=NH group the first reaction almost always consists in the replacement of hydrogen by chlorine with formation of substances of the group known as chloramines. All protein substances contain an abundance of these groups, and they readily react with hypochlorites:

The antiseptic action of hypochlorites doubtless depends upon reactions of this type. It was therefore interesting to examine many different varieties of the large group of chloramines in order to study their antiseptic actions. In this work I have enjoyed the co-operation of Professor J. B. Cohen of the University of Leeds.

In the first place, it may be stated that all substances containing the =NCl group were found to be strongly antiseptic, and some of them will probably be found to have practical value. Proteins, such as blood serum, egg white, casein, etc., when treated with hypochlorites, give products of high antiseptic value, and undoubtedly compounds of this type are formed *in situ* when wounds are treated with hypochlorites. This is doubtless an advantage, as in this way a certain antiseptic action may be expected to persist even after the free hypochlorite has disappeared.

Substances such as acetanilide when treated with hypochlorous acid under appropriate conditions, carefully studied by Chattaway, give chloramines—for example, acetylchloraminodichlorobenzene—which are sparingly soluble in water, but which may be dissolved in vaseline or lanoline. Although the germicidal power of these compounds is very high indeed, the action on infected wounds of strong solutions of them in vaseline or lanoline was not markedly superior to that of plain vaseline. It appears that, generally speaking, active germicidal action can hardly be hoped for from sparingly soluble antiseptics mixed with fatty substances. Anaërobic organisms can readily grow under the fatty film covering the surface of the infected area.

On the other hand, certain aromatic chloramines which form soluble sodium salts have given most encouraging clinical results. The best of these compounds are the benzene or paratoluene sodium sulphochloramides, both of which have been described by Chattaway.

These substances are extremely powerful antiseptics, are practically non-irritating, and can be used in much higher concentration than can the hypochlorites. A 2 to 4 per cent. solution may be conveniently employed. In general, the action of these substances is similar to that of the hypochlorites, but more powerfully antiseptic. They have, however, no special solvent action on necrosed tissue, this being doubtless due to the fact that the active chlorine in these compounds is already attached to nitrogen. While the number of cases thus far treated with these antiseptics is smaller than those treated with the hypochlorite mixture, excellent results have been obtained in a number of badly infected wounds, notably compound fractures of the femur. It appears probable that these chloramides, which are relatively easily prepared at low cost, and which have the advantage of being stable solids, may be found useful for other purposes than for the treatment of infected wounds. Their possible applications will be the subject of further study.

Benzene sodium sulphochloramide kills staphylococci suspended in water in two hours at a concentration of 1 : 500,000, and the toluene derivative kills at 1 : 1,000,000. In the presence of serum the necessary concentrations are about 1 : 1,500 and 1 : 2,500 respectively. *Bacillus pyocyaneus*, *B. typhosus*, and *B. coli* are slightly more resistant than staphylococci, while *B. aerogenes capsulatus* and streptococci are more readily killed. The concentrations refer to the weight of the crystallized salts. It will be seen that the molecular concentration of toluene sodium sulphochloramide necessary to kill staphylococci in the presence of serum is only about one-fifth of the correspondingly active molecular concentration of sodium hypochlorite.

ON THE USE OF A SLEEVE OF VEIN IN NERVE SUTURE.

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DURING the present war many cases of nerve injury have been recorded. The injuries are produced for the most part by rifle bullets, fragments of shell, and shrapnel. Primary suture is frequently out of the question, and the wounds are allowed to heal without any attempt being made to suture the divided nerves. Later, secondary suture is required, and often the divided ends have to be

sought for in a large amount of scar tissue. It is essential in cases of this sort to protect the junction so as to avoid ingrowing of scar tissue between the nerve ends, and consequent failure of the operation. To prevent this various substances have been used, including decalcified bone tubes, gelatine tubes, animal's artery, paraffin wax, Cargile membrane,* and human vein. Sherren (*Injuries of Nerves*) prefers chromicized Cargile membrane.

For some years I have been using portions of vein in the manner here illustrated. The most suitable vein for nerves of the upper extremity—as, for instance, the musculo-spiral, the median, and the ulnar—is the basilic vein at a spot between its commencement and the point at which it pierces the deep fascia of the upper arm. A segment of the vein about 1½ in. or 2 in. in length is excised and threaded on a sinus forceps as in Fig. 1. One end of the nerve is then caught by the forceps, and the sleeve pulled over as in Fig. 2. The ends of the nerve are then freshened with a sharp scalpel and sutured with fine catgut. When the suture is complete the sleeve is pulled over the junction, as in Fig. 3, and fastened to the nerve sheath by a few points of suture. The vein thus applied is intended to form an aseptic sheath for the nerve, to keep the ends in secure apposition, to direct the growth of the new axis cylinders, and to prevent the ingrowth of scar tissue from the outside. Any vein of suitable size will, of course, do, and in the lower extremity a portion of the internal or external saphenous will probably be the most convenient.

The sleeve must be pulled over the first nerve end before trimming so as to avoid damage to the freshly cut end.

Possibly this method has been in use by others, but I have not seen it used or described up to the present.

* Peritoneum of the ox.