differences. Mr P. K. Smith (University of Sheffield) complemented these studies with a demonstration of the use of penetrating statistical tests (principal component analysis followed by factor analysis), which provide a firm basis for analysing clusters of infant behaviour patterns. He confirmed Dr Hutt's observation that English children, at least, exhibit some highly significant sex differences. On a different tack, Dr A. Kendon (Bronx State Hospital, New York) gave a descriptive account of human greeting gestures, largely based on a film record of a party. This particular talk, however, illustrated the fact that human ethology is still hovering between the anecdotal and analytical levels. Systematic data analysis and presentation are necessary to convince sceptics that complex terminology reflects underlying behavioural mechanisms, rather than the verbal creativity of the observer.

MERCURY

In the Atmosphere

from our Geomagnetism Correspondent

THE recent public attention given to the levels of mercury in, for example, tuna fish and swordfish has led Weiss *et al.* (*Science*, **174**, 692 ; 1971) to investigate the complementary problem of whether or not the atmospheric content of mercury has increased in recent years and, if so, whether the increase may be attributed to man. On the face of it there is good reason for supposing that man's activities may have produced such an increase. The combustion of fossil fuels, the roasting of ores and the production of chemicals with mercury catalysts are all processes which could in theory lead to a significant rise in the mercury level, although there are also known natural processes which could contribute to such a rise. What Weiss and his colleagues have thus set out to do is to make quantitative estimates of what has been, and is, happening.

Their method has been to determine the mercury content of ice samples ranging in age from 800 BC to the summer of 1965. At the time of their formation ice samples record, and subsequently maintain in essentially unchanged condition, the composition of the atmosphere. Strictly speaking, the composition recorded is the composition of the materials which are washed out from the atmosphere by the relevant precipitation; but because rain effectively removes mercury from the atmosphere it may be confidently assumed that the mercury content of ice may be equated to the corresponding mercury content of the atmosphere. By analysing ancient ice samples and dating them using such methods as ^{210}Pb and fission product geochronology, oxygen isotope analysis or firn stratigraphy, it is thus possible to estimate the composition of the atmosphere as a function of time depending only on the availability of samples.

In this case the ice samples were taken from Greenland and Antarctica. The results indicate a significantly higher rate of deposition of mercury in recent years. Ice samples formed before 1952 had mercury contents ranging from 30 to 75 ng per kilogram with a mean value of 60 ± 17. By contrast, the mean value for the period 1952–1965 was 125 ± 52 ng per kilogram with a range of 87–230. The mercury content of the atmosphere has thus apparently increased by an average factor of two since early historic times.

To investigate the cause of this increase Weiss and his colleagues have attempted to calculate the relative contributions of mercury to the atmosphere from both natural and industrial processes. Clearly any such calculations must make many oversimplifying assumptions and the results can thus only be regarded as orders of magnitude; but in the sense that some of the computations may be made in different ways starting from different assumptions there are certain inbuilt checks on the validity of the results.

The flux of mercury from the continents to the atmosphere arising from natural processes is thus calculated by Weiss *et al.* to be in the range 2.5×10^{10} to 1.5×10^{11} per year. By contrast, the flux of mercury from the continents to the oceans by way of rivers is much less—a maximum of 3.8×10^{9} per year. Neither can industrial processes compete with the natural continent-atmosphere transfer, apparently. The mercury lost to the atmosphere in chloralkali production is estimated at 3×10^{9} g per year ; cement manufacture adds another 10^{8} g per year ; the roasting of sulphide ores could give another 2×10^{9} g per year ; and Bertine and Goldberg (*Science*, **173**, 233 ; 1971) recently showed that an upper limit of 1.6×10^{9} g of mercury per year can be released to the atmosphere through the burning of coal, oil and lignites.

Why, then, has the mercury content of the atmosphere recently increased by a factor or two? Weiss and his colleagues speculate that man is, in fact, responsible but not in the most obvious way. They attribute the natural transfer of mercury to the atmosphere to the degassing of the Earth's upper mantle and lower crust—a thesis supported by the fact that mercury is enriched in sedimentary compared with igneous rocks and the fact that atmospheric mercury concentration depends on barometric pressure.

INDUSTRIAL HEALTH

Exposure to Asbestos

from a Correspondent

ASBESTOS is an insidious pollutant. But because of its widespread industrial application as an insulator many workers are liable to be exposed to its effects. In a study of workers in a New England shipyard whose job was to cover pipes with an asbestos layer, signs

Role of Initiation Factor F3

IN *Nature New Biology* next week Ochoa and his colleagues, in two reports, describe their latest probings of the function of factor F3, one of the initiation factors responsible for catalysing the association between ribosomes, messenger RNA and the initiating species of aminoacyl-tRNA, fmet-$tRNA_f$, at the start of protein synthesis. Sabol and Ochoa show that factor F3 is not only required for the binding of messenger RNA to the small 30S ribosomal subunit at the beginning of translation but is also required for the dissociation of 70S ribosomes released from a messenger when they have completed a round of protein synthesis.

Sabol and Ochoa's experiments indicate that 70S ribosomes released from a messenger are dissociated when a molecule of F3 binds to the 30S subunit of the 70S ribosome. The released 30S subunit, with a molecule of F3 still attached, is then available to associate with another messenger molecule to form an initiation complex. Once this has happened the molecule of F3 is displaced as the 50S ribosomal subunit binds to the complex to form a 70S ribosome capable of completing the translation of the messenger. The liberated molecule of F3 meanwhile is free to dissociate another 70S ribosome running off the end of a messenger and so the cycle continues.

Factor F3 thus plays a crucial part in potentiating the 30S ribosome and Lee Huang and Ochoa report further evidence that different species of F3 factors exist in *Escherichia coli* which can discriminate between different species of messenger RNA and therefore regulate which are translated. They find that two F3 factors purified from *E. coli* infected with phage T4 and from uninfected cells differentially promote the translation of early and late T4 messengers and phage MS2 RNA. One factor promotes translation of MS2 and early T4 messenger RNAs and the other promotes translation of late T4 messengers.