

two mountings, back to back, and all the engine equipment which goes in the mounting unit is installed there. The undercarriages are also assembled on these jigs, pits in the concrete floor of the shop permitting of the undercarriage being fully extended for test.

One feature of the Handley Page works system which deserves mention is that nowhere does one see a blueprint. Presumably they were used when production first started, but by

now the men have become so accustomed to the work that they do not need drawings to guide them. This obviously saves a good deal of time.

The type of production adopted at Cricklewood could equally well be introduced elsewhere. For example, there does not appear to be any reason why, if Hampdens are wanted in larger quantities than the parent firm can produce, the great shipbuilding concerns should not undertake the work.

Handley Page, Ltd., have had to train a large percentage of their workers, and the shipbuilding firms could do the same. Already something of the sort is taking place in that the English Electric Company, Ltd., by arrangement with Handley Page, Ltd., and the Air Ministry, is building the Hampden at Preston. In Canada the machine is to be built by the Canadian Central Aircraft Corporation.

SOME CONTRIBUTORS to the HAMPDEN'S CONSTRUCTION

Accles and Pollock, Ltd.: Steel tubes.
Aerograph Co., Ltd.: Spray guns, etc.
Aerostyle, Ltd.: Spray equipment.
Aircraft Components, Ltd.: Wheels, undercarriage equipment, etc.
Aircraftings, Ltd.: Aircraft cocks.
Geo. H. Alexander (Machinery), Ltd.: Marking presses.
Edgar Allen and Co., Ltd.: Tipped tools.
Alley and MacLellan, Ltd.: Electric motors.
Aluminium Corporation, Ltd.: Aluminium sheets.
T. B. Andre and Co.: "Floatex" bearings.
Andrews Toledo, Ltd.: Steel.
Jas. Archdale and Co., Ltd.: Production machines.
Arens Controls, Ltd.: Arens controls.
Sir W. G. Armstrong-Whitworth, Ltd.: Machines and parts.
Arnott and Harrison, Ltd.: Tools.
Aviation Developments, Ltd.: Rivets.
Automotive Engineering Co., Ltd.: Circlips.
Automotive Products, Ltd.: Hydraulic equipment.
Avimo, Ltd.: Standard couplings.
Bakelite, Ltd.: Bakelite sheets.
B.B. Chemical Co., Ltd.: Bostik cement.
Baldwins, Ltd.: Tinned steel.
Barber and Colman, Ltd.: Shakeproof screws.
Barrow, Hepburn and Gale, Ltd.: Leather straps.
J. E. Baty, Ltd.: Gauges.
Baxters (Bolts, Screws, Rivets), Ltd.: Rivets.
J. Beardshaw and Son, Ltd.: Steel sheet.
G. Beaton and Co.: Pressings.
Becket, Laycock and Watkinson, Ltd.: Beclawat channels.
Bell's Asbestos and Engineering Supplies, Ltd.: Asbestos sheet parts, etc.
Bifurcated Tubular Rivet Co., Ltd.: Rivets.
Birmetals, Ltd.: Aluminium bar, sheet, etc.
Birmingham Aluminium Castings Co., Ltd.: Magnesium alloy castings.
Birmingham Tool and Gauge Co., Ltd.: Spigots, rose cutters, rivets, etc.
Blackburns (London), Ltd.: Copper tubing, copper wiring, brass, etc.
Bloctube Controls, Ltd.: Bloctube fittings.
D. H. Bonnella and Sons, Ltd.: Cable sleeves and rings.
Jas. Booth Co., Ltd.: Aluminium alloy bar, wire, tube, copper, etc.
Bowden (Engineers), Ltd.: Cable.
Boytriven, Ltd.: Upholsterer's solution.
Briggs Motor Bodies, Ltd.: Frame-members.
British Aluminium Co., Ltd.: Aluminium tube, sheets, strip, etc.
British Celanese, Ltd.: Novellon, Celastoid.
British Ebonite Co., Ltd.: Ebonite.
British Insulated Cables, Ltd.: Ducel, Unicel, Tricel, etc.
British Oxygen Co., Ltd.: Welding equipment.
British Thomson-Houston, Ltd.: Electrical equipment.
Brooke Tool Manfg. Co., Ltd.: Small tools.
Broome and Wade, Ltd.: Drills, etc.
Brown Bros. (Aircraft), Ltd.: Accessories.
Bruntons, Ltd.: Swaged rods.
Buck and Hickman, Ltd.: Tools.
Buncher and Hasler, Ltd.: Spinnings.
Burley, Ltd.: Rubber strip, etc.
I. Burns and Sons, Ltd.: Fibre parts, fairleads, washers, etc.
Burton, Griffiths and Co., Ltd.: Small tools.
Cambridge Instrument Co., Ltd.: Pyrometers.
W. Canning and Co., Ltd.: Plating equipment.
Jas. Gartland and Son, Ltd.: Special bolts, aluminium piano hinges, door catches, etc.

