OXYGEN AT HOME.

BY EMILE GUARINI.

For some years past oxygen has been employed for numerous industrial, medical, and hygienic purposes; but, up to the present, one of the drawbacks to its use has been the cost of the gas in a compressed state, due in great part to the expense of transportation. This difficulty, however, has been recently overcome by the invention, by M. G. F. Joubert, of a solid product styled "oxylith," which disengages absolutely pure oxygen through a simple immersion in water. Every one, therefore, may have at home a supply of latent oxygen, just as the bicyclist and automobilist has a supply of carbide for the manufacture of acetylene.

The boxes of oxylith are even so arranged that they can be directly utilized as gas generators in case of necessity. It suffices to puncture the bottom of the box with a drawing pin, and, after this has been done, to remove the strap that holds the plug, and then to unscrew the latter, and replace it with another provided with a nozzle. The box is then ballasted by means of a weight, and upon the nozzle is placed a rubber tube with which is connected a glass washing bottle provided with a filter of hygroscopic cotton, which completely arrests the water. The box is then submerged in a pail of water, and the disengagement of oxygen begins. Each box furnishes one cubic foot of chemically pure oxygen. In order to further facilitate the immediate and extended use of oxygen, the Société Française pour les Applications de l'Oxygen, which is exploiting the Joubert process, and which owns in the department of Isère a factory utilizing a 10,000-horse-power head of water, and has a capacity of producing 5,000 tons of oxylith a year, has devised a life-saving box (Fig. 1) for the use of physicians, pharmacists, and firemen, and for use in mines, gasworks, blast furnaces, public baths, etc. This box measures 10 x 5.5 x 10 inches and weighs 7 pounds. It contains all the necessary apparatus for the use of oxygen in cases of asphyxia, viz., three boxes of oxylith like those mentioned above, a washing bottle, drawing pins, a ring of lead for ballasting the box, a rubber tube, a plug with glass tubes, a tube for nasal insufflations, a device for effecting rhythmic tractions of the tongue, and a collapsible rubber pail for the submersion of the boxes of oxylith.

Fig. 3.—Large-Sized Oxygen Apparatus.

In addition to the rudimentary apparatus that we have mentioned, the Société, which has a branch house at Paris, is manufacturing gas generators of various types for domestic uses. Figs. 2 and 3 represent the types giving a small, medium, and large discharge. The small discharge generator (Fig. 2) which is entirely of glass, except the upper part, is designed especially for pharmacists and chemists. It may be employed also for rendering the air of apartments wholesome. It consists essentially of a large glass flask with a nickel-plated cap and is capable of producing 2.6 cubic feet of oxygen, without recharging. For charging the apparatus, the metallic upper part is unscrewed and raised in such a way that the central tube and the basket may be removed from the oxygenator. Some oxylith is placed in the basket and the water is renewed if need be. The water that has been used, diluted to one-tenth, constitutes a good wash liquor for domestic purposes.

The apparatus giving a medium discharge (Fig. 2 at the left) differs from the preceding only in size. It is adapted for supplying oxyhydrogen, oxyetheric, oxyacetylic blowpipes, and for the purification of the atmosphere of large halls. It is of enameled iron plate and produces about 5 cubic feet without being recharged.

The portable apparatus of maximum discharge (Fig. 3 on the right) is adapted for large magic lantern exhibitions. It consists of several parts that screw together and are packed in a small case. The apparatus presents the advantage of being easily carried on a voyage. It produces about six cubic feet without being recharged. It includes two reservoirs, one of them for holding the water, which attacks the oxylith, from above, in a perforated basket.

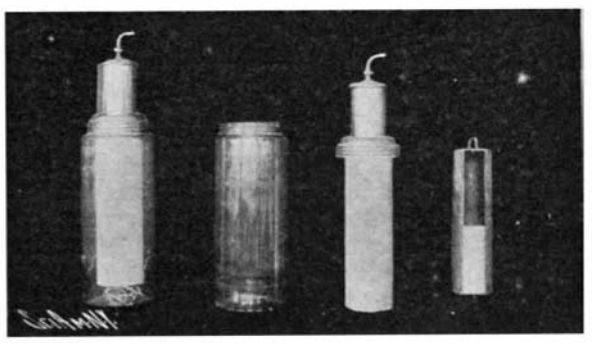

Fig. 2.—Small and Medium-Sized Oxygen Apparatus.

