted.

The trailing edge of the throttle valve, of course, controls the volume of mixture passing to the engine.

These throttle valves can be supplied with various cut-aways from No. 3 up to No. 8, each number varying in its cut-away on the air intake side by $\frac{1}{16}$″.

The **NEEDLE JET** (1), which is of stainless steel to prevent wear, has been found for best all round usage on petrol or petrol benzole to require a diameter of ·107″ for choke sizes up to $1\cdot\frac{1}{32}$″, over this a needle jet of ·109″ diameter is necessary. For alcohol fuel, of course, larger needle jets are necessary : this is dealt with on page 6.

The **PILOT JET** on this Instrument is a taper needle (24) which controls the volume of fuel passing to the pilot assembly where it mixes with air from a permanent leak hole in the body, ultimately passing into the Mixing Chamber itself through a small hole at the back of the throttle slide. It mixes with air coming under the throttle valve through the main bore at this point and then passes into the engine as the necessary slow running mixture.

This method of fuel adjustment has a very wide effect on the lower end carburation, and it will be found possible to control to quite a large degree the initial pick-up by an accurate setting of this pilot screw. A word of warning should be given that it is a bad thing to set this as weak as possible which, with a warm engine, may result in a very good tick-over being obtained but it will be found that there is a tendency for a flat spot to persist when opening the throttle. In consequence of a really good tick-over not being of great moment where racing carburation is concerned, a slightly rich setting of the pilot screw is desirable, which will help towards obtaining a more perfect opening up.

COMPENSATION on this G.P. Carburetter is obtained through the medium of the primary air which passes through a slot (4) in the Mixing Chamber and then, via the air jet (2) previously mentioned, atomises the liquid fuel passing from the needle jet (1).

As the engine supply increases or decreases at a given throttle opening with a varying load, so compensation will take place. The mixture strength supplied to the engine will vary as the air supply falls off, or increases according to whether the R.P.M. decreases or increases, due to the lesser density of the air compared to the petrol. This damping effect on the flow of liquid results in a compensated mixture being maintained.