Central Chemicals, Ltd.: Casein cement.
J. Christopher and Sons: Trolley wheels.
W. T. Clark and Co., Ltd.: Spinnings, circular window frames.
Consolidated Pneumatic Tool Co.: Riveting guns.
Corfield and Buckle, Ltd.: Blanks and pressings.
Cork Mng. Co., Ltd.: Langite washers.
Cornercroft, Ltd.: Gauges.
R. E. Cotes, Ltd.: Saws, screws, blades, etc.
Coventry Tool and Gauge Co., Ltd.: Snaps and blocks, rivets, squeezers, springs.
Craig and Donald, Ltd.: Guillotine blades.
C.V.A. Jigs, Moulds and Tools, Ltd.: Tools.
Dashwood and Partners, Ltd.: Insulator sleeves, hooks, links, etc.
Davis and Timmins, Ltd.: Brass screws.
De Bergue Patents, Ltd.: Rivets, riveting machines and tools.
De Havilland Aircraft Co., Ltd.: Airscrews.
Deloro Smelting and Refining Co., Ltd.: Stellite tool tips.
Delta Metals Co., Ltd.: Bronze, brass, etc.
Desoutter Bros.: Drills.
Dexine, Ltd.: Dexine fairleads, etc.
W. B. Dick and Co., Ltd.: Anti-freezing grease.
Dunham White and Co., Ltd.: Lead seals.
Dunlop Rubber Co., Ltd.: Wheels.
Ealing Park Foundry, Ltd.: Castings, etc.
Edison Swan Electric Co., Ltd.: Bulbs.
F. J. Edwards, Ltd.: Swaging machines, presses, etc.
Ellison Insulation, Ltd.: Tufnol parts.
Enfield Rolling Mills, Ltd.: Zinc foil.
English Electric Co., Ltd.: Coupling sleeves, carbon bushes.
Everett, Edgecumb and Co., Ltd.: Electrical parts.
Ever-Ready Co., Ltd.: Batteries, torches.
Expanded Metal Co., Ltd.: Expanded metals.
Expanded Rubber Co., Ltd.: Rubber.
Farmer, Stedall and Co.: Grinding wheels.
Fescol, Ltd.: Fescolising.
Thos. Firth and J. Brown, Ltd.: Small tools.
Firth-Vickers Stainless Steels, Ltd.: Steels.
C. J. Fitzpatrick and Co.: Bevel gears, worm wheels.
W. T. Flather and Co.: Steel.
Fry's Metal Foundries, Ltd.: Solder.
John Fraser and Son, Ltd.: Salt baths, etc.
Gallay, Ltd.: Aircraft heating apparatus.
Gaston E. Marbaix, Ltd.: Riveter.
General Electric Co., Ltd.: Lighting equipment.
Gillett, Stephens, Ltd.: Machined parts.
F. Gilman (B.S.T.), Ltd.: Flexible-drive tools, etc.
Gittings and Hills, Ltd.: Enamels, etc.
Goodman Industries, Ltd.: Tools and parts.
Grey and Martin, Ltd.: Silver solder.
J. J. Habershon and Sons, Ltd.: Steel.
Hall and Hall, Ltd.: Washers, fabric, etc.
Harrison and Sons, Ltd.: Cornered steel grit.
G. A. Harvey and Co.: Pressings, corrugated sheets, etc.
T. P. Headland, Ltd.: Drill chuck keys, sleeves, chasers, snips, screwdrivers, etc.
Heaton and Duggard, Ltd.: Single- and double-link chains.
C. E. Heinke, Ltd.: Tubing.
Held Glue and Compounds Co., Ltd.: Heldite jointing.
W. T. Henley's Telegraph Works, Ltd.: Soldering irons, insulation tape, etc.
R. Heppelthwaite, Ltd.: Machined parts.
Alfred Herbert Co., Ltd.: Small tools.
High Duty Alloys, Ltd.: Alloy, strips, slabs, stampings, etc.
Hoffman Mfg. Co., Ltd.: Ball bearings.

