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AN IMPROVED EYE-IRRIGATOR FOR USE IN THE FIELD

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In the 1914-1918 European War it happened on some occasions that as many as 2,000 men with their eyes damaged by the vapour of poisonous gas, particularly mustard, arrived at a dressing station or a casualty clearing station and found there inadequate provision for immediate treatment or no facilities at all, a situation both pitiful for the afflicted men and humiliatingly uncomfortable for the medical officers who were compelled to stand by with empty hands.

In the present campaign if poison gas should be used it is hoped that the eye-shade, a celluloid device worn constantly by all troops in the theatre of military operations, will afford them ocular protection against droplets of mustard or lewisite sprayed from aeroplanes on to them when on the line of march or in the trenches. The service respirator protects the eyes against gas vapour. However, in spite of these guards it is probable that some men will suffer ocular injury from the mustard or lewisite droplets entering the eyeshade which has been perforated by flying particles or a bullet from an aeroplane opening machine gun fire simultaneously with the liberation of the gas, or due to the shade becoming accidentally displaced whilst the soldier falls to the ground or takes cover.

The enemy may employ "spray" over rest camps and sites behind the lines for the purpose of harassing large bodies of troops who may have become careless about cover and anti-gas protection. These men would thus be rendered unfit to act as reinforcements.

Injuries of the eyes from vapour may also occur when respirators are discarded or not put on in a recently contaminated zone in which the odour of gas is so faint as to avoid detection by anyone but an especially trained soldier.

Although the eye casualties from this source may be considerably fewer at any one time than in the last war it is as well to make reasonable preparation for such.

It is undesirable from a military point of view to encumber the equipment of "forward" medical units, such as the regimental aid post and the advanced and main dressing stations of the field ambulance, any further than is absolutely essential for the immediate needs of the wounded. The carrying of stores of lotion, undines and receivers in sufficient bulk to treat heavy eye casualties from gas would impose a burden that would often be quite unnecessary. For the purpose of economy in cost and size of the equipment and for its advantage in rapid working the following suggestion is put forward.

Apparatus.—An irrigator is improvised by taking an empty 2 gallon petrol tin, boring 4 holes in its bottom, each sufficient in size to admit the base of a discharged bullet case, the cap of which has been perforated. The bases of these 4 bullet cases are soldered into the tin making water-tight junctions. The whole tin is cleaned and sterilized. To the projecting extremities of the bullet cases $4\frac{1}{2}$ feet of rubber tubing is attached (see Fig. 1) and into the free ends of these are inserted metal irrigator nozzles each with a lever switch control to cause or stop the flow of lotion. The tin is suspended from a 6 foot wooden stake driven into the ground and each of the 4 irrigator tubes is operated by an orderly.

A suitable quantity of sodium bicarbonate or sodium chloride salt is carried by the unit and with boiled water it is made up into either a 2 per cent. solution of the former or a 0.9 per cent. of the latter. The tin is filled with the lotion. Eusol, 1 in 10 cold, has been recommended for the treatment of mustard gas injuries and the Americans at the end of the 1914-1918 war claimed that dichloramine T 0.5 per cent. in chlorcosane reduced the degree of corneal erosion and necrosis from mustard gas droplets and prevented secondary infection.

It is generally thought that after a droplet of mustard oil has entered the eye treatment is of little avail in conserving useful sight.

In the case of injury from gas vapour the ocular symptoms do not come on for 6 to 8 hours after exposure and whilst many recover in 3 to 12 weeks some of the severe cases may develop corneal complications which impair sight and lead to recurrences

FIELD CONTAINER FOR EYE LOTION

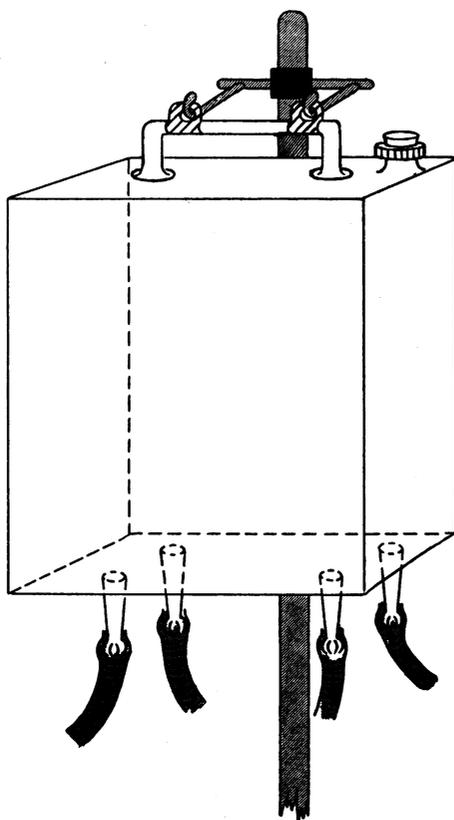


FIG. 1.

Two gallon petrol tin—improvised container in the field for eye-lotion, anti-gas. Four perforated discharged bullet casings soldered into base of tin and connected by rubber tubing to irrigator nozzles. Tin mounted on a standard inserted into the ground.

of ulceration and keratitis as long as 10 years after the injury was sustained.

I feel that the psychological effect of prompt relief of pain by the instillation of gutt. pantocain 1 per cent. (cocaine is contra-indicated in these cases) of ol. parolein for the possible solvent effect of this on any residual mustard in the conjunctival sac,

the copious irrigation of the eye and the supply of a tinted eye-shade may assist the rapidity and efficiency with which the soldier is evacuated from the regimental aid post through the field ambulance and casualty clearing station to entrain for the base hospital.

