

and Britain, early January is a more realistic target. One suspected case of Hong Kong flu in Birmingham was confirmed before Christmas but, as there were reported cases earlier this year with no ensuing epidemic, that is not necessarily the start of a large outbreak.

Also questionable is the instruction to doctors to immunize—at least in the first instance—only those people who are at special risk. From the medical point of view, of course, healthy individuals should be able to survive an attack of flu without too much discomfort. But what of the economic aspect, which the spokesman at the Department of Social Security said was entirely a matter for the Department of Employment and Productivity to consider? British industry is hardly in a position to face a temporary shut-down. Although it would now be impossible to immunize the whole British population, there appears to be a strong case for providing industrial medical centres with enough vaccine to protect employees. In any case, it is naive to imagine that vaccine is going to be administered completely in accordance with instructions. Dr Sydney Greaves, secretary of the Medical Practitioners' Union, is reported to have said that at least one local authority has taken the bulk of its vaccine supplies for its own staff, and that some doctors are complaining that commercial firms are supplying individuals not in great need of vaccine, with the result that priority patients are having to do without.

POLLUTION

Controlling the Motor Car

from a Correspondent

A SYMPOSIUM was held at the London headquarters of the Institution of Mechanical Engineers on November 25 and 26 under the joint sponsorship of the British Technical Council of the Motor and Petroleum Industries (BTC), the Institute of Petroleum and the Automobile Division of the Institution of Mechanical Engineers.

The chairman of the organizing committee, Mr L. Martland from Ford Motor Co., started the proceedings by describing the Californian and American pollution regulations. The continued export of cars with engines of less than 140 cubic inches capacity, he said, was helped by the action of the BTC and others in securing higher permitted levels after demonstrating to the US Federal authorities the increased technical effort needed on the smaller car.

Mr W. T. Oliver (Ford Motor Co., Basildon) described how his company was meeting the American regulations by air injection into the exhaust ports; stainless steel tubes were used and positioned to deliver the air close to the exhaust valve heads. Back firing in the exhaust caused by pressure changes during deceleration was avoided by using a valve to divert the air supply. Mr D. L. Sutton (Rover Co.) showed the influence of air/fuel mixture, ignition timing, engine speed and load. He described work on a valve fitted to the carburettor throttle plate to secure improved combustion on overrun. Gas traces and results from tests on treated vehicles were produced showing compliance with the regulations.

Mr G. L. Lawrence (Zenith Carburettor Co.) outlined some of the advantages of the air valve type carburet-

tor, and Mr E. W. Downing (Joseph Lucas Ltd) described the application of petrol injection to high performance cars. He pointed out the difficulties of securing low hydrocarbon and carbon monoxide levels on engines with large valve overlaps because the high exhaust gas content in the cylinders slows down combustion and limits the burnable range of mixtures.

Mr B. L. H. Bishop (Smiths Industries, Witney) reviewed the various crankcase emission regulations both in the United States and in Europe, and described various control systems to recirculate these gases into the induction system of the engine. It is well known, he said, that 85 per cent of the blow-by past the pistons into the crankcase of petrol engines is derived from the carburetted air/fuel mixture. The remainder—usually about 15 per cent—is exhaust gas. Hydrocarbon emission from the crankcase is therefore high and, ignoring evaporative losses from the fuel system, can account for some 25 per cent of the total discharge of hydrocarbons from an untreated engine.

Messrs B. V. Harris and H. I. Fuller (Esso Petroleum Co.) described the evaporative loss control device (ELCD) developed by Esso, which uses activated charcoal to trap hydrocarbon vapours from the fuel tank and carburettor, and then releases them to the engine at defined intervals of operation.

Mr B. W. Millington (Ricardo and Co., Engineers (1927), Ltd) reviewed recent work on the study of soot formation in the exhaust, and explained that X-ray spectroscopy showed it to have a graphite structure with hexagonal basic carbon units linked into platelets giving a crystallite about $21 \times 13 \text{ \AA}$ in size. Mr A. E. Dodd (MIRA) and Mr J. Spiers (Perkins Engine Co.) reviewed various smoke meters for assessing diesel exhaust and pointed out their various shortcomings. The relationship between density measurements and subjective appearance to non-technical observers of vehicle emissions from the exhaust pipe confirmed that, for steady speed full load conditions, the subjective reaction was related to carbon concentration and rate of discharge by the formula $C\sqrt{G}=K$, where C is solids concentration (g/m^3); G is the rate of discharge (litre/s) simply calculated for 100 per cent volumetric efficiency; and K is a constant representing a particular degree of acceptability.

Details of experiments with a barium compound diesel fuel additive for suppressing smoke were given by Mr B. E. Knight and Mr C. H. T. Wang (CAV, Ltd). Films of combustion with and without the additive were shown by the authors and illustrated the earlier disappearance of the luminous flame when the smoke suppressant was used. Results from engine tests showed that 0.5 per cent of additive in the diesel fuel reduced the weight of carbon by some 50 per cent; carbon monoxide and carbon dioxide were slightly increased and hydrocarbon content in the soot was reduced. Aspiration of the additive in petrol with the intake air has a smaller effect on smoke.

AMERICAN RESEARCH

Gloomy Forecast

It will come as no surprise that for the second year in succession a marked drop is forecast in the growth of expenditure on research and development in the United States. The prediction, prepared by Dr W. Halder Fisher and Mr L. Lederman, economists at the