

negative staining techniques for examining tissues, cells, and pellets from associated fluids.

(a) *Budding particles.* The maturation (budding) process is known in detail for leukaemia viruses in mice and chickens. Confirmation of similar processes in human tissue would be good evidence of virus formation.

(b) *Detached particles.* These particles should possess a dense central region or nucleoid separated by a clear zone from the envelope which should have unit membrane structure. The envelope may or may not exhibit an external fringe. The nucleoid is not uniformly dense and may have a filamentous structure. The boundary of the nucleoid is sharply delimited. The presence of particles possessing a double shell, the inner of which is more electron dense and thicker than the outer, is considered to be of significance. However, the presence of particles consisting of two unit membranes, one inside the other, is not considered significant.

Particles of uniform size and consistent morphology should be present (if only isolated particles can be found identification is less certain).

The characteristics described here are important in distinguishing viruses from secretion granules, specific granules of blood cells, elementary bodies of *Mycoplasma*, etc.

In addition to these criteria, evidence for the presence of nucleic acid (presumably RNA) in the nucleoid by cytochemical methods should be sought and if found would argue strongly in favour of the viral nature of the particles.

Great caution should be exercised in the use of negative staining in the search for virus particles and whenever possible results should be confirmed by studies with thin sections. To be significant a number of particles of uniform size and consistent morphology should be present.

The avian and murine leukaemia virus particles have not so far been shown to possess the characteristic symmetrical structures that allow many other viruses to be easily recognized by this method. Nucleoids can be observed in murine and avian leukaemia virus particles if the particles are fixed before negative staining. The consistent presence of similar structures in human material would be an indication of viral nature.

The 'tails' that may be observed in leukaemia viruses after negative staining are not sufficiently characteristic to be useful as a diagnostic criterion.

This statement is being published both in this journal and in the *Bulletin of the World Health Organization*.

Engineers by Television

A PILOT experiment in the use of television for training professional engineers is to begin in Poland in September. In the first year of the project, four television production centres at Warsaw, Gdansk, Wroclaw and Katowice will broadcast five half-hour programmes each week on the Polish television network. In 1967-68 and thereafter, there will be ten programmes a week covering the material normally included in the first and second years of the Polish engineering curriculum. The pilot scheme is being sponsored by Unesco, and will be conducted in such a way that other authorities wishing to use educational television for professional training will be able to do so. Students wishing to follow

the television course in engineering will be required to pass an examination so as formally to enrol and to qualify for paid study leave and the travelling expenses that will from time to time arise in visiting university centres. Formally enrolled students will also have first call on a set of text-books. It is expected that some 9,000 students will be taken on in the first academic year of the project, and that there will be room for 12,000 in later years, when instruction in the core of the engineering course is properly under way.

Enthusiasm for television teaching is clearly as high in Poland as it is wherever else television educators meet. Mr. I. Waniewitz, director of education television in Poland, says that his next objective will be a television course for training teachers. But first there is to be a thorough study and evaluation of the engineering course, not only in educational terms but also from the point of view of those concerned with cost-effectiveness. That could be a valuable piece of work.

Abstracts for Physics

WHAT information do physicists want and what is the best way of making it available? These are the questions that *Physics Abstracts* is trying to answer. The British Institution of Electrical Engineers, which publishes *Physics Abstracts*, is using £54,000 from the Department of Education and Science to carry out a 3 year study into the problems of a physics information service. According to Mr. J. R. Smith, assistant director of the Institute and head of the project, there are really four problems to be solved: (1) What is physics and what fields should it cover? The area that is now covered by the abstracts could easily be doubled. (2) What should be in the literature—should books, theses, and patents, as well as journals, be included? (3) What services do physicists actually need and want? (4) What is the best way of mechanizing *Physics Abstracts* and also turning it into an efficient information retrieval service?

The American Institute of Physics, which works jointly with the I.E.E. on *Physics Abstracts* and is co-operating on the present project, has its own documentation research project and has recently started investigating a "community network for physicists"—the information network from primary journals to the data centres required for disseminating information. The I.E.E.'s study will form a middle section of this overall review.

The British project grew out of a private conference on physics abstracting held in London in October 1964, which concluded that *Physics Abstracts* should be mechanized and that a service for information dissemination and retrieval should be established. To answer these needs, the I.E.E. is attempting to prepare a 'unit record' of each piece of data; each record will contain enough information for a variety of uses, including the present abstract journal and the current-awareness journal, *Current Papers in Physics*—a bi-monthly tabloid giving brief references for nearly all physics literature that will later be abstracted. In addition, the 'unit record' could be used for machine retrieval—straight searches for particular information, for selective dissemination of information, or for printed indexes.

Mr. Smith is hopeful that within a very few years such a mechanized system could be used for the