ably smaller percentages of women than men were found to be carriers. We can find only one reference in the report to the effect of cleanliness of the throats tested: on page 55, referring to the tonsils of nine schoolboys, it is stated: "From six of these cases the Type 19 streptococcus was isolated, while the remaining three gave completely sterile swabs—probably as a result of recent gargling or throat-painting."

Antiseptics were in some disrepute at the end of the last war, in great part owing to the conflicting results obtained by those attempting to eliminate meningococcus carriers. Now that it is known that carriers are so numerous among the general population and that the form of meningococcus carried (Group II) is comparatively harmless, the Ministry of Health (1940) discourages the search for carriers and states in its Memorandum that local treatment of the nasopharynx is probably useless. We hope, however, that contacts and carriers are not discouraged from using such simple hygienic measures as advocated here in addition to the fresh air and exercise prescribed. Infection, as stated on page 10 of the Ministry's Memorandum, appears to be through the nose and mouth, and it must surely be an advantage for individuals to take any steps likely to clear away infecting bacteria while they are still only on the surface of the epithelium.

From our personal experience of "gargling fatigues" we know that the men generally appreciate being encouraged to keep their mouths and throats clean—so much so, in fact, that they sometimes make solutions of anything available, such as common salt or vinegar, to use at other than the official times.

There seems little doubt that it is sometimes beneficial to change temporarily the antiseptic used as a throat- or mouth-wash, and the usual solutions of potassium permanganate or even boric acid may thus come in useful as a change for a day or two from more powerful antiseptics such as thymol and iodine.

Conclusion

It may be of interest to add here the results* of recently testing iodine solutions to discover one with the same germicidal effect *in vitro* as thymol. The method was that devised by one of us in 1917. A thin cover-slip film of an emulsion of the bacteria to be tested (in this case *B. coli*) was dried and immediately placed in the prepared solutions for the required time, then rinsed and pressed on to the medium (MacConkey's bile-salt lactose-agar) and incubated at about 34° C. for twenty-two hours. Provided that great care is taken in making the films and using aseptic methods throughout, the results obtained are surprisingly consistent.

Dried control films of coliform bacilli submitted only to water gave large growths always, whereas in thymol solution saturated at 15° C. (0.077 per cent.) sterilization was effected in under thirty seconds. Iodine so dilute as 0.01 per cent. gave similar results. This is only 1/100 the strength of Lugol's solution as used in laboratories, yet its efficacy is undoubted, and suggests that even the small amount of iodine contained in some lozenges may have a useful action. In water alone iodine dissolves only to the extent of 0.017 per cent. at 10° C. A convenient way to keep it for gargling is to make this saturated solution and dilute it with warm water as required.

* These experiments were made in the Department of Zoology, University Museum, Oxford, and our thanks are due to Professor E. S. Goodrich for much helpful criticism.

Summary

The occurrence of harmful organisms in the mouth and throat is discussed. Since they multiply on the surface of the tissues the problem of getting rid of them is similar to that of killing them *in vitro*. For this purpose methods are described and the use of antiseptics is recommended.

The advantages of thymol as an antiseptic or disinfectant are its almost negligible cost and its convenience in use.

In overcrowding, where it is impossible to increase adequately the cubic space per person, it would seem specially important to enforce "gargling fatigues" and so help to guard against "droplet" infection.

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A CASE OF CONGENITAL COMPLETE HEART-BLOCK

THE EFFECT OF ATROPINE

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That this condition is comparatively rare is evinced by the fact that in 1932 Aitken collected only thirty-nine cases. By 1934 Campbell and Suzman were able to collect fifty-three. It has been suggested that the reason for the increase is that the more frequent use of graphic registration is leading to the recognition of a greater proportion of cases.

Yater (1929) laid down the postulates for acceptance of the diagnosis as (1) recognition in early life; (2) absence of previous history of other possible cause of heart-block such as diphtheria, rheumatism, or congenital syphilis; and (3) demonstration by the electrocardiogram. The presence of congenital heart disease also lends weight to the diagnosis.

Case Report

A child aged 2 was admitted to Kilmarnock Infirmary on March 1, 1939, as a case of suspected meningitis or infantile convulsions. She had been ill for two days. On admission her temperature was 101°, pulse 42, and respirations 30. There was very slight nuchal resistance and Kernig's sign was negative, no history of ear disease, and no sign of cerebral compression. Lumbar puncture gave a clear fluid (normal on examination) under slight pressure (140 mm.—the child crying vigorously). The heart was enlarged laterally in both directions, the transverse diameter being four inches; there was also a definite bulging of the praecordium and a thrill in the fourth left intercostal space just inside the nipple line, and a harsh systolic murmur was heard over the whole cardiac area, most pronounced in the region of the thrill. No other abnormality was detected: no dyspnoea, cyanosis, or clubbing of the fingers was present. The temperature fell to normal in twenty-four hours, and the child remained well during the remainder of her stay in hospital. She was otherwise healthy and well developed; her Wassermann reaction was negative.

