

the distinction has been made, researchers have yet to learn why cancer cells need the external supply and how they use it.

Dr. Old, with Dr. Herbert F. Oettgen and co-workers, reported results of clinical trials at the meeting of the American Association of Hematology in Toronto this week. Five patients, three of them children, with acute lymphoblastic leukemia, responded well, they said. The three children had complete bone marrow remissions. Another patient, with acute myeloblastic leukemia, showed temporary improvement. But, the researchers caution, six other patients showed no response at all and there is no evidence the remissions will be permanent. They stress that clinical use of L-asparaginase is so new that it is impossible even to speak of it as treatment, let alone a potential cure.

One serious problem facing physicians studying L-asparaginase is that there is not enough of the enzyme available to give to patients in meaningful doses. Experiments in mice show that the amount of L-asparaginase required to cure leukemia in these animals is 100 times greater than the dose used to bring about a temporary remission. Dr. Old says no human being has yet received enough of the enzyme to cure leukemia, if indeed a massive dose would do the job.

The short supply is the result of the time-consuming and complex proce-

dures required for the enzyme's production. Although scientists have known about L-asparaginase since 1961 when it was identified as the anticancer agent known to exist in guinea pig serum, useful quantities would require tens of thousands of animals, and no one considered trying to produce it in any quantity until 1963, when researchers learned it could also be extracted from the common intestinal bacteria *Escherichia coli*.

But even though a ready source of supply is now available—*E. coli* can be easily grown in tremendous quantities—production problems abound: Growing the bacteria in the first place takes three to five days. Then they have to be washed, which may take another two days. To extract pure L-asparaginase, scientists must precipitate it by column chromatography, an extremely complicated process that takes another four to five days. Dr. Old is confident that faster methods and new sources of L-asparaginase will be found, but in the meantime available procedures severely limit the possibilities of mass production.

So far, L-asparaginase activity has been studied only in terms of its effect on leukemias, but researchers suspect it may be active against other types of cancer as well. The National Cancer Institute, Bethesda, Md., has awarded grants to eight different research groups for L-asparaginase study. ♦

emotional bonds. But that also meant an attendant increase in frustration and aggression, says Dr. Holloway. Also in the service of survival came the enlarged brain and its capacity to symbolize. Then evolution played a strange trick: It infused the intellectual-symbolic structures with strong human emotions. Symbols like clan, tribe, race, state, nation and ideology became capable of inspiring the strongest emotional feelings—positive for one's own group, negative for those outside.

Man, in other words, can't look to lower, brute instincts for an explanation of his wars because they are rooted in his own much-valued intellect. "Man is up against himself—he is up against social structure—he is up against culture," says Dr. Holloway. "These are his costs as well as his gains."

For some of the anthropologists, the warfare to be concerned about is not that of primitive peoples, but of modern society, civilized society, American society in particular and especially in Vietnam.

"Wars in most authentic primitive societies are highly ritualized, self-limiting and qualitatively distinct from ours," says Dr. Stanley Diamond of the New School for Social Research.

"I think that there is an extremely deep psychopathology which is involved with the character of our social structure in almost every conceivable way," says Dr. Diamond. It is rooted, he says, in disassociated persons: "persons who have permitted themselves to be reduced to social functions, alienated, bureaucratized, persons who can kill for an abstract strategy but who are out of touch with their own capacity to express and transcend hostility."

Dr. Seymour Melman of Columbia University, the only non-anthropologist at the symposium and one of the country's foremost experts in conversion from a wartime to a peacetime economy, focuses on the U.S. Department of Defense—which he sees as a distorter of American society.

Military spending in this country amounts to \$87 billion a year—more than half the world's total annual military budget of \$150 billion, says Dr. Melman.

Who needs the war system . . . the military establishment, he says.

In an age when nuclear horror has made military defense an anachronism, those involved with the huge defense establishment have nevertheless been able to maintain the myth that they can defend American shores.

"They cannot do it," says Dr. Melman, but the mythology remains, and is instilled in the culture's children.

Dr. Mead has few words for this point of view. "Saying your society is

WAR

A Human Idiosyncrasy, Anthropologists Conclude

Man's curse, constant companion, and social invention—war—doesn't often come under close scrutiny. Men simply do it all the time; they don't know why, and seldom ask.

Anthropologists this year asked why and amassed a bulk of evidence that goes far toward opening up two troubling questions: What drives us to legalized killfests and what are the consequences to ourselves and nature?

The evidence was presented in an eight-hour symposium at the annual association meeting early this month and reflected wide-ranging views drawn from cultural, physical and medical anthropology.

From the start the anthropologists drew a sharp line between aggressive behavior in animals and human wars, a parallel often used to explain warfare.

"I think there is no continuity between animal aggression and what we call war," says Dr. Margaret Mead, curator of ethnology at the American Museum of Natural History. There is much continuity between animal behavior and the actions of a man who

gets his foot trod on in a subway and comes back with a punch in the ribs, or between fighting stags and human rivals, says Dr. Mead. But war is something else. "War depends on man's capacity to symbolize."

Legal killing, in other words, arose hand-in-hand with the developing human ability to break down natural perceptions into symbols—thoughts, ideas and words. Once a man could make symbolic distinctions he was able to identify his own men as "insiders"; other men as "outsiders" and therefore less than human. The human symbolic capacity allows men to deny others their species, says Dr. Mead. The others become "legitimate prey—and so non-human—or predators, whom it is noble to fight and kill—and so non-human." The symbols become a trap.

