crankshafts. An air-blown cupola melts low-carbon iron (2.3 per cent carbon) into a 15-ton electric furnace. Also charged into this furnace is a burden of cold low-carbon steel (approximately 0.4 per cent carbon), this making about 50 per cent by weight of the total charge. The electric furnace discharges into a receiver, the temperature here being measured and recorded every five minutes.

The temperature range here is the controlling factor in the balancing of the two charge constituents and in any adjustment of composition found necessary.

The Honeywell-Brown "Electronik" indicating-recording instrument employed with the thermocouple used in this procedure is fitted with a time-controlled bell to give an audible warning when the highest temperature is reached during each dip. This prevents undue immersion of the couple in the metal and consequently reduces the attack on the silica sheath. In addition, a permanent record of the temperature is thus obtained for reference in the future.

It can be seen that the platinum : rhodium-platinum quick-immersion thermocouple is a reliable tool in the quality control of castings in grey iron and alloy steels. It enables the Ford Motor Company Ltd. to produce many thousands of cylinder blocks, cylinder heads, gear-boxes, crankshafts, malleable iron chassis brackets and other castings with a high degree of confidence that the casting conditions are maintained completely uniform throughout each production run.

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Ruthenium Catalyst for Paraffin Wax Synthesis

LIQUID PHASE HYDROGENATION OF CARBON MONOXIDE

The possibility of using ruthenium catalysts in the preparation of high-melting hydrocarbons through the reaction of carbon monoxide with hydrogen—the Fischer-Tropsch synthesis—has been known for many years. In a recent paper (*Liebig's Ann. Chem.*, 1958, **618**, 67–71) H. Kölbel and K. K. Bhattacharyya describe the preparation of similar compounds by the liquid-phase hydrogenation of carbon monoxide with water, again using a ruthenium catalyst.

The reaction is carried out in a two-litre steel autoclave containing the catalyst, 5g of finely-divided metallic ruthenium, suspended in 750ml of water, through which a stream of carbon monoxide is passed. The product, which consists almost entirely of high molecular weight paraffins, is immiscible with water, and can easily be separated from the aqueous suspension. The best results are obtained with a reaction temperature of 195°C and a carbon monoxide pressure of 100 atm, when over 70 per cent of the carbon monoxide is converted. The paraffin wax so formed has a molecular weight of up to 7000 and a melting point of up to 130°C. The course of the reaction can be represented as a combination of the water-gas reaction with the Fischer-Tropsch synthesis – the carbon monoxide and water first react giving hydrogen and carbon dioxide, the hydrogen so formed then reacts with further carbon monoxide to form hydrocarbons and carbon dioxide.

The advantages of carrying out the hydrogenation in the liquid-phase are numerous. The water, which is present in large excess, acts not only as reactant but also as a means of uniformly suspending the catalyst and as a medium for dispersing the excess heat produced by the reaction. The technical development of the process would be favoured by such advantages and also by the simplicity of the apparatus and the high yields obtained.