Previous History.—Normal full-time delivery attended by a midwife. The child was first seen by a doctor when 18 months old, suffering from symptoms similar to the present illness, and was sent to another hospital, where the bradycardia was noted and where she made an uneventful recovery. Since then till her present illness she had been perfectly well except for

"fainting turns," which unfortunately her parents were unable to describe satisfactorily, but which might have been Stokes-Adams's syndrome; she had also had two of these attacks previously. Both of her parents and her elder brother are healthy and have normal pulse rates.

Radiological examination revealed enlargement of the heart due to congenital abnormality; oblique views and barium swallow could not be achieved owing to the restlessness of the child.

Electrocardiograms were taken before and after the injection of atropine, and are reproduced in Figs. 1 and 2. Later the effect of 1/100 grain of atropine sulphate was

FIG. 1.—Electrocardiogram taken before the injection of atropine. Auricular rate, 115 per minute; ventricular rate, 38 per minute; complete block.

FIG. 2.—Electrocardiogram taken half an hour after the injection of 1/200 grain of atropine. Auricular rate, 120 per minute; ventricular rate, 40 per minute; apparent partial block of 3:1 ratio.

investigated, with the following results. First and foremost was the failure to break the complete block: the rates of the individual chambers at the different intervals were as follows:

Before atropine	..	..	{ Auricles .. 111 per minute
			{ Ventricles .. 38 " "
30 minutes after atropine	..	..	{ Auricles .. 158 " "
			{ Ventricles .. 40 " "
60 " " "	..	..	{ Auricles .. 131 " "
			{ Ventricles .. 36 " "

On November 4, 1939, the child was re-examined; the electrocardiogram still showed a complete block, the auricular rate being 124 per minute and the ventricular rate 36. Since the previous examination the parents, now instructed what to look for, were able to describe several Stokes-Adams's attacks, lasting a few minutes at the most. Otherwise the child had been well and had played about normally.

Discussion

In view of the clinical findings, the compliance with Yater's postulates, the radiological report, and the electrocardiograms, this is undoubtedly a case of congenital complete heart-block, associated with probable patent interventricular septum and Stokes-Adams's attacks.

Regarding the effect of atropine on heart-block, Aitken (1932) discusses possible changes of rhythm from complete to partial heart-block by vagal paralysis; in the twelve cases in her series where atropine was given no such change of rhythm occurred. On the other hand, Allan (1928) describes a case of partial heart-block which was temporarily abolished following the administration of atropine, but at times this abolition was preceded by a transient complete block owing to the initial stimulation of the vagus; in this case there was no anatomical severance of the bundle of His. Other authors describe change of rhythm apart from the administration of atropine: Smith (1921) describes a case of heart-block complete except during forced expiration, and Calandre (1921) published a case in which there was complete block except when the patient was in absolute repose; Bass (1918) quotes a case in which there were short

intervals showing normal QRS complexes preceded by normal P waves; Campbell and Suzman (1934) state that in their opinion the block always remains complete even in a case showing at times short records of 2:1 block. The last-named authors believe that this was most likely due to the auricular rate being almost exactly twice the ventricular rate: no graphic record of sudden change from complete to partial block has been published.

In the present case the first injection of atropine produced an apparent reduction to 3:1 partial block; the possibility of its having been caused by paralysis of the vagus in the presence of a few remaining fibres of the bundle of His giving normal sinus rhythm was taken into account. If this were the case, then the second and larger dose of atropine should certainly have had the same effect. Such was not the case, the auriculo-ventricular ratio rising to nearly 4:1. It would therefore appear that, as with Campbell and Suzman (1934), the apparent partial block is due to the coincidence of the auriculo-ventricular ratio being exactly 3:1 for the time being and the P wave coming in at its normal interval before the QRS complex.

It is of interest to note that the effect of 1/100 grain of atropine was to raise the auricular rate out of all proportion to the rise in the ventricular rate, and also that the latter fell much more quickly to its original rate than the auricular. This also agrees with the findings of Campbell and Suzman.

The above case is also one in which atropine affected the ventricular rate in spite of the complete block cutting off action through nerve control. On another occasion in this patient after the injection of 3 minims of adrenaline the ventricular rate rose to 48, the block still remaining complete.

Summary

A case is described of congenital complete heart-block in a child aged 2, associated with patent interventricular septum and attacks of Stokes-Adams's syndrome.

Electrocardiograms under normal conditions and after the injection of atropine are reproduced. The results of graphic investigation are given, and from these figures is discussed the possibility of the reduction of complete to partial block; the balance of opinion is against this possibility.

The disproportionate action of atropine on the dissociated auricular and ventricular rates is noted, and also the much quicker return of the ventricular rate to its original figure.

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The King Edward's Hospital Fund for London has decided that the annual distribution for 1939 shall be made up to the usual total of £300,000. Part of this distribution was held up on account of the war, but now that hospitals have resumed much of their ordinary work they are dependent on the normal sources of income: the supplementary grants from the King's Fund and increased subscriptions and donations from the public. The area of the King's Fund is to be extended from eleven miles round St. Paul's to the Metropolitan Police District; most of the hospitals in Greater London will thus come within its range.