"Human evolution has been the evolution of a paradox," says Dr. Ralph L. Holloway Jr. of Columbia University. On one hand, human beings—requiring a high degree of cooperation to insure their evolutionary survival—developed a capacity for heightened

the only wicked one in the world is like saying it's the only good one," and amounts to extreme ethnocentrism. "It's a bore, just a bore," she says.

No one nation can achieve peace; all will have to be involved, Dr. Mead points out, and she suggests a future world in which men would no longer be able to draw their historic, exclusive lines between nations, races, customs, religions and ideologies.

The alternative to war is not a world federation, since revolution would only replace wars between states. Therefore, says Dr. Mead, the essential functions of life must be spread out in a network over the globe so that no one group can fight another without cutting off, for example, its food. Shipping might be in one center; finances in another; food distribution in another, in an overlapping interdependent system, somewhat analogous to the international monetary system.

SAFEGUARDS

Counting the Plutonium

Among the scientists who developed the atomic bomb, the hope that nuclear energy could be used for peaceful power was a happy dream shadowed by the nightmare fact that any reactor would produce plutonium equally useful for weapons.

The dream became a reality—but so did the nightmare. And attempts to forestall the prospect of nuclear weapons proliferation rely mostly on the development of international techniques to keep track of the fission material produced in reactors, and to insure that it isn't diverted to weapons production.

The hopes for controlling the spread of weapons improved slightly last week when Germany, Brazil, Italy and India—all critics of the proposed U.S.-Soviet draft of a nuclear non-proliferation treaty—had kind words for President Johnson's pledge to open all U.S. nuclear facilities not connected with weapons production to inspection by the International Atomic Energy Agency.

Johnson's announcement—made on the 25th anniversary of the first successful atomic reactor, a prototype of the pile that produced plutonium for the bomb that destroyed Nagasaki—was followed by a similar pledge on the part of Great Britain.

The U.S. already has put one power reactor, the Yankee plant at Rowe, Mass., under IAEA inspection. Recently, inspectors visited the fuel reprocessing plant of Nuclear Fuel Services, Inc., West Valley, N.Y., which services the Yankee station.

Experience at these sites has shown that keeping track of fissionable mate-

rial in reactors themselves presents relatively few problems: "a cinch," is the way one industry spokesman describes it.

In the first place, fuel for most reactors now going into the line uses slightly enriched uranium, with only a few percent of fissionable U-235 and the rest U-238. For weapons, the uranium must have a much higher percentage of U-235.

Beside this, the nuclear fuel gets very little handling in the reactor. Fuel elements are received at the plant, sealed in the reactor, and left there until they no longer have enough U-235 to maintain fission. Keeping track of fuel elements, and insuring that none get misdirected, is relatively simple.

But the fission process that produces heat for power generation also affects the U-238, turning it into plutonium, which is also fissionable. So fuel elements that become depleted in U-235 are shipped to a fuel reprocessing plant, where any remaining U-235 is removed, along with the plutonium produced.

In the processing plants, the problem is more difficult. Here, bomb-quality material—plutonium—is present in large quantities. Moreover, the process of working with radioactive material, melting it down and making a solution of it, then separating the plutonium and U-235, involves some fairly exotic chemistry. The presence of inspectors demanding information at critical moments, perhaps gaining access to industrial secrets in privately-run plants, is an unsettling prospect.

European companies—particularly in Germany—have made foreign inspectors' access to commercial processes a key argument against IAEA.

Nevertheless, the U.S. willingness to open nuclear installations to international inspection—while not overcoming the non-nuclear nations' contention that they are being asked to give up weapons with no compensation—was taken abroad as a step in the right direction.

DRAFT

Deferments for Graduate Science Students

A special report to National Security Council this week is urging draft deferments for graduate students in natural sciences, mathematics, engineering and health. If the recommendation is accepted, the draft situation will remain much as it is for the nation's science students, though their contemporaries in the liberal arts will not fare as well. Of the nation's 144,000 graduate students, about half would come under the categories recommended for deferment. The recommendation comes from a special Interagency Advisory Committee on the draft.

ALDABRA

Saved by the Pound

The devaluation of the British pound shook international finance. But it also seems to have provided a reprieve for the ecology of Aldabra.

For months Aldabra's virgin ecology has lived under the threat of invasion (SN: 8/12). The British Ministry of Defense, backed by the U.S. Defense Department, planned to build an air base, complete with 9,000-foot run way and a BBC-operated radio station. Last February the prestigious British Royal Society began to worry about the matter, and three months later threw its full weight behind efforts to ban the base. Soon the Society was joined by the U.S. National Academy of Sciences, the American Association for the Advancement of Science, the Smithsonian Institution and platoons of individual scientists in both countries.

The fighting became fast and furious, with impassioned speeches in the House of Commons and scientific expeditions to the atoll preparing lengthy reports in defense of the unique ecology of the Aldabra group.

Then British Prime Minister Harold Wilson devalued the pound.

That did it. The Wilson's action resulted in some \$250 million in defense spending cutbacks, and the island base was one of them. "We have decided not to proceed with the Aldabra project," said Wilson.

ELECTION

Brode to Head Chemical Society

Dr. Wallace R. Brode, a leader in international science diplomacy, has been elected president of the American Chemical Society for 1969.

He was science adviser to the Department of State from 1958 to 1960.

In 1960, Dr. Brode, who is a Trustee of Science Service, won the Priestly Medal, the highest award in American chemistry.

His research has been on the chemistry of dyes, optics and photographic processes.

During his teaching years—1928 to 1948—at Ohio State University, he developed sets of models to enable students to visualize molecular structures. His text, "Chemical Spectroscopy" is a standard reference.

A member of the National Academy of Sciences, Dr. Brode is former foreign secretary of the ACS.

