CHEMICAL WARFARE

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CHEMICAL WARFARE

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CHEMICAL WARFARE SERVICE

Of Interest To All Arms

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Edited By STAFF, CHEMICAL WARFARE SCHOOL

"Every development of science that makes warfare more universal and more scientific makes for permanent peace by making war intolerable." *Brigadier General Amos A. Fries.*

Editorial Comment.

GRADUATION OF THE SECOND LINE OFFICERS' CLASS, U.S.N.

Saturday morning December 20th graduation exercises were held upon completion of the second course for Line Officers, U.S. Navy. Fifteen officers completed the course and were given certificates.

The exercises were opened with a short address by Colonel Exton, Commandant of the School. Colonel Exton expressed the regret of the School that the period allotted to this course was of such short duration, it being impossible to give the amount of instruction desirable in the short period allotted.

Rear Admiral William R. Shoemaker, U.S.N., made the principal address and presented the certificates to the class. Notes from Admiral Shoemaker's address will be found on page 12.

The following officers were given certificates:

Blackford, Cope M.,	Lt. (MC) U.S.N.
Cady, John P.,	Ensign, U.S.N.
Craven, Thomas T.,	Lt. (jg) U.S.N.
Crowe, John F. Jr.,	Lt. (jg) U.S.N.
Eicks, Casper H.,	Lt. (jg) U.S.N.
Helm, Jesse B.,	Lt. Comdr. (MC) U.S.N.
Johns, Llewellyn J.,	Lt. (jg) U.S.N.
Kernodle, Michael H.,	Lt. (jg) U.S.N.
Millhouse, Edwin C.,	Lt. (jg) U.S.N.
Moureau, Reinhard C.,	Lt. (jg) U.S.N.
Smith, John G.,	Lt. (MC) U.S.N.
Van Cleve, Joseph C.,	Lt. (jg) U.S.N.
Wencker, Florentin P.,	Lt. (jg) U.S.N.
Whitten, Robert T.,	Lt. U.S.N.
Winslow, Alan F.,	Lt. (jg) U.S.N.

RELATION BETWEEN INDUSTRY AND CHEMICAL WARFARE.

By C. H. Beebe

War has become so complex that it now involves not only the armies of a nation but all its natural resources as well as the productive capacity of its non-combatant citizens. Success in war demands success in industry and preparedness requires the existence of well organized thriving factories. This is true, not only because of the requirements upon the metal industries necessitated by the use of firearms, big guns, and dreadnaughts, nor because of the huge quantity of essential explosives which must be manufactured, but also for the use of the newest and most effective weapon yet devised, gas warfare.

The actual use of this weapon depends, as is doubtless apparent to the reader, upon the existence of a personnel versed in the technique of its use, supported by a research organization of specialists possessed primarily of a thorough chemical education augmented by considerable experience in this special field itself. The real basis for production, however, on the scale necessary for use of chemicals in war, lies in the industries, particularly the chemical industries.

Now to a large extent many industries not usually considered to be chemical are really so, essentially. Thus even the steel and cement industries require chemical control to insure uniformity and duplicability in their products. The great advances made by these and similarly constituted industries would have been unimagined and impossible without the aid of chemistry and its applications. In many such cases the part played by chemistry may seem insignificant on cursory observation and does often appear so to non-technical executives, but diminished success and failure would follow on the heels of the abandonment of chemical control and research.

Some industries are, however, so absolutely chemical in nature as to be obviously so. The fundamental industries of this character are those which manufacture the so-called heavy chemicals, such as the common acids, sulfuric, hydrochloric, nitric, and the caustic alkalies. It has been said that without sulfuric acid modern industrial civilization would be impossible, and many other extensively manufactured chemicals are almost equally important. Many forms of manufacturing not essentially chemical yet depend on these common chemicals as part of their raw material and the same is true of the dye industry and the manufacture of war gases and explosives.

One of the most essential chemical industries for the purposes of national defense is the nitrate industry. At present the United States is dependent chiefly upon the importation of sodium nitrate from Chile for its supply of nitrates necessary for agriculture, and besides, for explosives and war gases in time of war. The same was true of Germany and other nations before the war. Some progress in the commercial fixation of nitrogen had been made but the

extraordinary requirements of war brought the culmination of the development. After the first battle of the Marne, when it became apparent to the German war lords that the war would continue much longer than predicted and that all foreseen requirements of explosives would be greatly surpassed they succeeded in avoiding the abandonment of the war early in the spring of 1915 only by the successful development of the nitrogen fixation industry. This rendered Germany self-supporting in this essential material and independent of outside sources blockaded by her enemies. The obvious lesson for us in this is the importance of the Muscle Shoals development and of other nitrogen fixation plants in this country, in order that we may be assured of an adequate supply of nitrates if the supply from Chile be cut off.

Of all chemical industries, however, the most important is the dye industry. Because of its great complexity it, more than any other, develops and fosters all other chemical industries necessary to it and incidentally to the production of war gases, explosives and pharmaceuticals. Thus the dye industry is one of the largest consumers of acids, alkalies, coal tar, nitrates and other heavy chemicals.

The complexity of this line of manufacture is almost beyond belief. Tens of thousands of dyes have been produced in German factories, and nine-hundred or more actually sold in America alone before the war, for Germany had a practical monopoly of the business. Each of these dyes requires a more or less distinct process of manufacture. They all descend from their common ancestor, coal tar, by an enormous number of family lines, through about ten crudes and three-hundred intermediates. The quantities obtainable and the by-products depend chiefly upon the laws of chemistry and cannot be greatly altered by the will of the manufacturer. This is well illustrated by the manufacture of mononitrotoluene by the nitration of toluene. Ordinarily there results 35% of the para-compound, 63% of the ortho- and 2% of the meta. Though containing the same elements these are arranged differently in the three compounds with the result that they are noticeable different in properties and in the products which can be made from them. Thus for instance paranitrotoluene is a solid and the others are liquid. There was a great demand in the German dye business for orthonitrotoluene as an intermediate for making certain dyes, but the necessary accompanying production of the para-compound greatly exceeded the demand for it with the result that many thousand tons of paranitrotoluene accumulated in the German dye works which were persistently seeking some way of using the unavoidable excess, only a small amount being applicable to the manufacture of useful dyes. About 1904 further effort became unnecessary, for the explosive properties of trinitrotoluene (T.N.T.) had been discovered and its adoption as a military high explosive made every pound of the accumulated and future excess paranitrotoluene available for easy conversion into this

explosive. Thus the manufacture of dyes must be carried out on a large scale with the aid of immense resources, and an enormous amount of research is continually necessary.

Most of the war gases are more or less complex organic chemicals derived from substances many of which are among the common intermediates occurring in the dye industry. Thus this industry is the very source from which the industries or the government must draw the materials necessary for the manufacture of war gases and explosives.

Probably more important still is the fact that it is also the most important training ground for chemists and is the chief factor in encouraging the pursuit of organic chemistry as a profession. It is obvious that lack of trained and adaptable men would be much more serious to a nation than lack of the finished products needed. Expert knowledge and energy can surmount many material difficulties. Most of the chemical warfare research personnel of the warring nations was drawn from the dye factories and related chemical plants. This was one item in the advantage which Germany possessed. Even at present many of the research men now engaged in Chemical Warfare investigation here, were formerly with the dye industry in this country, which has come into existence chiefly since 1914. The Chemical Warfare Service will always have to rely on this industry for research personnel in time of need.

