in so doing. Apparently such an experiment is already being carried out.

A theoretical analysis of the "bulk" magnetic property of the film also showed up an interesting feature. By applying standard spin-wave theory, Professor Liebermann and his team found good agreement with experiment if the atomic magnets were assumed to line up preferentially within the plane and not perpendicular to it. This means that the film behaves in effect as a two-dimensional ferromagnet, provided there are at least two atomic layers of iron present.

FUSION RESEARCH

To Russia with Lasers

EARLIER this week, Dr N. J. Peacock of the Culham Laboratory left for Moscow to head a UKAEA team evaluating a nuclear fusion research device, Tokamak 3, at the Kurchatov Institute of Atomic Energy. The visit of Dr Peacock and his colleagues, arranged during a conference at Novosibirsk last year, is the most ambitious of a series of exchanges in fusion research between Britain and the Soviet Union which has been going on for ten years. But this seems to be the first time equipment has shuttled between the two countries —five tons of it was flown to Moscow last week. For the Culham Laboratory this is a rare chance to do some measurements on what by the standards of fusion research is one of the most promising devices yet built—according to Dr Peacock last week, Tokamak 3 fails to be a viable fusion reactor by only two orders of magnitude. As far as the Russians are concerned, the payoff will be measurements of the temperature and density of the electrons in the plasma more reliable than they can achieve themselves.

Fusion research long ago boiled down to the problem of producing a plasma of hydrogen isotopes at a high enough temperature—roughly 100 million degrees—for energy to be generated by fusion. At such temperatures, the only way of containing the plasma is by magnetic fields, but the fields tend to give way after a time and allow the plasma to cool down. Tokamak 3 is the largest and probably the most successful example of the confinement system known as the toroidal pinch, typified by the device called Zeta originally built at Harwell. A toroidal discharge of about 100 kA heats the plasma, which is stabilized by strong magnetic fields. The outer diameter of Tokamak 3 is 2 m and the inner diameter 20 cm. With this arrangement, the plasma is satisfactorily contained for a time in the range 1/50 to 1/20 seconds, which is good as fusion devices go. But the Russians have only approximate estimates of the temperatures and plasma densities, which is where the Culham team comes in. During the next few weeks, Dr Peacock and his team aim to check the Russian estimates of temperatures between 3 and 10 million degrees and densities up to 3×10^{13} particles cm^{-3}.

Fusion scientists like to use as many techniques as possible when they are measuring plasma temperatures and densities. Those at Culham have developed a technique based on the scattering of laser light from the plasma, which Dr Peacock says is the most unambiguous method so far devised. Two other less direct methods are in use, one based on measurements of the conductivity of the plasma and the other on the shape of the spectrum of X-ray bremsstrahlung from the plasma. The Russians use the bremsstrahlung method, easier than the laser method but a good deal less reliable. In the Culham method the plasma is irradiated by pulses of monochromatic light from lasers, and the spectrum of the scattered light is recorded. The electron temperature and density at any point within the plasma can then be found from the spectral distribution of the scattered light.

RESPIRATORY VIRUSES

Cold Comfort

FEW people manage to avoid the common cold and influenza is hardly a rare affliction. Not surprisingly, acute diseases of the respiratory tract are the commonest illnesses suffered by man, accounting for over 50 per cent of all human illness in temperate climates, but influenza viruses infect many species of animal; strains of influenza virus A have been isolated from swine, horses and birds. The cost of the human afflictions of these diseases in man-hours lost and mental and physical discomfort is high. The World Health Organization last published a report on viral respiratory infections in 1958, one year after the influenza pandemic that marked the appearance of the novel A2 virus. A new report on the same topic has been published recently (*WHO Technical Report Series*, No. 408, 10*s*.) following hard on the heels of epidemics of the popularly termed Mao 'flu (A2/Hong Kong/68), caused by a virus of the A2 subgroup but having distinct antigenic properties. There have been a number of advances in the decade separating the two reports and these are dealt with in some detail. The report concentrates on the aetiology and control of the influenza virus.

Influenza is caused by strains of *Myxovirus influenzae*. Viral infection of host cells is followed by the production of antibodies by the host to counter the pathogenic principle, or antigens of the virus. A change in the antigen complement of a particular virus subgroup will result in an influenza epidemic, until host resistance has been acquired by the production of the equivalent antibodies. A major change in the antigen complement will result in pandemic. This occurs at irregular intervals, the last occasion being 1967, when the subgroup A2 appeared. This was distinctly different from the A0 and A1 subgroups of earlier years and was responsible for the Asian 'flu pandemic of that year.

The only established procedure for conferring protection against influenza is vaccination. This involves infection of the host with viral antigenic material which has been attenuated or rendered harmless. The host will produce antibodies in response to this stimulus, which, if present in sufficient concentration, will confer some degree of immunity against further infection. The exact nature of the antibody antigen interaction is not clearly understood, but there is evidence that vaccination may produce effects similar to an allergic response in the host.

In the long run, the most promising method for the control of influenza would seem to be the induction of production of interferon by the host cell. Interferon is a protein which is non-toxic to the host cell, but which will effectively neutralize a variety of viruses. Research has not so far suggested an effective way of introducing interferon into affected cells, but it may