Venezuela. Plans are also being drawn up for two other centres, one in Manila and the other somewhere in French-speaking Africa. These centres are intended to provide instruction in anaesthetics for a few individuals who will then return to their homes and in turn instruct the rank-and-file. Dr Hingson hopes that this bootstrap operation will eventually relieve the present shortage, but he predicted that it would be two generations before even a reasonable standard of practice can be attained.

Funds for the centres come from the individual members and the member-nations of the federation. So far, Dr Hingson says, there have been no contributions from American foundations which normally support medical and health schemes. Quite plainly, the anaesthetists at the congress felt that if they were proposing to open centres for open-heart surgery or liver transplants, they would not have had this difficulty.

INFECTIOUS DISEASE

Detecting TB in Cattle

from our Microbiology Correspondent

ALTHOUGH tuberculin sensitivity has become the diagnostic method for the detection of bovine tuberculosis, the search for an alternative diagnostic test has been intense. The potential advantages are several. The use of the tuberculin test has precluded the vaccination of cattle against TB, because that would result in tuberculin sensitivity. The tuberculin sensitive response has also to be interpreted with caution because it does not necessarily indicate infection. Thus tuberculin-negative animals can quite frequently be found to have large tuberculous infections, an observation which may implicate other growth phases of the bacillus such as *L*-forms as causative agents of the disease. Canadian microbiologists in particular have been aware of the need for other diagnostic tests and, while recognizing that serological tests would be ideal, point out that a reliable system has not yet appeared. This, no doubt, is why Wallace and his colleagues have persevered with the bentonite flocculation test which they developed some years ago.

Results of a survey of healthy and tuberculous cattle using bentonite sensitized with human old tuberculin (*OT*) and a purified BCG antigen (*Fl*) are reported currently by Wallace *et al.* (*Canad. J. Microbiol.*, **14**, 887; 1968). The production of the BCG *Fl* antigen is also described (Diena *et al.*, *ibid.*, **14**, 881; 1968). The antigen appears to be a carbohydrate free of any tuberculin-like protein. Nearly one thousand tuberculin-negative and 141 tuberculin-positive animals were given the flocculation tests. In the tuberculin-negative control group, fifty-two per cent of the cattle produced a cross-reaction with the *OT* antigen. By contrast, only four per cent of the cows reacted positively with the purified BCG *Fl* antigen. The greater specificity of the *Fl* preparation is almost certainly related to the fact that BCG is a bovine strain. With the tuberculin-positive sample, the predictable increased level of positive titres was observed, but no significant difference between *OT* and *Fl* antigens emerged. The limitations of the flocculation test can be gauged from the failure to detect TB in cows shown to have visible lesions on post-mortem examination in seven and fourteen per cent of the *OT* and BCG *Fl* sensitized

animals respectively. The results of the study are nevertheless encouraging for the detection of TB infections using BCG *Fl*-sensitized bentonite.

The same group of workers has also investigated the duration of antibody response to mycobacterial antigens (*Canad. J. Microbiol.*, **14**, 921; 1968). Such information is obviously of value in deciding whether circulating antibodies are indicative of a previous patent or new tuberculous infection. In rabbits challenged with a variety of *Mycobacterium* strains, circulating antibodies were detectable after one week and began to disappear after the sixth week. High bentonite titres correlated with lesion development, and the *in vivo* proliferation of the bacillus was clearly implicated in the establishment of antibodies.

BIO-DETERIORATION

Southampton Conference

from a Correspondent

THE first International Bio-deterioration Symposium was held at Southampton from September 9 to 14 to consider all aspects of biological action leading to the deterioration of materials, products or processes of economic importance. There were approximately 200 delegates from a very wide spectrum of industrial, research and teaching establishments, which reflected the many different branches of science as well as specialized technologies involved in the study of bio-deterioration. The inter-disciplinary nature of the subject was further emphasized by the programme, which ranged from the bio-deterioration of traditional materials such as wood to the attack of synthetic polymers, and from considerations of the enzymology of the attack mechanism to practical problems in the use of proofing agents.

Mr J. Knox of the British Ministry of Technology gave the opening address, and, in speaking of the need for international cooperative research, organized at government level if necessary, emphasized the economic importance of the problem. Delegates were later reminded of this when several speakers referred to the considerable cost of bio-deterioration to specific industries.

The morning sessions of the symposium reviewed general problems of bio-deterioration. Dr H. J. Hueck in the first lecture argued for the real existence of this only recently recognized branch of science as a subject comparable to pathology, biosynthesis or toxicology. Dr T. G. Mitchell (for Dr J. M. Shewan) and Dr H. O. W. Eggs emphasized the way in which the traditional disciplines of taxonomy and ecology were essential to an understanding of bio-deterioration, and Dr G. Ayerst's contribution on the prevention of bio-deterioration by control of environment illustrated the application of the ecological viewpoint. Most of the papers on prevention, however, represented the more conventional approach and dealt with all aspects of biocides.

Many afternoon sessions expanded subjects which had been reviewed in the morning lectures. The diversity of interest was well illustrated by two sessions on the deterioration and protection of materials, which considered paint, PVC, paper, textiles, pharmaceuticals, industrial water, stone and works of art. A session on marine fouling was the only recognition given to bio-