"The chart showing the intimate relation between the manufacture of war gases, dyes, explosives and pharmaceuticals" was drawn under the writer's direction for the Chemical Warfare Service exhibit at the Chemical Exposition in New York, 1920. A copy of this chart is now in possession of the Chemical Warfare School, Edgewood Arsenal, and copies with a description have also been issued as Chemical Warfare Service Information Set No. 57. A part of this description will, however, be given here with the hope that it will be possible for the reader to consult the chart in connection with it.

This chart is an idealized representation of a factory in which a wide variety of chemical products is produced. Starting on the top floor with a number of raw materials or crudes such as salt, alcohol and chemicals derived from coal (coal tar crudes) - benzene, toluene, xylene, phenol and naphthalene-, there are shown on the floors below the more important types of equipment required in carrying out the chemical transformation of the crudes into the intermediates and finished products. To avoid confusion many of the steps involved have been omitted but some of these will be included in this description. The purpose of the chart was to show not only the chemical relation of the products but also the fact that the same types of apparatus are used showing how it is possible for the dye factories to shift to the manufacture of explosives or war gases in a few days or weeks.

Sodium chloride, or common salt (1), is a crude from which

three very important intermediate chemicals, chlorine (5), caustic soda (3), and hydrochloric acid (8) are derived. Caustic soda and chlorine are prepared by electrolyzing a solution of sodium chloride. The chlorine which escapes as a gas, is either liquefied and stored in cylinders, is used directly as a gas, or is used for making bleaching powder (6). The sodium hydroxide is obtained in solid form (3) by evaporating the solution from the cells to dryness.

Hydrochloric acid is obtained by heating sodium chloride with sulfuric acid in a retort or similar apparatus the gas evolved being absorbed in water.

These three chemicals, caustic soda, chlorine and hydrochloric acid, are vital intermediates in the manufacture of a vast number of dyes, medicinals and other chemical products of peace, and one or more of the three is required in the production of practically every known war gas. The equipment required and the reactions involved in making a number of the war and peace time products are illustrated on the chart.

Bleaching powder mentioned above is used extensively as an oxidizing agent in bleaching paper pulp and as a disinfectant. It is also used as an intermediate in the production of chlorpicrin, and for the destruction of mustard gas.

Chlorine and carbon monoxide (9) in the presence of a suitable catalyzer, react to form phosgene (10). Phosgene, an important war gas, is also used extensively as a dye, medicinal, perfume and flavoring extract intermediate.

As an example of its use as an intermediate, for making the dye, crystal violet, phosgene and dimethylaniline are mixed, heated under pressure in the presence of zinc chloride, the mixture then made alkaline with caustic soda and the base of the coloring matter thus formed is dissolved in sulphuric acid and precipitated as the chloride (crystal violet) by the addition of sodium chloride. Diethyl violet and ethyl purple are prepared in the same way by substituting diethylaniline for dimethylaniline.

In 1919, 51,872 lbs. of crystal violet were imported in the United States and 2,919 lbs. in 1920, the rest required being manufactured by various American companies.

Another phosgene dye is wool green S made from phosgene, dimethylaniline and beta-naphthol. 212,362 pounds of this dye were made in the United States in 1920.

Phosgene is also used in making synthetic coumarin, an ingredient of synthetic vanilla; in making methyl heptin carbonate, the essential principle of synthetic essence of violet perfume; and the value of guaiacol, a drug used in the treatment of tuberculosis, is greatly increased by treating it with phosgene.

Another chemical involving chloride whose production is illustrated in the chart, is sulphur chloride (11), which is made by passing chloride over molten sulphur. Sulphur chloride is used with ethylene (16) in the production of mustard gas (12); a peace time

use of sulphur chloride is in the vulcanization of rubber.

Anhydrous aluminum chloride (13), an important catalyst, is formed by heating aluminum with dry chlorine gas. It is used in the synthesis of a large number of organic compounds, - among them is the tear gas chloracetophenone (27).

Ethyl alcohol (14), used so extensively in the arts and industries, plays also an important part as a war chemical.

In the production of mustard gas, alcohol vapor is first converted to ethylene gas (16) by passing through a column of kaolin fragments heated to a high temperature. The ethylene thus obtained is stored in gas tanks and is an intermediate in both of the processes employed. In the sulphur chloride process previously mentioned, ethylene gas is simply bubbled through sulphur chloride. The reaction which takes place results in the formation of dichlorethyl sulphide (mustard gas) (12).

In the other method (chlorhydrin method), ethylene is treated with hypochlorous acid (formed by passing chlorine into water) to form ethylene chlorhydrin (17). The ethylene chlorhydrin is then treated with sodium sulphide which results in the formation of dihydroxyethyl sulphide (thiodiglycol) (19). Thiodiglycol reacts with concentrated hydrochloric acid to form mustard gas (20).

Fulminate of mercury (21) is prepared by adding alcohol to a cold solution of mercury in nitric acid contained in a large flask. A very violent reaction takes place which is moderated by the further addition of alcohol. On cooling, the solution of mercury fulminate crystallizes in shining white or grey colored prisms.

Connection of ethyl alcohol with two intermediates, diethyl aniline (22) and benzyl aniline (23) themselves used for various dyes, is also illustrated.

Two other important chemicals which may be derived from alcohol are acetic acid (24) and acetone, although in peace times most of the acetic acid and acetone are obtained indirectly from the distillation of wood. The conversion of alcohol into acetic acid involved a second fermentation carried out by percolation over wood shavings carrying the proper bacteria. The resulting acetic acid is converted into acetone by passing the vapors over red-hot lime as a catalyst.

Both acetic acid and acetone are extensively used in the industries. The largest use of acetic acid is in the manufacture of the pigments, white lead and verdigris. It is also used in the printing and dyeing of textiles and enters into the manufacture of many drugs. Acetone is used principally as a solvent for fats, resins and other gums, nitrocellulose (cordite, gun cotton, pyroxylin plastics) tannin, acetylene. It is also used in storing acetylene.

Two war time uses of acetic acid and acetone are illustrated in the chart. By treatment with bromine, acetone is readily converted to bromacetone (25), a tear gas. By treating acetic acid with chlorine, monochloracetic acid (26) is formed. This material

on conversion into chloracetyl chloride and coupling of the latter with benzene in the presence of aluminum chloride yields chloracetophenone (27). Monochloracetic acid is also used in making the dye, indigo.

The domestic production of indigo in 1920 was 18,178,000 pounds and the importation that same year amounted to 520,000 pounds, as indigo is one of the best dyes known. This is of special importance in connection with the manufacture of the important lachrymator, chloracetophenone.

Incidentally these examples of the close relation between the products derived from alcohol used in peace, and those used in war show the importance of encouraging the use of industrial alcohol as an element of national defense.

