OUR SUPER-POISON GAS
First Story of Compound 72 Times Deadlier Than “Mustard,” Manufactured Secretly by the Thousands of Tons

I had the fragrance of geranium blossoms. It was an oily amber liquid, highly explosive, and bursting into flame with water. It was the American super-poison gas, deadly by contact or by inhalation of the smallest detectable portion. A drop on the hand would cause intolerable agony and death after a few hours. It was called methyl (partly because that name did not describe it) and it was the climax of this country’s achievement in the lethal arts.

The signing of the armistice spared the enemy any first-hand acquaintance with the terrors of methyl. Major Gen. W. L. Sibert, in command of the Chemical Warfare Service, had directed that 3,000 tons of it, in shells and drums, be in readiness on the battlefield March 1, 1919.

Ten tons a day were being produced in an eleven-acre plant near Cleveland, Ohio, and the plant was two months ahead of its schedule when Foch crossed No Man’s Land to offer terms to a beaten foe. It is estimated that ten tons of methyl is one ton more than enough to depopulate Manhattan Island; and so it is not difficult to guess what would have happened had Hindenburg and his cohorts persisted until Spring.

Two days after the armistice was signed, workmen began dismantling the big plant. They scrapped the complicated and expensive apparatus, every piece of which had been specially planned and manufactured for the production of the most terrible instrument of man-slaughter ever conceived. On Feb. 1 the work of demolition was complete. There remained no trace of that scattering array of barracks and laboratories which had been a cradle of death. But the formulas, processes, and personnel were painstakingly set down for the records at Washington against the contingency of another war.

There did remain, however, tons and tons of methyl. What was to be done with it, now that there was no longer any active occasion for exterminating Germans? Cleveland did not want the deadly stuff dumped into Lake Erie, and there seemed no practicable method of neutralizing its deadliness chemically. Almost enough was on hand to destroy the entire people of the United States, and some safe way must be found to dispose of it.

The ocean was selected as its cemetary-basin. Difficulties were met in transporting the stuff from Cleveland to the ocean. Handling such quantities was perilous. So it was put into big iron containers, for it does not react on iron, and those containers were loaded into freight cars. Then there was assembled the most extraordinary train probably that ever traversed American railroad tracks. It moved under an armed guard and on a special schedule. No railroad employe rode on it except the engine driver. The train moved slowly, so that two days were consumed in the journey from Cleveland to the Edgewood Arsenal near Baltimore. And then the iron containers were stowed gently in a ship and taken fifty miles to sea, where they were lowered over the side into water three miles deep.

Rust will eat pinholes into those containers, and there will be a minute and gradual intermixture of water with their fatal contents. In such circumstances—there is no flame, but a slow chemical reaction which produces two nontoxic compounds. Experts do not believe even that fish will perish from the presence on the ocean bed of this vast quantity of poison. When the salt water of the Atlantic embraced the last of those iron tanks, flms was written to a chapter in American war effort which, until now, has been a secret scrupulously guarded.

Compare this secret new compound with “mustard,” which the chemists dubbed “king of poison gases.” Mustard was first used by the Germans, with terrific effect, at Ypres, July 20, 1917. Thereafter its use became general, and afforded such marked tactical advantage to the enemy that retaliation by the Allies became imperative as a matter of self-preservation. American chemists devised a formula one-fourth more toxic than that used by the Germans. The gas, known to chemists as dichlorethyl sulphide, is now the common property of the combatant nations. The processes by which it is made are generally known. It is a sweetish liquid, both in taste and smell, about as volatile as turpentine. In contact with the skin its presence is at first not noted. Then there begins the burning and swelling which prompted its nickname among the Tommies. It spreads through the tissues, and on reaching the lungs breaks them down, setting up what is called “chemical” pneumonia, usually fatal.

Methyl is somewhat more volatile, and is comparable in that regard with benzol. Instead of being insensible at first contact, it sets up an acute and almost undearable pain. It does not spread through the tissues, but poisons the blood and attacks first the kidneys, then the heart and lungs. It hardens the cell tissues of the lungs, and causes simultaneously strangulation and a heart affection which speedily produces violent death. If taken into the lungs by inhalation in any perceptible quantity it kills almost instantly. It is estimated to be seventy-two times deadlier than mustard.

The processes of manufacturing the two poisons differ radically. It is not permissible even now to tell what basis is used for methyl, but its manufacture from the raw material requires but a short time. The equipment is elaborate. No fear is felt that experimenters will be able to make such a gas. That the United States came to know of such a poison was due, in the first place, to an accident. Years ago a student of chemistry, then living in another country, happened upon a combination which almost cost him his life. It was a compound never made before, or at least never recorded. Subsequently he came to this country, and when the question of poison gases came to the fore he recalled his narrow escape and imparted the information to the Government. The production of methyl resulted.

