(*b*) General description of and the process of putting together a locomotive boiler, a Lancashire or Cornish boiler, single- and double-ended marine boilers. A general knowledge of water-tube boilers.

(*c*) Methods of inserting, expanding, and removing the tubes of a locomotive-boiler. Caulking.

(*d*) Methods and machines for making, inserting, and removing boiler-stays. Roof-stays. Methods of making, inserting, and removing the different kinds of roof-stays. Girder stays. Sling stays. Direct stays. Longitudinal stays.

(*e*) A knowledge of the arrangements fitted to give access to a boiler for cleaning out. A knowledge of the boiler fittings necessary for the safe working of a boiler. Method of making repairs, such as the renewal of a tube plate, the fixing of a patch. A knowledge of the kinds of deterioration which go on in the different types of boilers.

(*f*) Methods of welding angle-irons, and of bending them to given shapes. Annealing.

(*g*) A knowledge of the machine tools used in a boiler-shop, such as punching and planing machines, edge-planing machines, multiple-drilling machines, vertical-boring machines, machines for tapping fireboxes for stays. Reheating and annealing furnaces. Hydraulic flanging-presses.

(*h*) Construction and jointing of steam-pipes for moderate and high pressures. Expansion-joints. Methods of testing boilers. Inspection of boilers. Steam-pipe connections for boilers worked in groups. Mechanical stoking. Feed-water heaters. Superheaters. Recording-instruments on boilers—*e.g.*, CO_2 recorders and temperature-indicators. Boiler fittings, including automatic feed-water regulators, feed check-valves, safety-valves, &c.

(*i*) General knowledge of the thermal efficiencies of different types of boilers; the consumption of coal per square foot of grate for boilers with chimney draught and forced draught.

(*j*) General principles and methods of rolling boiler plates, angle-irons, and rivet iron. Pneumatic tools.

(*k*) The effects of corrosion on different types of boilers. Water-softening apparatus.

(*l*) A knowledge of the general equipment of a boiler-shop, such as the cranes required, and the hydraulic installation necessary for working the flanging-presses.

(*m*) The use of oxy-acetylene blow-pipe flame for welding and cutting in boiler repairs. Electric welding.

(*n*) Geometrical methods of setting out patterns for metal-plate work.

MOTOR MECHANICS' WORK.

Apprentices should receive for the first two years at the technical school instruction in general subjects cognate to the trade, including free-hand and mechanical drawing, mechanics, mathematics, and physics to the standard approximately of the Senior Free Place Examination.

The following candidates will be exempted from the preliminary examination:—

(*a*) Those candidates who have passed the examination for a senior free place in the subjects trade drawing, freehand and instrumental drawing, mathematics or alternative mathematics, and general experimental science.

(*b*) Those candidates who have obtained a senior free place by recommendation, having reached the pass standard in the subjects trade drawing, freehand and instrumental drawing, mathematics or alternative mathematics, and general experimental science.

SYLLABUS OF COURSE FOR THE PRELIMINARY EXAMINATION FOR MOTOR MECHANICS.

1. *Drawing.*

(*a*) *Geometry.*—The substance of Drawing II, Instrumental, as prescribed for the intermediate examination, but treated less fully, only geometrical constructions necessary for practice in mechanical drawing being included.

Use and care of drawing-instruments, including scales, pencils, pens, compasses, dividers, protractors, set-squares, and T square. How to test the accuracy of drawing-instruments, and how to correct errors. Hand sketching in plan, elevation, and section.

(*b*) *Freehand Sketching.*—Making approximately accurate hand sketches of simple geometrical solids and of objects such as tools and simple machine parts, conventional representation of screw threads; description of functions of parts drawn.