Of all the chemical products which enter into the question of national defense, the so-called coal tar chemicals are undoubtedly the most important. Coal tar (28) is obtained as a by-product in the manufacture of coke in by-product ovens and in the manufacture of coal gas for city distribution. In both of these processes, the essential chemical operation is to decompose certain special grades of bituminous coal by heating to high temperature out of contact with air. The products obtained are coke, tar, ammonia and gas.

There are several other substances which have been obtained from coal tar but those mentioned on the chart are of special importance, namely, benzene toluene, xylene, phenol and naphthalene.

Of the benzene (29) derivatives, nitrobenzene (25) is one of the more important. This is made by slowly adding a mixture of nitric and sulphuric acids (commonly known as mixed acid (34) to benzene. This treatment of mixed acid is called nitration and the receptacle in which the nitration takes place is a nitrator. Nitrobenzene is used for the preparation of a number of dyes and for making other intermediates such as aniline (36) which is prepared by the reduction of nitrobenzene with hydrochloric and iron filings.

Starting with aniline, one may proceed to the two war gases diphenylchlorarsine and phenyldichlorarsine. The first step consists in treating aniline with hydrochloric acid and sodium nitrite. This results in the formation of phenyl-diazonium-chloride (37). This compound, which is also a dye intermediate, is then treated with sodium arsenite to form phenyl arsenic acid (38). Phenyl arsenic acid when heated with hydrochloric acid, sodium bisulphite, potassium iodide and benzene results in the formation of phenyldichlorarsine (40). By further reaction between phenyldichlorarsine and phenyl arsenic acid at higher temperatures, diphenylchlorarsine (39) is formed.

Many dyes, particularly the so-called azo dyes are obtained from aniline through phenoldiazonium chloride. Besides those mentioned on the chart, Ponceau and chrysoidine, one of the most important is naphthalene blue black produced from aniline, p-nitraniline and an acid derived from naphthalene. The domestic production of this dye

was 2,680,864 pounds in 1920. In the same year 7,737,000 pounds of Erie black GX, 2,050,741 pounds of Erie direct black and 284,285 pounds of magenta were also produced all of which are dyes derived from aniline.

Dimethylaniline (41) also shown on the chart and its homologue diethyl aniline are among the chief substances used in combination with phosgene for production of dyes such as wool green S and crystal violet previously mentioned, as well as many others including acid violet of which 144,207 pounds were made in the United States in 1920 and auramine of which 127,567 pounds were produced in 1919.

Another important derivative of aniline is p-nitraniline (44) obtained from the intermediate product acetanilide (43). Para-nitraniline is used extensively in cloth mills for when the cloth is run through a solution of it and then through a solution of beta-naphthal a dye called para-red is produced in the fabric. Another aniline derivative not mentioned on the chart is diphenylamine an important intermediate for various dyes and also for the toxic smoke, D.M.

Toluene (30), like benzene, is the starting point for a large number of intermediates and finished products. By nitrating toluene with mixed acids trinitrotoluene (47), the high explosive, is formed. The importance of this material to the German factories as a means of using paranitrotoluene which had been practically a waste material has already been mentioned.

Benzyl bromide (48),a tear gas, is formed by treating toluene with bromine. Benzyl chloride (49) is formed by treating boiling toluene with chlorine. This is the intermediate for the dye patent blue and also for the war gas brombenzylcyanide (50) which is formed by first converting benzyl chloride to benzyl cyanide by treatment with sodium cyanide, the product in turn being treated with bromine.

In a similar manner, the coal tar crude xylene (31) may be transformed into the war gases xylyl bromide (51) and bromxylyl cyanide (52). Xylene is also a starting point for making intermediates used in the manufacture of such dyes as scarlet S,xylidene S and Benzopurpurin 4B.

Phenol (32) is a crude which is extensively used as an antiseptic and as an intermediate in the production of a large number of medicinals. It is readily converted into picric acid (53), the high explosive and dye, by nitration with mixed acids. Picric acid is itself used in the manufacture of chlorpicrin (54) by treatment with bleaching powder.

Naphthalene (33) in addition to being used for the manufacture of moth balls,is used in signal rockets for producing a black smoke and by nitration is converted into a high explosive, trinitronaphthalene (55). When naphthalene is oxidized in the presence of a catalyst, the very important dye intermediate phthalic anhydride (56) is produced. This intermediate with resorcinol and bromine

makes the dye eosin; and by treating phthalic anhydride with ammonia, phthalimide is formed which is used in the manufacture of indigo.

From the foregoing discussion it is evident that the same raw materials, intermediates and much the same equipment can lead to dyes, explosives and war gases. Thus nitration, nitrosation and chlorination in particular are applied in the manufacture of all these classes of substances.

It is evident therefore that those who have a thorough knowledge of these reactions and can successfully carry them out on a commercial scale can, in peace time, produce commercial chemical products and in war time, war gases and explosives.

We now have a fairly thriving dye-stuff industry producing about 90% of the domestically used dyes, not organized as a trust but consisting of several large companies and various smaller ones. It is urgently desirable to foster this industry by tariff rates and anti-dumping regulations so that America may never again be at the mercy of another nation in chemical matters as she was to a considerable extent during the early part of the last war.

As a further illustration of the importance of the dye industry to the waging of modern war it is interesting to consider the German dye industry which was one of the chief sources of German strength and military advantage during a great part of the war. As a result of the monopoly in dyes enjoyed by the German factories before the war they had become organized in six big companies which in turn became combined in an immense dye trust called the Interessen Gemeinschaft which enjoyed the support of the German government. Their research laboratory became a great and highly efficient organization. Hundreds of chemists were constantly employed there and close cooperation existed on the part of the chemistry departments of universities. As a result an immense amount of scientific data was accumulated and most of the organic chemical literature in existence is of German origin. The German public was very cognizant of the importance of chemistry and of their dye industry. As an example of how closely the progress of this industry was followed by the public, when it was announced that the great Hoechst Works had purchased the important patent which made possible the very large scale production of synthetic indigo the company's stock advanced 150 points on the stock exchange in a single day.

The explosives and war gases used by the Germans during the war were produced solely by the big dye factories as is shown by the following data concerning them. Thus the F. Bayer color factories at Leverkusen and Dormagen, in peace times the producers of azo triphenylmethane, and alizarine dyes as well as the common acids hydrochloric, nitric, sulfuric and other heavy chemicals, produced during the war approximately six hundred tons of chlorine per month, thirty tons of phosgene, three-hundred of diphosgene, two hundred of chlorpicrin, sixty of xylyl bromide, twenty of bromacetone, three-