SCHEME FOR TREATING IN THE FIELD EYE GAS CASUALTIES

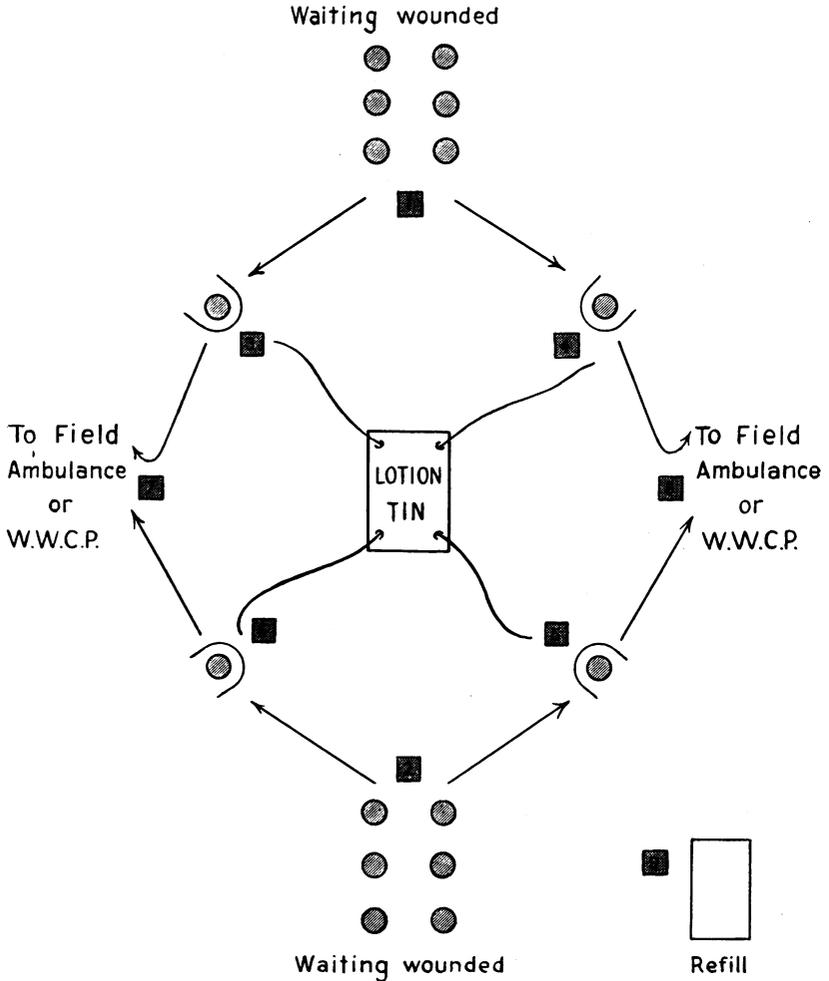


FIG. 2.

1 and 2. Instil pantocain 1 per cent. and 40 seconds later ol. parolein. 3, 4, 5 and 6. Irrigate with sod. bicarb. 2 per cent. (or sod. hypochloride or dichloramine T. 0.5 per cent. solution in chlorcosane). 7 and 8. Instil ol. parolein and supply new eye-shades. 9. Attends to refills of lotion tins.

Such therapeutic attentions would also have a good effect on the morale of the troops who have witnessed the casualties but have been unaffected themselves.

Distribution.—One irrigator would probably suffice the needs of a regimental aid post, two an advanced dressing station and 4 to 6 might be necessary at a casualty clearing station. (There is no occasion to halt wounded again at the main dressing station on the line of evacuation but it is more desirable to carry them through from the advanced dressing station to the casualty clearing station.)

Organization.—The duties of a team working on an irrigator is shown diagrammatically in Fig. 2. This organization is designed for dealing with large numbers of casualties and so would apply to the work of an advanced dressing station or a casualty clearing station rather than the regimental aid post.

The casualties are assembled in two double files (*e.g.*, one file to the north and the other to the south of the irrigator). Orderlies 1 and 2 instil pantocain 1 per cent. into the eyes followed in 40 seconds with ol. parolein. The ol. parolein is allowed to remain in the conjunctival sac for about 3 minutes before irrigation. Orderlies 3, 4, 5 and 6 each have charge of an irrigating nozzle. A little bleach cream is applied to the skin of the cheeks, the oil-skin anti-gas cape is drawn closely round the soldier's neck and the eyes irrigated whilst he sits on an improvised seat. The bleach cream is then wiped off and he passes to either orderly 7 or 8 for the instillation of ol. parolein and the supply of a new eye-shade, preferably tinted. Thence the wounded are evacuated through the usual channels. Orderly 9 replenishes the supply of lotion in the tins.

In the advanced areas badly injured men may be led in files, connected by ropes or sticks, by a sighted guide from the field ambulance.

After 1 hour the treatment may be repeated at any appropriate site along the line of evacuation, *e.g.*, advanced dressing station, casualty clearing station and ambulance train.

Allowing 3 minutes for the treatment of both eyes ($1\frac{1}{2}$ minutes each eye) 1 team of orderlies with 1 irrigator could treat 80 men in 1 hour, 2 teams 160, 3 teams 240 in 1 hour and so on.

In heavily contaminated cases the personnel carrying out the treatment will have to work in anti-gas clothing and respirators and the wounded pass through a decontamination and cleansing centre.

