Bacteriological warfare defense points to new multipurpose filtering medium now available to civilians

A VERY THIN FILTER, called the first line of defense against bacteriological warfare, is finding scores of new peacetime uses in medical and industrial laboratories. The membrane, or millipore, filter was suggested by researchers at the Chemical Corps' Camp Detrick back in 1947. Now a reality, the filter was termed a "revolutionary detection device," around which a workable defense against bacteriological warefare (BW) can be built, by Maj. Gen. William M. Creasy, Chief Chemical Officer, in a speech last week.

The filter greatly reduces the time required for bacteriological analyses. For example, in defending against BW, conventional methods of plating and incubation are too time consuming to be used to detect harmful microorganisms and their toxic products. Using the millipore filter, however, these agents can be trapped and identified within 15 hours, about one sixth the time formerly required.

Aside from its military uses, the filter medium offers bacteriologists in many fields an effective new tool for concentrating and culturing microorganisms. In recent studies, it has been shown that the filter can be used in both liquid or gaseous systems.

Available to Civilians

The millipore filter is now being mass produced and it is available to civilian laboratories. The filtering medium is said to have a uniform cell structure that approaches unimolecular dimensions. The volume defined by the material is about 80% voids. There are about 5×10^7 pores per square centimeter.

Filtration of microscopic and submicroscopic particles is achieved as a surface phenomenon or as a screening action. Retention is defined by pores of controlled size. The material approaches optimum efficiency as a filter in terms of retention and resistance to flow.

Another property of the filter is that it provides a porous matrix—virtually a plane surface—upon which to culture microorganisms. Cultures may be grown on the surface of the filter when the bottom of the sheet is placed in contact with liquid nutrients.

The millipore filter has several advantages for the analyst. The area of the filter disk is ruled off into squares which represent $^1/_{100}$th of the total filtering area. This speeds visual counts of bacterial concentrations.

Even when used with particles varying over a wide range of sizes, the filter enables accurate microscopic examinations. The filter material can be made transparent with immersion oil, permitting study of retained particles and great flexibility in analysis. In addition, the filter medium is soluble in ketones, so thin transparent films of the material can be made.

Water Examinations

One of the most important uses for the new filter is in the bacteriological examination of water and sewage. Bacteria counts by older methods were restricted usually to one milliliter samples. The bacterial concentrations have to be more than 25 organisms per ml. to get a true picture when using these older determinations.

Makers of the filter claim that adoption of the new technique to quantitative bacteriological water tests will result in lower costs and will reduce materially the time, labor, and laboratory space needed for such tests.

The millipore's unique properties suggest several possible applications in the food and food technology fields. Filtration of wines and other liquids can be accomplished easily with the new filter. Bacteria - free water, for soft drinks and other special uses, can be processed. In addition, rapid process control counts can be taken in industrial fermentations, such as yeast, alcohol, or antibiotics.

Public Health Applications

In bacteriology the new filter medium could be used in bacterial nutrition studies and research on bacterial dissociation. The filter could be used in public health studies where rapid isolation and identification of harmful microorganisms is vital. The method might be of particular value in detecting typhoid carriers and in examining food handlers.

Medicinal applications for the filter include screening and assay of new antibiotics, filtration of certain pharmaceutical fluids, and research on antiseptics and germicides.

The millipore filter adapted for use with airborne particles is valuable in air pollution studies. These filters effectively collect sulfuric acid mist and other pollutants sometimes missed by other methods. This type filter also can be used for pollen counts and for the collection and detection of radioactive and fluorescent particles.

And a Plastic Petri Dish

Along with the membrane filter, another piece of equipment which has seen military service is being used by bacteriologists. It's the plastic Petri dish, also devised at Camp Detrick. This innovation will save several thousand dollars annually just on military needs.

Costing only about one tenth as much as the usual Petri dish, the plastic dish is thrown away after use. This saves labor and sterilization costs which quickly mount when conventional dishes are used. The plastic dish is shock resistant, too.

Sterilization of the plastic dish is unnecessary because the heat of molding kills microorganisms that would interfere with actual tests. The dishes are shipped in sterile containers so they are ready for use when needed.

The dishes are particularly adapted to field use. The weight of the new dish is considerably less than the older glass models. Field sterilization ovens or special equipment are not needed.

Danger of infection to laboratory personnel is said to be considerably lower when the plastic dish is used. The transparency of the dish also enables the bacteriologist to make an examination of a culture without removing the lid.