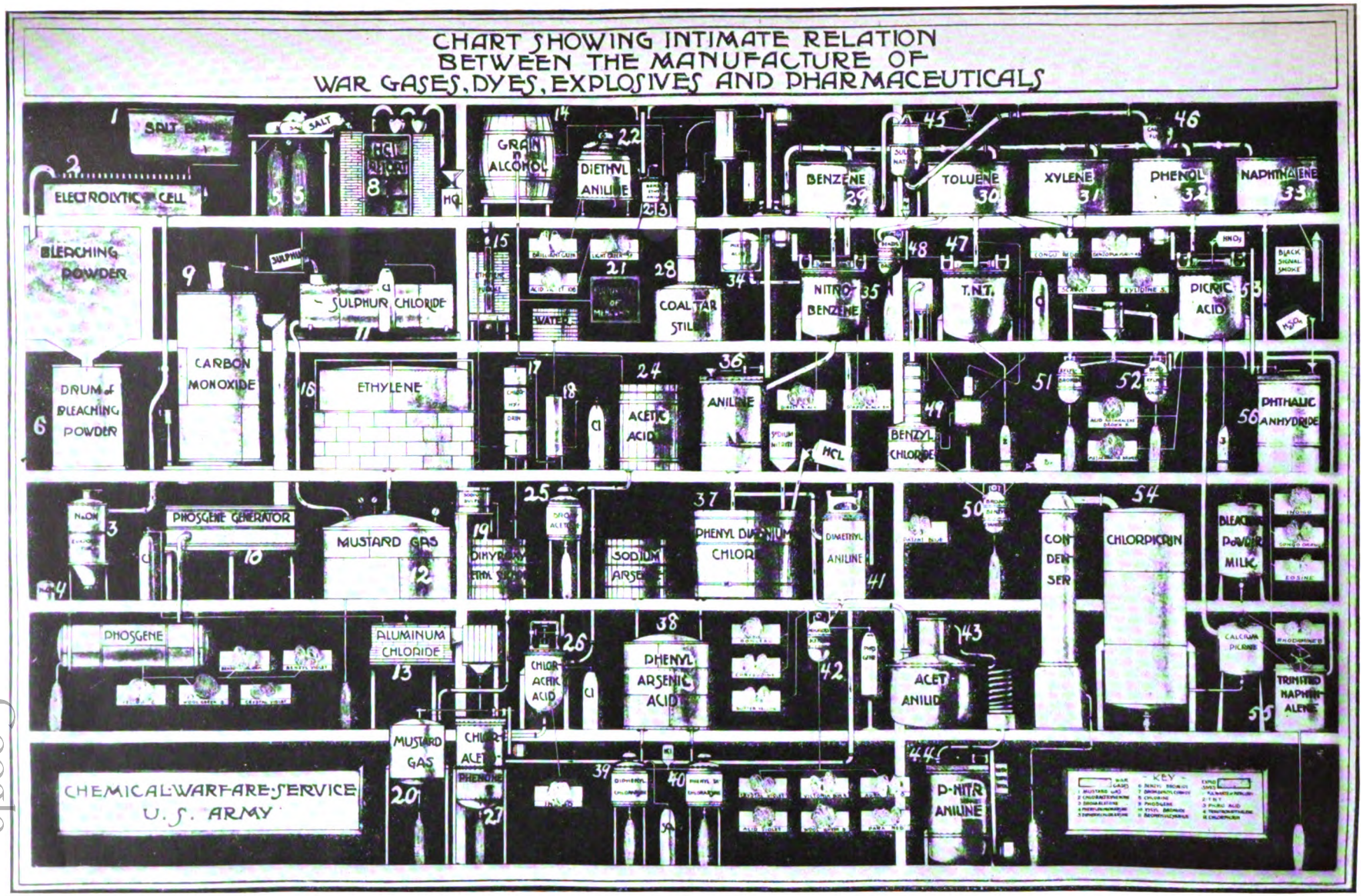
hundred of mustard gas as well as quantities of the explosive picric acid and T.N.T. Lucius & Bruening at Hoechst-am-Main, the producers of many dyes and pharamceuticals, produced two-hundred tons of chlorine per month, two-hundred and sixty-six of diphosgene, one-hundred of chlorpicrin, nineteen of bromacetone, three-hundred of diphenylchlorarsine and one-hundred and fifty of ethyldichlorarsine as well as chlorsulfonic acid, chloracetone ethers and many common acids. The Baden Aniline and Soda Factory at Luswigshafen and Oppau, in peace times an enormous producer of acids, nitrates and dyes produced twelve hundred and sixty tons of chlorine per month and six hundred and twenty tons of phosgene besides ethylene chlorhydrin and thiodiglycol used for making mustard gas at Leverkusen as well as ethylarsenic acid and phenyl arsenic acid used for arsines, and explosives including nitro-naphthalenes. The three other companies made explosives and some of the intermediates required for war gases.

In conclusion the importance and necessity of the connection of chemical industry with national defense may advantageously be summarized by quoting from the report by the British Mission appointed to visit German chemical factories in the occupied zone after the armistice, and written in February 1919.

"The figures for the output of explosives and gas show the great military value of the I.G. combination. Although no arrangements had been made to mobilize them at the outbreak of hostilities, they were rapidly converted to war purposes, thanks to their highly trained personnel and the great technical resources of their peace organization. In the future it is clear that every chemical factory must be regarded as a *potential arsenal*, and other nations cannot, therefore, submit to the domination of certain sections of chemical industry which Germany exercised before the war. For military security it is essential that each country should have its chemical industry firmly established.

"The key to Germany's war production of explosives was the Haber process for the production of ammonia from atmospheric nitrogen". This was performed by the Badische company at Oppau.

"The resources of the German dye industry are of no less military importance. Most of the gases employed toward the end of the war were complex substances, none of which had been previously made except in small quantities, and some of which were prepared for the first time during the war. Gas warfare will undoubtedly continue to develop in this direction, and in the future substances will be employed which we do not know to-day. Any country without a well developed organic chemical industry will thus be severely handicapped".



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NOTES FROM THE ADDRESS BY REAR ADMIRAL WM. R. SHOEMAKER, U.S.N.

The address by Rear Admiral Shoemaker to the second Naval Line Officers Class upon their graduation from the Chemical Warfare School, December 20th, 1924, pointed out the trend in our services resulting from specialization.

Admiral Shoemaker pointed out that as the knowledge of the world increases the farther away the individual finds himself from knowing all there is to know about any one subject. This has resulted in the dividing of subjects and the attempt on the part of the individual to master but one division. As an example no one man is now an expert in ordnance though he may be in the chemistry of explosive, the theory of balistics or the strength of steel.

Specialization has resulted in the narrowing of the viewpoint of the individual and there is a resulting danger of each specialist considering his own particular branch as the one most important with all others as auxiliaries.

There is a necessity of the officers of one branch understanding the functions of other branches and the individual should study his special work with a view to coordinating his special function with the work of other specialists and branches.

The Navy proposes to use the services of those officers instructed in Chemical Warfare toward perfecting the knowledge of the service as a whole and coordinating chemical warfare instruction with the other activities of the Navy.

The warning given by Admiral Shoemaker that specialization was in danger of overshadowing coordination is the more pertinent to the services following as it does a similar warning voiced by General Eltinge in an address given to the graduating class on November 22. Both of these officers, one from the Army and one from the Navy; officers whose service and position are such that their statements are of the highest order have, while thoroughly endorsing specialization, warned of the need of cooperation and pointed out that no one branch is so efficient, important and self contained that it can disregard the other branches.

Let us heed these warnings.

NAVAL OFFICERS CLASS.

As this issue goes to press a new Naval Line Officers Class is starting the six weeks required for the course.

