

MILITARY SCIENCE

Gas Warfare Challenged

► **CHEMICAL AND BIOLOGICAL** weapons stockpiled for wartime use are being examined with grave ethical "considerations" by physicians who are questioning the moral and even practical justification of their use.

Many of the biological weapons can trigger afflictions that doctors have labored for centuries to eradicate, said Drs. Victor W. Sidel and Robert M. Goldwyn of the Harvard Medical School, who are members of the executive committee of an organization called Physicians for Social Responsibility.

Objections even to the "humane argument" are reported in *The New England Journal of Medicine* 274: 21, 1966.

Once the Pandora's box of weapons has been opened, the doctors say, "military commanders will select the most effective, and therefore the most lethal."

They divide the weaponry into two classes, one of which includes the nonlethal tear gas employed against the Viet Cong.

Chemical weapons are toxic to man, to animals and plants, but exclude explosives, smoke, flame and incendiaries. Biological weapons include living organisms or their toxic products whose use causes death, disease or disability. Plants and food supplies also are contaminated.

The scientists list toxic chemical agents in six categories, three nonlethal and three death-dealing.

The nonlethal agents are irritants, vesicants or blistering material and psychochemicals. Irritants produce excessive watering of the eyes, coughing, difficulty in breathing, nausea and vomiting. The blistering agents include sulfur mustard, also called mustard gas, the arsenical called lewisite, a new distilled mustard and two nitrogen mustards.

The blistering agents are more insidious in the gaseous phase because the effects may not be known for several hours and many victims will remain in the gas-laden atmosphere until severe damage is done. Mustard gas, which is a liquid at room temperature, penetrates leather, clothing, plastics and other materials. It evaporates slowly and can cause problems several months after it is used.

The third nonlethal chemical category is the psychochemicals, which can produce hallucinations, and which include LSD-25. Widely publicized, this d-lysergic acid diethylamide is odorless, tasteless and colorless. It may produce a wide spectrum of psychopathological reactions and psychoses in which the victim may be unaware of his altered behavior.

The killer gases attack the nerves, the lungs and certain enzymes, the physicians said. Nerve gases are the newest, the most effective and the most likely to be used. They are colorless and odorless organic phosphates that enter the body either as gases by way of the lungs or as liquids through the skin.

The person may think he has hayfever when he gets a low concentration of the

lethal nerve gases, because he may show an allergic reaction, along with excessive narrowing of the eyes and difficulty in breathing.

If he gets a higher dose he will have nausea, vomiting, muscular twitching, convulsions and respiratory paralysis that may lead to death.

Newer varieties, the doctors said, possess all the qualities that make an excellent chemical warfare agent and are so potent that in heavy concentration even a single inhalation can kill.

They also listed the World War I gases, chlorine and phosgene, and said the latter is still considered for possible use in warfare.

Biological weapons, however, can really be the more insidious of the two types of weaponry. Protective measures are difficult

SURGERY

Best Heart Valves Sought

► **HEART VALVE** replacements are causing some controversy among surgeons, some favoring metal or plastic devices, and others preferring human or even animal tissue.

Advocating the use of valves from newly dead persons is Sir Russell Brock, president of the Royal College of Surgeons in Britain, and director of cardiology, Guy's Hospital, London, whose views were reported in the *Journal of the American Medical Association* 194:21, 1965.

Taking the stand that human tissue is as good and perhaps better than artificial material for repair of heart valves is Dr. Charles P. Bailey of St. Barnabas Hospital, New York. He pointed out that repair can be done using tissues from the person's own body, thus lessening the danger of rejection.

A number of surgeons who prefer metal or plastic material, argue that it may not pose the problem foreign tissue does in affecting an individual's immunity. But Sir Russell and Dr. Bailey said that more time is needed to evaluate prosthetic valves.

Artificial valves have not been in use long enough for their long-term survival rate to be evaluated, Dr. Bailey pointed out. Failure rates as high as 37% within a year after transplantation have been reported.

Sir Russell's principal objection to the artificial valve is that it represents too radical a departure from the shape of the natural valve. At Guy's Hospital more than 100 patients have had their aortic valves replaced with those of recently dead persons. The earliest of these patients has now survived three and a half years, and tissue rejection has not been a problem in the other patients.

Both surgeons agree that it is difficult to get a variety of heart valve sizes from cadavers and that the solution could lie in the use of "heterograft" valves, or valves from the lower animals.

and medical treatment would be extremely difficult to carry out for a large number of victims.

Physicians themselves may be asked to develop such weapons, and the writers said each one must carefully evaluate his own attitudes toward his rights as a citizen and as a doctor.

Physicians for Social Responsibility now has members throughout the United States and is concentrating on the problems of the nuclear as well as chemical and biological aspects of modern war.

Any condoning of the manufacture or use of some of these weapons "seems a tragic reversal of medical progress and a disquieting rejection of the Hippocratic Oath," the writers stated. The young, the elderly and the infirm will be particularly susceptible victims, they warned.

No mention was made of a possible escalating war in Viet Nam, but its horrors are clear, not only for the enemies of democracy but for its advocates as well.

• *Science News Letter*, 89:34 January 15, 1966

SOCIOLOGY

More People Prefer Suburbs to City Living

► **FOR THE FIRST TIME** in the nation's history, more people are living in the suburbs than in the cities.

About 68 million people were living in the suburban areas in 1965, compared with 61 million living in central cities, according to Max S. Wehrly, executive director of the Urban Land Institute, a non-profit research organization.

Only three years ago, more people, about 58 million, lived in the city, whereas 55 million lived in the more rural areas.

A growing conflict between man the social animal and man the individual can be eased by comprehensive planning of attractive subcenters or clusters of dwellings with enough stores, branch offices and utilities for the people in each cluster to be self-contained. These metropolitan centers would be divided by refreshing green spaces of parks and forests and be connected with expressways and rapid transit systems.

• *Science News Letter*, 89:34 January 15, 1966