Hofman Tool and Engineering Co.: Tools and parts.
Hogget, Young and Co., Ltd.: Acetylene-welding equipment.
H. C. Hopper, Ltd.: Cast-iron castings.
F. A. Hughes and Co., Ltd.: Acids.
Hughes, Johnson Stamping Co., Ltd.: Steel stampings, forgings, etc.
Hyde and Co., Ltd.: Engraver's wax, etc.
Hypower, Ltd.: Pressings.
I.C.I. Plastics, Ltd.: Perspex panels.
Impervia, Ltd.: Rubber, rubber hose.
Improved Liquid Glue Co., Ltd.: Glue.
India Rubber and Gutta Percha, Ltd.: Rubber solution, tapes, strips, etc.
Integral Auxiliary Equipment Co.: Pumps.
C. E. Johansson, Ltd.: Small tools.
Johnson and Phillips, Ltd.: Switches, bobbins, coils, etc.
A. A. Jones and Shipman, Ltd.: Belts, coil springs, pulleys, etc.
E. H. Jones (Machine Tools), Ltd.: Machines and tools.
T. C. Jones and Co., Ltd.: M.S. bar, cast iron, channel, angle iron, etc.
C. H. Joyce, Ltd.: Index plates, etc.
Kautex (Plastics), Ltd.: Sealing rings, sealing gaskets.
Kirby's Refineries, Ltd.: Lard oil.
Lapointe Machine Tool Co., Ltd.: Broaching parts.
Leverstart, Ltd.: Machine parts.
Leytonstone Jig and Tool Co.: Tools and parts.
Lion Engineering Co., Ltd.: Pins, hinges, etc.
Lockheed Hydraulic Brake Co.: Tube adaptors, tube nuts, pipe connectors, etc.
London Name Plate Manfg. Co.: Labels.
J. Lucas, Ltd.: Mirrors, Lucas horns.
MacReady's Metal Co., Ltd.: Black and bright mild steel.
Manganese Bronze and Brass Co., Ltd.: Oilite bushes, brass bar.
Metal Moulding, Ltd.: Sections.
Mitchell Bros., Ltd.: Washers, felt strip, etc.
Mollart Engineering Co., Ltd.: Bearings, ball joints.
C. D. Monninger, Ltd.: Metal-cutting band-saws, steel bar, etc.
Morrison, Marshall and Hill: Band-saws, feed attachment, brazing attachment, etc.
Herbert Morris, Ltd.: Chain tackle, etc.
Mouldrite, Ltd.: Perspex, Perspex panels.
M.R.C., Ltd.: Controls.
Nettlefold and Sons, Ltd.: Wood screws, cowlings, bolts to drawing, etc.
J. C. Nicklin, Ltd.: Steel sheets, tinned steel.
Northern Aluminium Co.: Aluminium alloy strip, strip, extruded bar, etc.
S. E. Opperman, Ltd.: Winch screws, geared nuts, worm shafts, etc.
Palmer Tyre, Ltd.: Springs, sleeves, washers, clips, spanners, cover plates, levers, valves, etc.
Petroflex Tubing Co., Ltd.: Tubing.
Philco Radio Corporation: Tools and parts.
Phosphor Bronze Co., Ltd.: Phosphor bronze, balls, wire, etc.
Phillips Industrial, Ltd.: Welding rods, etc.
Phoenix Telephone and Electric Works: Cables.
Pinchin, Johnson and Co., Ltd.: Metal-marking paint, varnish, etc.
Wm. Pinchin and Co., Ltd.: Resin.
F. W. Potter and Soar, Ltd.: Brass and steel gauze.
Power Flexible Tubing Co., Ltd.: Tubing, hose.
Pressed Steel Co., Ltd.: Pressings.
Ransome and Marles, Ltd.: Bearings.
Ratcliffe Tool Co., Ltd.: Tools and parts.
(Concluded on p. 466.)