This is the third course for Naval Line Officers to be given by the Chemical Warfare School.

The following officers comprise the class:

Lieut. C. H. Fogg, Lieut. John Law, Lieut. H. L. Shinn, Lieut. G. L. White, Lieut. (jg) W. L. Hickey, Lieut. (jg) F. M. McLaury, Lieut. (jg) John W. Rice, Ensign C. L. C. Atkeson, Ensign W. H. Von Dreele.

Chief Pharmacist's Mates: Felix H. Ogle and Harold W. Tryon.

UNITED STATES CHEMICAL WARFARE ASSOCIATION.

The United States Chemical Warfare Association recently organized held a joint meeting with members of the American Chemical Society at the Raleigh Hotel, Washington, D. C., Monday evening, January 5th.

The Association is composed of officers of the Regular Army and Reserve, chemists and others interested in the progress of chemical warfare as an element in National Defense.

The Association has offices in the Mills Building, Washington, D.C., Captain Frank B. Gorin, CW-ORC., being secretary.

General Amos A. Fries, Chief of the Chemical Warfare Service addressed the meeting on January 5th on "chlorine". The speech of General Fries follows.

ABOUT CHLORINE.

Nearly two and one-half years ago Lieut. Colonel Vedder and Captain Sawyer, both of the Medical Corps of the Army, detailed to the Chemical Warfare Service, took up the work of proving whether or not chlorine gas could be used successfully in preventing, curing, or ameliorating diseases of the respiratory system. Any one of these three results would have been highly satisfactory.

After about 1½ years experiment they reported 931 cases covering whooping cough, bronchitis, both acute and chronic, common colds, rhinitis, laryngitis, and two or three others. The results were so conclusive of the good effect of chlorine that they unhesitatingly gave the report in full. Since that time, various and sundry persons have said that chlorine was not as effective as claimed, or that it did not do this particular thing or that particular thing, and in a general way have decried its use.

I am not going to take up your time by going into this "Mutt and Jeff" discussion of doubting Thomases. I am not primarily interested as to whether chlorine kills a part of the germs or all of the germs or none of the germs. Eventually, of course, we will want to know if such be possible, exactly what chlorine does to the human system and to the germ. In the meantime, *I* am vitally interested and *you* are vitally interested in whether or not it will aid in preventing respiratory diseases, or will cure them or will decrease their danger. Scientists or no scientists, doctors or otherwise, I want to go on record, definitely, here and now, that chlorine helps prevent the development of certain respiratory diseases, decreases the danger and vigorous character of others, and cures still others. Whether it cures by killing all of the germs, a part of the germs, or none of the germs, I do not know and it matters little.

We purify all of the water of the civilized world with chlorine today. We know absolutely that it does not kill all of the germs. It does kill enough of them, however, to make the water safe under practically all conditions.

We pasteurize milk, and if you will read the reports of the best dairies of the District of Columbia, or other cities where close supervision is found, you will discover that they do not claim that the milk is free of germs. They do claim that the number is reduced to the point where danger does not exist.

I might remind you that the effective part of the Dakin-Carrel solution for the treatment of wounds is chlorine.

Now, as I have just stated, it makes no difference whether the germ is weakened or killed or whether he likes the chlorine so well that he eats it and gives up attacking the human system. At any rate, chlorine patients get better and get well.

Colonel Gilchrist, in my office, in order to test under practical conditions the work of Colonel Vedder and Captain Sawyer, built a little chlorine chamber 7½ by 10 feet, and up to December 5th had treated in that little room 2175 different people, old and young, rich and poor, doctor, lawyer, scientist, day laborer, Congressmen and Senators. Out of the 2175, reports were made out by 1979. Of these, 844 or 42.6% reported themselves cured; 878, or 44.4% improved; 257, or 13% no improvement. Thus, 87% of all that group of people being treated over a space of three or four months in a little chamber 7½ by 10 feet, occupied by three to as many as eleven people at a time, reported themselves cured or improved.

Inasmuch as Washington is a great place for transients, many of these took one treatment and got away without reporting. From reports received we can feel sure that the average of improvements and cures was as great among the 196 who did not report as among the 1979 who did report.

The above 2175 cases do not include any of the 750 to 1000 who were treated in a room in the Capitol near the Appropriations Committee of the Senate. Among those there treated were 23 Senators and 146 Congressmen. Their clerical assistants, friends in the city and outside brought the number up to somewhere near one thousand. Inasmuch as no accurate record was kept of these cases, the percentage cannot be given, but from the nearly unanimous approval of the treatment, I am perfectly sure the record of cures and improved cases was the same as among the 1979 treated in the room in the Office of the Chief of the Chemical Warfare Service. So much for the general run. Now a few detailed cases.

On December 30, 1924, a lady with her husband came to Colonel Gilchrist's office. She had been a sufferer for ten years with bronchial asthma. For several nights she had been unable to get through the night without taking adronalin. She brought adronalin with her to the room and begged to be allowed to take the chlorine treatment. As asthma happens to be the only disease we know of where patients are irritated with concentrations of chlorine that will irritate no one else, she was advised not to take it. She insisted. At first she was allowed to get only the chlorine in the entrance room to the new chamber. As that gave her no discomfort, in a half hour she was allowed to go into the room with the regular concentration. After one-half hour of that treatment she reported herself

the next day as improved, and for the first time in many nights had not found it necessary to use adronalin. She came again December 31st and January 2nd. On the latter date, she came with a springy step into the room, reporting that she was cured; that nothing else in all the ten years had given her anything like the relief that those three preliminary treatments of chlorine had given her.

When appearing before the Appropriations Committee recently, mention was made of the fact that the New York Health Department had rather condemned chlorine. One of the Congressmen said, "Oh well, you don't need to tell me about chlorine; I know, I was cured." One of the best known physicians of Washington sent his niece with whooping cough down to the chlorine chamber, and she was cured. Since then he has sent other patients. I have given a number of treatments to my own family, to my children 7, 8, 11 and 16. My wife, last spring, had a cold that got very severe before treatment was given, due to my being absent from the city. I took the apparatus home, gave her one treatment in the evening, between 8 and 9. By 2 o'clock in the morning she was afraid she was going to get pneumonia. Another treatment was given between 2 and 3, and a third treatment between 8 and 9 the next morning. The cold disappeared that day.

Are we to say to the thousands who have reported themselves cured or greatly improved that you are lying or you are crazy, or you don't know what you are talking about? That is what the quibbler says, in effect, when he argues that chlorine does not or will not cure.

I would just remind my readers that Colonel Vedder is a medical officer of over 21 years experience, who stands high in medicine in the Army and will be sent next July to the Philippines to be chairman of the Army board on tropical medicine. Colonel Gilchrist is a medical officer of over 24 years experience, - two years of it in France, where he saw thousands of gas cases, and two years of it in Poland in helping stamp out typhus and other infectious diseases. Captain Sawyer, who workd with Colonel Vedder, is a medical officer of more than 7 years experience, and a highly trained pathologist. If further confirmation be needed, take the records of Admiral Cary T. Grayson, as obtained in the chlorine chamber maintained in the Navy Department, or the General Electric Company at Schenectady, New York, or the Fidelity & Casualty Insurance Co. of New York City, or the Hooper Electrical Co. of Niagara, or The Henry Ford Hospital at Detroit, or any one of a thousand doctors now giving the chlorine treatment.