Not one worker died from poisoning. In large measure this was due to the precautions enforced by Captain George A.
Messa Hall was the plant where the Methyl Gas was Made; the Workers Slept in Hastily Constructed Barracks in the Stockade.

required three months. The speed accomplished was due to the fact that the biggest industries in the United States fitted for that kind of work put themselves behind Uncle Sam in his war effort.

Colonel F. M. Dorsay, formerly chemical engineer of the National Lamp Works of the General Electric Company, a graduate of Ohio State University in 1900, and a man who added courage and tremendous driving energy to his specialized technical ability, became chief of the development division under General Sibert. The General Electric Company permitted him to give all his time to the work, whose success would have been impossible without the facilities of the National Carbon Company, F. S. Terry and G. B. Tremaine, General Manager, and J. E. Randall, its consulting engineer, offered their facilities and met all the expense involved, under an agreement to be reimbursed later at the convenience of the War Department. This was to save the time of all concerned. The equipment was hurriedly increased, and the speed of the development division was increased.

M. H. McAdams, a graduate of the University of Kentucky, 1913, became Colonel Dorsay's executive assistant and organizer. His executive and engineering experts and executives were recruited from the largest and most successful industrial establishments in the United States. The companies put into the war work assigned to them not only the super technical equipment of their employees, but also their own tremendous resources.

In the production of mustard and other poison gases known to the public, no such complaint could have been made about methyl, even if the public had known anything about it. This compound is made to the Chemical Warfare Service also as G-34. The preliminary experimental work with it was done by the Research Division at the American University, Washington. When General Sibert on July 12 last told Colonel Dorsay to electrify the project, it had been produced by a laboratory process of five steps. Subsequently the sixth and fifth steps were evolved. But the immediate problem was the design and layout of a full-scale equipment for practical production. Some of the raw materials required were of an unusual nature for such work, and the engineers had to work in a vacuum. It was necessary to manufacture two of them in the plant itself. And it was necessary to assemble all these new organizations in a very short time.

Colonel Dorsay set to work with that task, energized by the very existence of the company, by the knowledge that the company did not produce anything, and by the knowledge that it did. The soil was fertile, the work was under way.

This plant, within six miles of the Cleveland public square, was in a congested district, and great precautions were necessary to avoid ever the possibility, which could not happen, that the work of the project was to be the death of the plant. But few outsiders ever became aware of the nature of the work being done in East 131 St. Street, and no serious trouble was caused by it. The second-story room was converted into a control and research laboratory, and was equipped with seven well-ventilated hoods and all the necessary equipment. The rapid assembly of the plant was made possible by the co-operation of Cleveland manufacturing concerns, whose attitude throughout the war has been thus expressed: "If we have it, the Governor can have it; if we haven't, we'll get it." At this plant no barracks or mess halls were provided, and the men ate cold meals, served in the mess halls, and slept in the neighborhood. As each arrived, he was told what was being done and its importance was explained to him; and the officers in charge report that the work performed efficiently and the tanks were clear of any aid given to them, although often they were tedious and hazardous.

The results of this work were immediately transmitted to the Edgewood Arsenal (Hastings-on-Hudson, plant), to the National Aircraft and Chemical Company at Buffalo, and to the Dow Chemical Company at Midland, Mich. At each of these places mustard gas was made in quantities. Nela Park, so named from the initials of the National Electric Lamp Association, forerunner of the National Lamp Works, was the hub from which these spokes radiated. At Nela Park investigations were made of two other poisonous gases, before the methyl work was undertaken, but the War Department stopped the other investigations before they were completed. The main result of the 131st Street plant was the development of mustard; the main result at Willoughby was the production of the death-dealing methyl.

Poison Gas Worker Armed Against Injury With Mask and Suit of Special Material.

to Cleveland on April 25, 1917, to enlist the aid of the National Carbon Company and the National Lamp Works of the General Electric Company. At that time mustard gas was the main point, and electric power was required to make chlorine and graphite for the electrodes. Moreover, expert knowledge about chemistry was required on the defensive side of the work, in devising gas masks and other protective apparatus. For example, tests at Nela Park proved that coconut hulls were the best raw material for making absorbent charcoal, and so that material became the standard. The plant of the Great Lakes Refining Company in Cleveland was set up for mustard gas search, and its personnel of 35 was increased to 175 officers and enlisted men. That was a massive increase, an example of the methods adopted to meet the greatest emergency in America's military history.