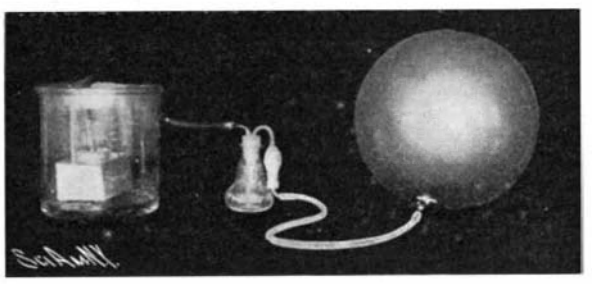

Fig. 4.—Box of Oxylith Used as a Gas Generator.

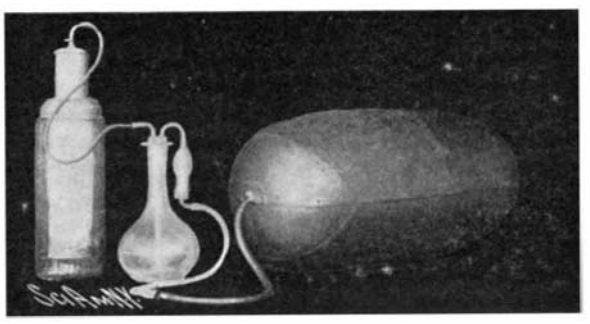

Fig. 5.—Small Apparatus Used as a Gas Generator.

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The oxygen produced in the different manners above described is under a slight pressure. If it is necessary to increase the pressure, it is stored up beforehand in a gas bag. The method of procedure is represented in Figs. 4 and 5. Fig. 4 represents a case in which the box of oxylith is used as a gas generator, and Fig. 5 that in which the gas generator of small discharge is employed. In order to fill the gas bag, the latter is affixed to the tube of the washing bottle and the cock is opened. At the end of ten minutes, the bag will have been filled. After this, the cock is closed and the bag is separated from the apparatus. Its capacity is about a cubic foot. The washing bottle contains nothing but water. It is also interposed as a saturator between the gas bag and the inhaler. If the inhalation is completed by a volatile substance, such as bromoform, terebinthine, thymol, menthol, etc., such substance is poured upon the filter of cotton wadding. As may be seen from what precedes, M. Joubert's discovery has made of oxygen a convenient and cheap agent that is within reach of every one.

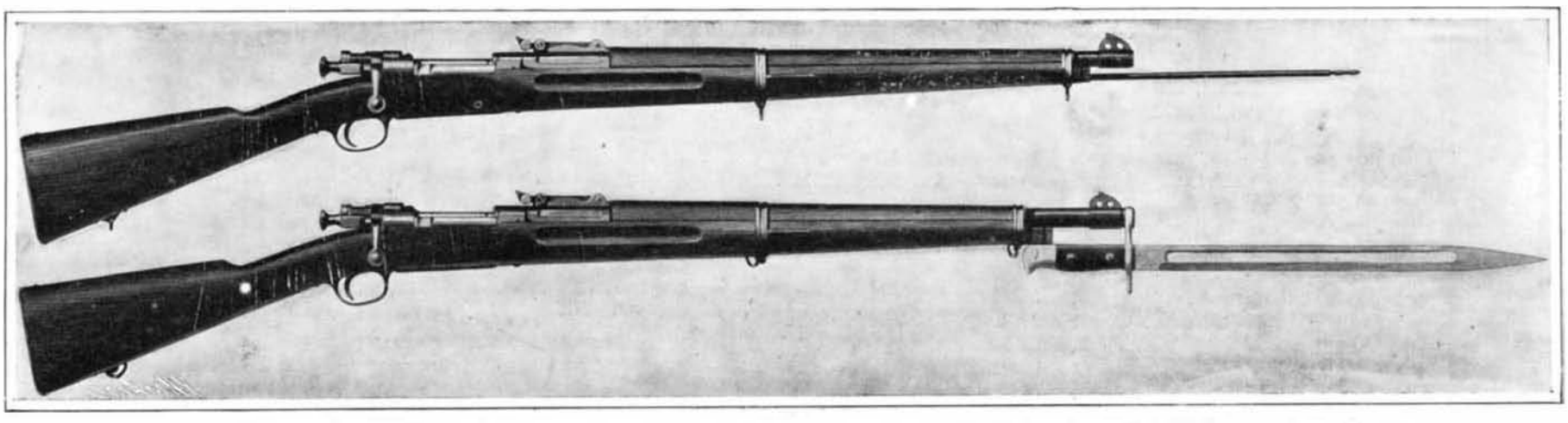
THE RENAISSANCE OF THE BAYONET.