Here is a highly illuminating report from the Chemical Warfare Officer in the Panama Canal Zone. He states, "In a recent epidemic of influenza here one-half of the personnel of the Medical Detachment at that post (Fort Amador) were chosen by lot and the chlorine treatment given them. Of these, none contracted the influenza, while the disease was contracted by seven of those to whom treatment was not given." Either chlorine was effective or the Fort Amador method of choosing by lot is a wonder and should be furnished

to every doctor in the world.

I won't take up your time longer. I can only remark, as did the man in jail who was visited by his lawyer. The lawyer said, "Why Bill! They can't put you in jail for that offense." Bill replied, "But, Damn it, I'm here."

Let those who will, squabble as to whether chlorine kills this germ or that germ or whether it does not kill any germ. I know it cures, and so do thousands of others. My only regret in this controversy is that many people will suffer and some will probably die through failure to take chlorine for fear it will do no good.

WASHINGTON, D. C. UNITS CW-ORC.

Chemical Warfare Reserve Officers of Washington, D. C., are showing an active interest in their service.

Colonel J. Edward Cassidy, CW-ORC., President of the District of Columbia Reserve Unit, in a recent letter gives the following information:

"The Chemical Warfare Unit of the Organized Reserves of the District meets the first Monday night in each month and the general scope of the meetings includes one main subject with an open forum following for the discussion of any subjects which may be brought up (religion and politics barred). At the meeting of December 1, the evening was devoted to two main subjects; First: "The Infantry Division, its organization and functions", Lt. Colonel John Scott, Inf., handling the subject in a very interesting and instructive manner. General Amos A. Fries, Chief of the Chemical Warfare Service delivered a very illuminating talk on "Re-evaluation" a subject which is of vital importance to the National Defense. In view of the rapidly changing conditions, it is essential that every phase of the services be re-evaluated from time to time so that a proper perspective can be maintained. In the matter of military operations, the majority of us are too prone to base our perspectives on the World War conditions in France whereas there is little likelihood of this country ever again engaging in warfare under the conditions existing in France hence the necessity of re-evaluating our ideas and plans.

The following is the program of major subjects to be dealt with at the other meetings during this season:

Jan. 5 - Organization of the War Department Auxiliary Arms of the Service.
Feb. 2 - Chemical Industry - its relation to Chemical Warfare.
March 2 - Chemical Warfare Weapons and Ammunition.
April 6 - Chemical Agents, Production in Peace and War.
May 4 - Chemical Warfare Operations.
June 1 - Chemical Warfare Problems.

The officers who will present the papers are announced in the notices sent out each month, it being impracticable to announce several months ahead the name of the officer who will present the papers".

Reserve officers should make every effort to attend these meetings. Lieut. Allen E. Ergood, CW-ORC., is the Unit Secretary.

SECOND CORPS AREA CW-ORC NOTES.

FIRST GAS REGIMENT DINNER.

The 1st Gas Regiment held a reunion and dinner at the Democratic Club, New York City, on Saturday evening, December 6th. Over 60 of the old officers and enlisted men of the Gas Regiment attended, some of them coming together for the first time since the regiment was disbanded in 1919. There were two members present from San Francisco, one from Buffalo and a number from Albany, Philadelphia and points within a radius of 100 miles from New York.

The dinner was due to the efforts and energy of Major Francis H. Phipps and Major C. P. Wood and a great deal of credit is due these officers for their activity in keeping alive the spirit of the old organization. Major Wood presided as Chairman and read the numerous letters, telegrams, etc., that came from former members of the regiment. Among the speakers were Major Wood, Major Phipps, Lieut. Colonel Morgan, Lieut. Colonel Byers, Major Berlin, Captain St. John and Lieut. O'Brien. Major Berlin organized the Stokes Gun Crew and a gun drill was held with one of the Stokes Mortars furnished by the Corps Area Headquarters. The "Agony Sextet" of the old Gas Regiment rendered a number of songs written and sung by the regiment when it was in France. A poem written by Robert Burns MacMullin of Company "E" was read. This poem is published in another part of the magazine.

At 7:15 P.M. assembly followed by mess call was blown by Bugler White of the 16th Infantry. The men then filed into the dining room and before taking their seats answered to the roll call of Victor Lomuller, - which showed that those present were:

St. John, Adrian - Adjutant 1st Gas Regt.
Rowlands, H. J. - Medical Detachment
Wilson, H. E. - Hdqrs., 2nd B.
Dodson, M. W. - A & D

Ellis, Robert	- A	Berlin, Roscoe C.	- D
Gribbel, Wm. G.	- A	Brennan, James	- D
Jordan, Rodney	- A	Johnson, Frank E.	- D
Morgan, John	- A	Lentz, C. J.- D	- D
Zick, W. J.	- A	Lomuller, Victor	- D
Cohen, Nathan	- B	Maturin, Martin E.	- D
Cohen, Samuel	- B	McKee, Dongall, F. D.	- D
Foley, James M.	- B	Mitchell, C. J.	- D
Griffith, Selby N.	- A	O'Brien, Bernard	- D
Jabine, Thomas	- B & C	Thielhard, Albert	- D
Mathieson, John T.	- B	Meyerowitz, Leo	- E
Asmun, Frank H.	- B	Phipps, Francis H.	- E
Romkey, Leonard J.	- B	Shuckerow, Fred J.	- E
Rosenberg, George V.	- B	Goetter, Allan J.	- F
Stump, Horace E.	- B	Phillipi, Henry J.	- E
Booth, Harold W.	- C	Shockley, H. G.	- F

Day, Alfred C.	- C & G	O'Brien, Humphrey S.	- K
Hastings, John E.	- C	Baker, V. P.	- M
Simpson, C. C. Jr.,	- C	Van Wie, H. E.	- M
Ahrens, C. W.	- D	Byers, H. G.	- Research

A simple program under the direction of C. P. Wood was carried out. In the midst of renewing acquaintances, "Rock" Berlin was ordered to take a detail and set up the Stokes mortar in the dining room and to prepare to fire in the general direction of the Woolworth Building. This he did amid much laughter.

Thomas Jabine and the old "sand pipers" of Co. B carried the thoughts of the boys back to France by singing songs that cheered them as they marched.

Captain St. John spoke on the history of the 1st Gas Regiment and of the development of chemical warfare since that time. Practically every one was called on to speak, the number being limited only by the lateness of the hour at which the reunion ended. Among those who spoke were, Wilson, Ellis, Jordan, Zick, Cohen, Foley, Griffith, Mathieson, Stump, Day, Ahrens, Berlin, Lentz. Meyerowitz, Shuckerow, Phipps, Goetter, O'Brien, Baker, Van Wie, Byers, Shockley, Morgan Robinson and Gribbel. The last named brought to the dinner interesting photographs of the battlefields of France in their peace time aspect.

The subject of a memorial to the 1st Gas Regiment in France was brought up and on a motion by Phipps, Gribbel was asked to select a committee under his own chairmanship and report on the subject at the next gathering.

