PHARMACOLOGY

Fight For Life Between Blue Dye and Cyanide Described

THE WARFARE and strategy that goes on in the human body when the blue dye, methylene blue, is called in to fight poisonous cyanides was revealed in a report by Dr. William B. Wendel of Washington University School of Medicine to the Federation of Societies for Experimental Biology.

Dr. Wendel's study showed that methylene blue can only win the fight for life against the poison when the dose of cyanide is not great. Successful use of the dye as antidote in a case of cyanide poisoning was reported last fall by Dr. J. C. Geiger, San Francisco Director of Public Health. The antagonistic action of the dye for cyanides has been observed by a number of scientists. Mrs. Matilda M. Brooks of the University of California claims to have first suggested its use as an antidote in poisoning and suicide cases.

Cyanides cause death by suffocation, since they interfere with the supply of oxygen to the tissues. Methylene blue fights cyanides by converting some of the oxygen-carrying hemoglobin of the blood into a new chemical compound, methemoglobin. This new compound is able to force the cyanide out of combat by uniting with it to form the chemical union, cyan-methemoglobin, which is harmless itself, and which keeps the cyanide from interfering with the vital, oxygen-carrying activity of the rest of the blood hemoglobin.

The only difficulty is that when very much of the poisonous cyanide has gotten into the body, too much hemoglobin is mobilized by methylene blue for the fight against the enemy, and not enough is left to carry on the important job of feeding oxygen to the tissues. So that even if all the poison of a large dose were forced into chemical union with methemoglobin, the fight would nevertheless be lost and death result from lack of oxygen, or asphyxia.

Dr. Wendel found that it would take nearly two-thirds of all the hemoglobin in the body to overcome four deadly doses of the poison. In Dr. Geiger's case, probably from one-fourth to one-third of the total amount of hemoglobin was withdrawn from its normal job of oxygen-carrying in order to overcome the poison. If Dr. Geiger's patient had absorbed two or three times as much of the deadly cyanide, however, he almost certainly would not have survived, in spite of the use of methylene blue because in such a case far too much hemoglobin would have been diverted from oxygen-carrying to combining with the dye and the poison.

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ENGINEERING—GENERAL SCIENCE

Unknown Almost Infinite, Measure of Progress Shows

EARLIER in the depression it was fashionable to blame all of our troubles on science and its machines. Moratoria on science were urged by several well-intentioned if misinformed persons.

Those who were figuratively panting in an attempt to keep up with science and engineering felt that our economic troubles were due to the fact that pure and applied science have advanced too fast. The non-scientific activities of mankind such as finance, government, business and philosophy had not been able to keep up with the procession of civilization lead by science.

The scientists, on the other hand, while admitting that science seems to have outstripped the other functions of our civilization, nevertheless point to the many frontiers upon which the advance of knowledge is pressing. Compared with what we know, what is unknown is nearly infinite.

This controversy puzzled a mechanical engineer, James Winston, and he determined to figure out whether applied science is so efficient as the non-scientific leaders take for granted. Since engineers have made some of their most remarkable advances in automobile development, Mr. Winston made an inquiry into how much or how little further they can progress in the development of automobile transportation before reaching perfection.

"The weight of a small five-passenger sedan is around 2500 pounds," he explained in a communication to *Mechanical Engineering*. "The weight of five average passengers will be about 800 pounds. Therefore in order to transport a useful load of 800 pounds a total load of 800 plus 2500, equal to 3300 pounds, must be transported. This represents an efficiency of 24 per cent. in the load ratio.

"The next step is to determine the efficiency of the engine. According to numerous tests the average automobile engine can convert only one-fifth of the energy in the gasoline into power. In the language of science this represents a thermal efficiency of 20 per cent.

"Similarly the mechanical efficiency of the engine is 80 per cent., and that of the transmission machinery, 80 per cent. This makes the overall efficiency of automobile transportation of passengers 3 per cent.

"We can see, therefore, that in one of his most successful lines of activity the engineer has attained an efficiency of only 3 per cent. In other words, he must advance 33 times as much as he has thus far in order to attain perfection.

"If this progress seems too fast for philosophers, financiers, business men, and others, it seems so only because their own advance has been very much less than 3 per cent."

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Nine out of ten injuries or deaths from lightning occur in the country and small town districts.

A pickle manufacturer in Australia peels onions by subjecting them to a fierce gas flame for three seconds as they roll down an incline, thus burning off the skins.