line of work involves mosaics: some mongols have an extra chromosome in all of their cells, others in only a few. Although it is not feasible at present, if some mongols could be made into mosaics, their appearance and behaviour would resemble more closely those of a normal person. Other puzzling questions include the number and nature of genes carried by the extra chromosome.

Prevention apart, the institute aims to make life a lot better for the mentally retarded. Already it has been effectively demonstrated that after appropriate training mentally retarded individuals can be economically productive, not only in sheltered workshops but also in open employment. It is, however, both unfortunate and surprising that the information service provided by the institute is well financed, while the actual research work is dependent on charities and private donations.

More about Pollution

Most records of air pollution are from towns and industrial areas and there is much less information on background levels of pollution in agricultural districts. To remedy this state of affairs, the Agricultural Research Council has now compiled a comprehensive review of the literature on the effects of air pollution on plants and soil.

The report describes a number of toxic elements and pollutants; how they originate and how they should be treated. The total emission of smoke in Britain, for example, has been declining for some years but reaches a higher concentration in winter. Deposited matter, including soot, tar, dust, grit and ash, is mainly derived from the combustion of solid fuels. So, too, is sulphur dioxide; in 1963, 68 per cent of sulphur dioxide came from burning coal, 7 per cent from coke and 25 per cent from oil. At Battersea and Bankside power stations in London, flue gases are washed with water from the Thames to which chalk has been added: this process removes 90 to 98 per cent of gases but it is costly, and more attention has been paid to dry processes in recent years. Fluorides are emitted by some brickworks and possibly by some potteries and cement kilns, but fluoride pollution is rarely reported in Britain now. It remains to be seen whether photochemical or oxidant smog, often referred to as Los Angeles smog, will be troublesome in Britain in future.

According to the review, the toxic effects of many pollutants vary with species and variety, with environmental conditions, with nutritional levels and with the stage of growth of the plant. Smoke and deposited matter have an adverse effect on photosynthesis by reducing the light intensity, blackening leaves and blocking stomata. Conifers are particularly sensitive to sulphur dioxide, which causes acute damage to leaves. In soils which have suffered heavy pollution for prolonged periods, oxidation and solution of the gas in rain water result in increased acidity and sulphate content of soil, with a corresponding reduction in calcium and other gases and reduced activity of micro-organisms. Fluorides, on the other hand, act as cumulative plant poisons and the consumption of such vegetation can cause fluorosis in cattle and sheep. Oxidant smog produces silvering and bronzing of the lower leaf surface, although it can cause physiological

disturbances and reduced growth in some species without producing any visible leaf symptoms.

Landing on Venus

from a Correspondent

THE drama at Jodrell Bank last week when the Soviet Union Venus 4 spacecraft reached the planet recalled the days of the early sputniks ten years ago.

Signals from Venus 4 were picked up at 0417 BST, some 40 minutes after Venus rose above the horizon. They were described as consistent with the signal strength recorded in July, with 2-tone telemetry similar to the Luniks' transmissions but speeded up four times. Besides recording, Jodrell was also measuring Doppler shift. At 0440 the distance of Venus 4 was estimated at 30,000 km and speed change at 30 cm per second per second. The received signal strength was 10^{-17} watt, assumed to be 1 watt transmitter power boosted to 200 watts effective power by the 2-metre directional antenna on the spacecraft.

It was estimated by the Jodrell team that if a Venus orbit or a main spacecraft soft landing was aimed for, the signal shift would slow between 0550 and 0530, the expected time of arrival at the surface. No such signal modifications occurred while the spacecraft continued to transmit and show enhanced frequency shift. At 0515 it was estimated to be 10,000 km from the surface. At 0538 05, the signals ceased, compatible with the probe ceasing to transmit at about 100 km from the surface.

As is now known, this was in fact the beginning of the main experiment, but further signals were not expected, and though the equipment continued to observe no recordings were made of the early part of the new transmissions. These began 15 seconds after the end of those from the main spacecraft. There was a hundred-fold drop in signal strength, compatible with the loss of the 2-metre high gain antenna, and the same telemetry as before was apparent but with many fewer data, as would be expected from the power reduction. The apparent stillness of the new transmissions led the Jodrell team to assume that the signals were coming from an ejected capsule actually resting on the planetary surface.

Some time later, it occurred to the Jodrell team as well as to some other commentators that the data had been transmitted in real time as the ejected capsule descended from 25 km to the surface of Venus in 90 minutes. Soviet sources gave 90 minutes as the period taken to descend and this exactly corresponds with the transmission registered at Jodrell Bank. The capsule transmission cut out sharply "as if on command" at 0714 BST. There has as yet been no conclusive evidence that the capsule did make a soft landing on the surface, or that its transmissions continued after touchdown, or that it directly measured surface conditions. It was certainly designed to do all these things—it had the same basic configuration as last year's first successful Soviet lunar soft landing by Lunik 9, with a weighted base to ensure it settled right side up. Indications are that this was not the main object of the experiment but a possible bonus. A sounding of entire Venus atmosphere from top to bottom which must have included very near-surface measurements makes a significant addition to planetary knowledge.