A poem, written in memory of the achievements of the old First Gas Regiment by MacMullin, Co. E, was read by John D. Morgan, of Company A, and on motion a telegram of goodwill was sent to the new 1st Gas Regiment at Edgewood Arsenal. Letters and telegrams received from many who were not able to be present, were read as follows:

Major Mills	Edgewood, Md.
Aaron Cherenoff	San Francisco, Calif.
Ernest R. Acker	Kingston, N. Y.
Percy D'Romtra	Cape May, N. J.
John L. Godley	Albany, N. Y.
Leo Rohde	Springfield, Mass.
J. T. Addison	Cambridge, Mass.
Robert B. MacMullin	Buffalo, N. Y.
Mayor John F. Hylan	New York City
Captain John G. McCoy	Edgewood Arsenal
Robert C. Tench	Newport News, Va.
Roscoe B. Dayton	Morgantown, W. Va.
Ellis Beesley, Jr.,	Newark, N. J.
M. B. Eastwood	Groveton, N. H.
Charles C. Carhart	Gulfport, Miss.
Walter H. Killam	Merced, California
Elmer C. Pfann	Buffalo, N. Y.

Raymond R. Abildgaard	Miami, Florida
Edward D. McCoy	Waterloo, Iowa
J. B. Carlook	Woodlawn, Pa.
Tom. W. Balfe	Chicago, Ill.
Harold D. Scoville	Hartford, Conn.
Harley B. Crippen	Saratoga Springs, N. Y.

And one gold star father, Philip V. Whipple, father of LeRoy M. Whipple, Co. A. Killed in action.

But the dead were not forgotten for when the dinner was at its height, Wood called the veterans to attention. The Bugler played church call and the impressive list of those who gave their life blood that the traditions of the greatest regiment in the A.E.F. might be cemented the surer was read. And then with each man at salute, taps was sounded.

On motion the Committee in charge was continued until the next gathering. It was composed of:

Francis H. Phipps - Chairman
Victor Lomuller - Treasurer
Bernard O'Brien
Nathan Cohen
Thomas Jabine
Charles P. Wood
Emil Friedenauer
Leo Meyerowitz
John D. Morgan

At midnight, Auld Lang Syne was sung and the veterans dispersed.

CW-ORC ASSOCIATION.

On December 16th a meeting of Chemical Warfare Reserve Officers of the 2nd Corps Area was held at the Army and Navy Club, New York. The object of this meeting was the forming of an association of Chemical Warfare Reserve Officers to promote the spirit of comradeship and cooperation among officers of the Chemical Warfare Reserve, to increase their knowledge and efficiency as officers and to cooperate with the National Association.

The association is the outcome of suggestions made at the Defense Day dinner at which time a committee was appointed to draft a constitution.

At this meeting the constitution was adopted and the following officers elected:

President	- Colonel F. G. Zuisser
Vice President	- Lt. Col. J. E. Zanetti
Secretary	- Capt. Louis Harris
Treasurer	- Major F. H. Phipps

ARMISTICE SONG OF THE "GAS AND FLAME".

Tune: Columbia the Gem of the Ocean.

Ye men that have once fought in battle
In the war ridden vale of the Aire,
Raise high o'er the dull daily prattle
Your voices resounding the air.
Let us live once again those great moments
When we plunged thru the line at St. Mihiel,
In the heart of each man there still foments
The will to follow glory to Hell.

Chorus:
Three cheers for the old "Gas and Flame",
Rip 'er up for the old "Gas and Flame",
We'll smell phosgene and mustard forever,
We are Vets of the old "Gas and Flame".

We were young, we were hale, we were hearty
When we answered the call to the flag,
There were fifteen hundred in the party
That embarked for our country and God.
In Virginia we rattled our mess-kits
And we cut fancy turns on parade,
But in France we shagged mortars and muskets
And played ball with the Jerry's grenades.

There were kilos of road long and dreary
From the dump to the trench at the line,
Toting shells on our backs made us weary
And a bomb-proof of dirt was divine.
There were nights when we dug damned projectors
'Neath the nose of the vigilant Hun
And we slobbered thru our gas protectors
Till the dirty emplacement was done.

We were comrades in battle together
We have fought from the Marne to the Vosges,
Thru the Argonne, thru red Chateau Thierry
And Verdun, thru the war to the close.
We have comrades who can't sing with laughter,
They've yielded their lives at the chance,
Let us sing then their praise six years after,
Hallowed they who fell with us in France.

November 11, 1924.
Buffalo, N. Y.

Robert Burns MacMullin,
Co. E, First Gas Regiment, C.W.S.

CHANGES - CHEMICAL WARFARE OFFICERS' RESERVE CORPS.

NAME AND RANK	ASSIGNMENT JURISDICTION	REMARKS
LT. COLONELS		
Keyes, Frederick G.	Unassigned	12 Prescott St., Cambridge, Mass. Apptd. 12/5/24; accptd. 12/18/24.
Lowenstein, Arthur	Unassigned	5132 Greenwood Ave., Chicago, Ill. Apptd. 11/19/24; accptd. 12/5/24.
MAJORS		
Elwell, Kenneth R.	Unassigned	35 North 5th Ave., La Grange, Ill. Apptd. 11/19/24; accptd. 11/29/24.
Howe, Harrison E.	O.C.,CWS	2702 - 36th St., N.W., Washington, D.C. Trans. from Ord-ORC 11/24/24. BA Group, Technical Div., OC-CWS.
Patten, Harrison E.	O.C.,CWS	Silver Springs, Md. Prom. from captain 12/4/24. BA Group, Chemical Div., E.A.
Thompson, Thomas G.	O.C.,CWS	Bagley Hall, University of Washington, Seattle, Wash. Prom. from captain 11/5/24. BA Group, Chemical Division, E.A.
Wannamaker, George W.	4th C.A.	Box 157, St. Matthews, S.C. Prom. from captain 11/28/24.
CAPTAINS		TA Group.
Coulter, Victor A.	4th C.A.	Newton, N.C. Apptd. 11/28/24; accptd. 12/11/24. TA Group.
Douglas, Julian L.	Unassigned	125 E. 57th St., Chicago, Ill. Apptd. 11/29/24; accptd. 12/12/24.
Finley, Mark F., Jr.	Unassigned	University Club, Washington, D.C. Apptd. 11/28/24; accptd. 12/8/24.
Jones, Russell M.	Unassigned	1967 Biltmore St., Washington, D.C. Apptd. 11/24/24; accptd. 12/2/24.
Keeler, George E.	O.C.,CWS	Add. chgd. from 1925 - 16th St., N.W., Washington, D.C. to 1901 19th St., N.W., Washington, D.C. BA Group, Supply Div., OC-CWS.
Kistner, Joseph L.	O.C.,CWS	Y.M.C.A., Baltimore, Md. Apptd. 11/10/24, accptd. 11/20/24. BA Group, Edgewood Arsenal.

