tion, mortality among the larvae infected with certain strains of phytopathogenic bacteria was significantly higher than among the control larvae which had been fed non-infected leaves. The highest mortality rates were observed for *Erwinia* sp. 418_3 and 449_2 isolated from beech and for *E. aroideae* 144 isolated from cauliflower (53.3 ± 6.7 per cent, 58.5 ± 1.6 per cent and 40.2 ± 2.6 per cent respectively, as against 20.4 ± 11.3 per cent among the control larvae). By day 20, mortality from *Erwinia* sp. 418_3 was 93.3 ± 6.7 per cent as against a control value of 23.8 ± 11.1 per cent. Significant increases were also observed for *Erwinia* sp. 262_{2a} and 521_{3a} from beech (81.3 ± 6.3 per cent and 74.6 ± 5.1 per cent respectively after 26 days, control value 46.6 ± 9.7 per cent). Other strains of *Erwinia* from beech and cauliflower and strains obtained from cucumbers produced no statistically-significant increase in mortality.

After 26 days imago formation took place among the surviving larvae, and further development proceeded normally. The number of eggs laid by the adult beetles varied considerably but seemed unrelated to the type of infection. The authors conclude that the entomopathogenic properties of phytopathogenic bacteria depend on the bacterial strain and its natural habitat. It is noteworthy that anaerobic strains in general had a greater effect on the larvae, irrespective of their origin.

In a converse series of experiments, entomopathogenic bacteria were isolated from the haemolymph of sugar-beet weevil larvae, and identified as being of types close to the phytopathogenic *E. caratovora* and *E. aroideae*. These were found to produce disease in onion seedlings and unripe tomato fruits, with symptoms similar to those from typical phytopathogenic strains. The *E. aroideae* analogue seemed more virulent than that of *E. caratovora*.

It seems therefore that in natural conditions certain plants and insects may be susceptible to the same pathogenic bacteria — a fact which, the researchers stress, should be taken into account in any attempt to develop microbiological methods of combating crop pests and diseases.

BREAST CANCER

Anti-oestrogen Therapy

from a Correspondent

ADMINISTRATION of sex hormones or their analogues, whether androgenic, oestrogenic or progestogenic, can produce temporary remission in about one-quarter to one-third of patients with advanced breast cancer. Preparations of anti-oestrogens have also been used, for example, ethamoxytrithetol ('MER-25'), triparanol and clomiphene citrate, three compounds which are analogues of the non-steroidal oestrogen chlorotrianisene (chlorotris (p-methoxyphenyl) ethylene). The number of patients treated by these compounds, however, has been too small for any conclusion to be drawn about their usefulness.

There have, however, been trials recently in women with advanced breast cancer of a new anti-oestrogen, 'Tamoxifen' (ICI 46,474), which is related chemically to clomiphene. Cole *et al.* (*Brit. J. Cancer*, **25**, 270 ; 1971) used doses of 10 to 20 mg daily in patients who had already been treated by a variety of means. Ten of the forty-six patients treated had a good response as judged by reduction in size of the soft tissue masses and/or radiological evidence of regression of pulmonary or bone metastases and a further seventeen patients had a partial response. The response rate was similar to that seen with other forms of hormone treatment. Side-effects were mild; only two patients stopped treatment because of them.

Better results have now been reported by Ward (*Brit. Med. J.*, **1**, 13 ; 1973) in a study of sixty-eight patients with advanced breast cancer. Sixty per cent of the patients receiving daily doses of 20 mg of 'Tamoxifen' and 51 per cent of those receiving 10 mg each day achieved some reduction in the size of the tumour and in 38 per cent of the women this reduction was to one-half or less. Breast tissue and breast tumours contain "receptor" proteins which take up and bind oestrogens and it is possible that 'Tamoxifen' acts by preventing the uptake of oestrogens.

VIRUSES

The RSV Genome

from our Cell Biology Correspondent

ROUS sarcoma virus was discovered in 1911 by Peyton Rous and if anybody could raise the energy to compile a complete bibliography of reports of work involving this virus they would surely end up with a massive tome which might well continue growing exponentially for some time to come. But in spite of the vast effort that has been spent and the vast literature that has accumulated the size and structure of the RNA genome in RSV particles are still not known for certain.

The problem is that none of the RNA molecules that can be extracted from the virions is reproducibly infectious, so although the 60–70S RNA in these particles probably is or includes the viral genome this has never been proven unequivocally. This 60–70S RNA (and let us assume it includes the viral genome because the properties of the 4S, 7S and other minor RNAs that can be extracted from RSV particles strongly suggest that they cannot be genomic) has curious properties. Most notably on denaturation, either by heating or treatment with denaturants such as DMSO, it sediments at 30–35S instead of 60–70S. Moreover, the 30–35S RNA has a greater electrophoretic mobility than has the 60–70S RNA. Clearly these differences can be explained in two ways ; either the 60–70S RNA is a single polynucleotide chain which can undergo dramatic

Double Helix from Mononucleotides and Polymer

IT has not so far been evident that double-helical structures are formed when mononucleotides associate with a single-stranded polynucleotide. For the system of adenine with polyuridylic acid the evidence is that only triple-stranded helices, with a base ratio of 2U : 1A, are formed. Now Pörschke, Hoffman and Senear, writing in next Wednesday's *Nature New Biology* (March 14), have found that a two-stranded complex, just like poly (A) · poly (U), can in fact be formed when an adenine derivative stacks onto poly (U). In N-6,9-dimethyladenine the additional hydrogen bonding site required for the attachment of a second poly (U) strand is blocked. The dimethyladenine also has a strong stacking propensity, and binds readily to poly (U).

Miles and his associates have already shown that the infrared spectrum of the complex is similar to that of poly (A) · poly (U). The first demonstration that Pörschke *et al.* give of 1 : 1 stoichiometry is by equilibrium dialysis, in which the binding ratio is incompatible with saturation at one dimethyladenine to two uracil residues. Second, a spectrophotometric continuous-variation mixing experiment gives a sharp maximum of hypochromicity at a base ratio of 1 : 1. The binding is cooperative and the complex displays a sharp melting curve like a two-stranded polymer.

That base pairing with hydrogen bonding is indeed involved was confirmed by showing that 6-N,N′ dimethyladenine, in which both hydrogen atoms at position 6 are replaced, does not form a complex with the poly (U). By the temperature jump method, the kinetics of the interaction of the monomer with poly (U) were found to be characterized by a relaxation time in the μs range, which is about three orders of magnitude slower than triple-strand interactions, in which there are three reactants. The stacking of monomers alone, in the absence of base pairing, occurs at a rate which is some three orders of magnitude faster again.