How greatly wide of the mark academic discussions of military matters may lead us, has been well illustrated in the matter of the United States army bayonet. The increased range and great accuracy of the modern rifle, and the good use of it made by the Boer sharpshooters in their late war, had led to the belief that in future wars fighting would be carried out at so great a range that the bayonet would seldom be brought into use. It was considered that the losses by an attacking party would be so great that they could never, or at least very rarely, hope to take intrenchments by storm and turn the enemy out by hand-to-hand fighting. Our own ordnance officers were so much impressed with these supposed facts, that in the new Springfield army rifle, which was being manufactured at the time of the opening of the Russo-Japan war, the bayonet was practically abandoned and a small, round steel rod, about a quarter of an inch in diameter, substituted in its place. The rod was a perfectly useless element in the rifle, being too weak for hand-to-hand fighting—indeed, its existence in the rifle at all must be looked upon as a concession to long-established habit.

The Russo-Japan war has taught us that the bayonet is by no means an obsolete weapon. In the fierce fighting at Port Arthur it was used freely both by day and night. Positions were taken, retaken, taken again, to be retaken once more, and in every case the work was done in hand-to-hand fighting, and with the bayonet. The estimate as to the losses that attacking troops will stand before they break and retreat, has been shown, at least in the case of Japanese troops, to be entirely at fault. An attack that lost twenty-five per cent of its forces was supposed to end in failure; but the Japanese have lost twice and three times that number in the face of a most murderous machine gun and rifle fire, and the remnant has swept on to turn the enemy out of the trenches at the point of the bayonet. The evolution of the United States army rifle, during the past two years, is shown in the accompanying illustrations. The original pattern of the new Springfield army rifle, designed to replace the Krag-Jorgensen, was built with a 30-inch barrel and it was provided with a ¼-inch-diameter round steel rod, which took the place of the ordinary bayonet of sword or triangular shape. This piece had a velocity of 2,300 feet per second, and it fired a 220-grain bullet with a charge of 43.3 grains of powder. In addition to having the highest velocity, it was the lightest of the best-known military rifles. Since the rifle was light and its energy unusually high, with such a heavy charge the recoil was, of course, excessive; and this was one of the objections urged against the new type. The wear on the rifling is also very severe. The ballistics of the piece, however, are exceptionally fine, its maximum ordinate for a 1,000-foot range being only 20.6 feet, as against 25.8 feet for the Krag-Jorgensen.

Fig. 1.—Portable Oxygen Apparatus.

Five thousand of the Springfield rifles with the 30-inch barrel were ordered for trial in the field; but while these were under construction, the Ordnance Board decided to design one that could be issued to both branches of the service, cavalry and infantry. Accordingly they cut off 6 inches from the barrel, reducing it to 24 inches, or 2 inches longer than the cavalry carbine. They carried the hand protection from the middle band, at which it stopped in the 30-inch barrel type, up to the second band, thus practically covering the whole barrel. This piece also had the



The New Springfield Army Rifle, Showing the Discarded Rod Bayonet and the Formidable Sword Bayonet Which Has Been Adopted.

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