NAME AND RANK	ASSIGNMENT JURISDICTION	REMARKS
CAPTAINS (Cont'd)		
Langford, Cecil T.	O.C.,CWS	Add. chgd. from 212 W. Eufaula St., Norman, Okla., to 1418 Spruce St., Berkeley, Cal. BA Group, Chemical Warfare School.
Pelham, Thomas W., Jr.	Unassigned	76 Water St., Boston, Mass. Trans. from QM-ORC 12/10/24.
Phelps, Happer K.	9th C.A.	238 Almendra Ave., Los Gatos, Calif. Trans. from BA Group to TA Group.
Scherer, George F.	O.C.,CWS	3227 Powhatan Ave., Baltimore, Md. Apptd. 11/10/24; accptd. 11/24/24. BA Group, Edgewood Arsenal.
Smith, Earle C.	O.C.,CWS	Hotel York, Denver,Colo. Apptd. 11/6/24; accptd. 11/20/24. BA Group, Edgewood Arsenal.
Thayer, Floyd K.	Unassigned	5009 N. Ashland Ave., Chicago, Ill. Apptd. 8/23/24; accptd. 12/11/24.
Wittman, George E.	Hawaiian Dept.	Schofield Barracks, H.T. Trans. from Inf-ORC 8/27/24.
FIRST LIEUTENANTS		TA Group (Staff Sgt., C.W.S.)
Carloss, Howard	Unassigned	c/o Como Chemical Co., Kokomo, Ind. Apptd. 12/11/24; accptd. 12/18/24.
Green, Louis W.	O.C.,CWS	205 Redmond St.,New Brunswick, N.J. Prom. from 2nd Lt. 12/9/24 BA Group, Chemical Division, Edgewood Arsenal.
Gullett, Ben H.	O.C.,CWS	456 South Sigel St., Decatur, Ill. Apptd. 11/7/24; accptd. 11/16/24. BA Group, School Battalion, E.A.
Hobart, Floyd B.	O.C.,CWS	1207 Oregon St.,Urbana, Ill. Apptd.11/7/24; accptd.11/17/24 BA Group, School Battalion, E.A.
Nesbitt, Carl W.	O.C.,CWS	217 West 15th St., Chicago Heights, Ill. Prom. from 2nd Lt. 11/28/24. BA Group, Production Division, E.A.
Palmer, Ivan A.	O.C.,CWS	505 North 8th St., Herrin, Ill. Prom. from 2nd Lt. 12/23/24. BA Group, Plants & Prod. Div., E.A.

NAME AND RANK	ASSIGNMENT JURISDICTION	REMARKS
FIRST LIEUTENANTS (Cont'd)		
Peeples, Harry W.	4th C.A.	400 W. Hill Ave., Valdosta, Ga. Apptd. 11/29/24; accptd. 12/13/24. TA Group.
Springer, Franklin H.	1st C.A.	Add. chgd. from #3 Massie Ave., Providence, R.I. to 15 Emerson St.,New Haven,Conn. TA Group.
Westbrook, Leon R.	O.C.,CWS	3239 Sycamore St., Cleveland Heights, Ohio. Prom. from 2nd Lt. 11/6/24. BA Group, Chemical Div., E.A.
SECOND LIEUTENANTS		
Beisler, Harold A.	O.C.,CWS	1096 Chancellor Ave., Milton, N.J. Apptd. 11/12/24; accptd. 11/18/24. BA Group, School Battalion, E.A.
Boring, Bonnel H.	O.C.,CWS	R.F.D. No. 3, Rushville, Ind. Apptd. 11/8/24; accptd. 11/13/24. BA Group,Replacement Center, E.A.
Carey, Francis P.	2nd C.A.	153 W. 84th St.,New York City. Apptd. 11/5/24;accptd. 11/17/24. TA Group.
Carn, Fred L.	O.C.,CWS	Add. chgd. from 800 - 24th St., Altoona,Pa. to 874 - 29th St., Altoona, Pa. Trans. from Training Div., E.A. to 1st Gas Regiment.
Gatewood, Edwin McC.	Unassigned	715 N. 12th St., Ft. Smith, Ark. Apptd. 12/1/24; accptd. 12/11/24.
Goebel, Elmer G.	O.C.,CWS	Add. chgd. from 5021 Belt Rd., Washington, D.C. to 702 Mills Bldg., Washington, D.C. BA Group,Pl nts & Prod. Div.,E.A.
Greene, Luther W.	Unassigned	1815 S. 58th St.,Philadelphia, Pa. Trans. from Inf-ORC 12/24/24.
Hilberg, Frank C.	Unassigned	Box 103, Winchester, Mass. Trans. from CA-ORC 12/29/24.
Hoerger, Winfield S.	Unassigned	6525 S. Peoria St., Chicago, Ill. Apptd. 12/11/24. accptd. 12/19/24.
Howe, Charles H.	Unassigned	Chapman,Kans. Apptd. 12/8/24; accptd. 12/19/24.
Jenkins, George W.	Unassigned	37 Circular St., North Attleboro, Mass. Apptd. 11/20/24; accptd. 12/3/24.

NAME AND RANK	ASSIGNMENT JURISDICTION	REMARKS
SECOND LIEUTENANTS (Cont'd)		
Kaplan, Bernard	O.C.,CWS	Add. chgd. from Hammond St., Hagerstown, Md. to 99 Messerole Avenue, Brooklyn, New York. Trans. from Training Division, E.A. to 1st Gas Regiment. BA Group.
McCarthy, Donal F.	O.C.,CWS	1111 M St., N.W., Washington, D.C. Apptd. 11/12/24; accptd. 11/21/24. BA Group, 1st Gas Regt.
McFadden, Herbert J.	Unassigned	229 E. 6th St., Loveland, Colo. Apptd. 11/24/24; accptd. 12/3/24.
Puckett, Robert F.	O.C.,CWS	Lemon Grove, California. Appointed 9/17/24; accepted 10/23/24. BA Group, Edgewood Arsenal.
Rowell, Herman L.	O.C.,CWS	Edgewood Arsenal, Edgewood, Md. Apptd. 11/20/24; accptd. 11/24/24. BA Group, Edgewood C.W. Reserve Depot.
Sullivan, Camillus C.	4th C.A.	809 Euclid Ave., Jackson, Miss. Apptd. 11/13/24; accptd. 11/24/24. TA Group.
Thomas, Thomas P.	O.C.,CWS	1508 Wood St., Wilkinsburg, Pa. Apptd. 11/4/24;accptd. 11/18/24. BA Group, 3rd C.W.S. Procurement District.
Toles, William E.	4th C.A.	P.O. Box 416, Birmingham, Ala. Apptd. 12/13/24; accptd. 12/19/24. TA Group.
Warnock, Irl B.	O.C.,CWS	Mason City, Ill. Apptd. 11/13/24; accptd. 11/29/24. BA Group, Edgewood Arsenal.
Winslow, Earl H.	O.C.,CWS	Department of Chemicals,University of Wisconsin, Madison, Wis. Apptd. 11/5/24; accptd. 11/14/24. BA Group, Edgewood Arsenal.

RESERVE OFFICERS PLEASE NOTE.

It is requested that any errors or omissions noted in these lists of Reserve Officers,be reported to the Personnel Section,Office, Chief, Chemical Warfare Service,Munitions Building,Washington,D.C.

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