extensive and dysphagia was but slight I used no active treatment. However, a week later the dysphagia was much more severe and I clipped away a piece from the left arytenoid, which was the most swollen. The dysphagia was promptly relieved and I noted a fortnight later: "No dysphagia, left arytenoid swelling shrunken quite so that the corniculum laryngis is visible; right arytenoid much smaller." Three weeks after this the dysphagia recurred; the right arytenoid swelled and I removed a piece from it, after which there were no symptoms. As the general health of the patient had improved I used lactic acid daily and by the middle of November there was no arytenoid swelling. The cords were normal, but the ventricular bands were slightly swollen, as also was the left aryepiglottic fold. The patient has since had hæmoptysis twice but has had no more dysphagia. With increasing dysphagia it is unlikely that he would have lived untreated over September and he would have certainly had a painful ending. Such a case is not a cure, but it shows the good effect of surgical treatment in an advanced case.

CASE 3.—A woman, aged 30 years, with fairly early pulmonary tuberculosis, had infiltration of the right arytenoid and slight swelling of the left, with interarytenoid granulations and infiltration of the right cord. On May 23rd, 1905, daily painting with Lake's pigment was begun and on the 30th part of the right arytenoid was clipped away. The patient was discharged to the sanatorium on July 5th with the larynx quite healed, no disease being visible and a small puckered scar marking the site of the operation. She is now in service; I have examined her to-day and find the larynx absolutely normal. The scar of the operation is just visible, but there is no sign of disease.

The third group consists of the hopeless cases in which no local cure can be expected, cases where there is advanced or acute disease of the lungs, rapid loss of weight, hectic fever, severe cachexia, or miliary tuberculosis. In cases of this class the treatment must be entirely symptomatic; if there are no severe symptoms, only such mild measures as do not trouble the patient should be employed. Careful attention to the administration of easily swallowed non-irritating food, and the use of sedative inhalations or, better, oily solutions in a nebuliser will do much to ease the patient. With tolerant patients an oily intratracheal injection containing menthol, 1 per cent., creolin or guaiacol, 2 per cent., &c., seems to improve the local condition and give relief. But if dysphagia supervenes such treatment is not enough. Morphine and cocaine take away the last remains of appetite and hasten the end; they should only be used when the case is near its termination. Orthoform is much less harmful and, given as an insufflation, often acts remarkably well, while its effect may last as long as 24 hours. But for the relief of dysphagia surgical measures rank far above all analgesics, and in my opinion no patient need, or should, be allowed to die with severe dysphagia from tuberculous laryngitis. The clipping away of even a small piece from the swollen arytenoid or the removal of even part of an infiltrated epiglottis may be relied on almost instantly to relieve this distressing symptom. The operation takes but a few seconds and causes little disturbance. Subsequently orthoform may be employed and is better absorbed through the wound than from unbroken epithelium. The use of surgical measures as a palliative in advanced cases with dysphagia has not received from the profession the attention which it deserves. I can quote numerous examples, but I will confine myself to cases of removal of the epiglottis, both because this structure is rarely involved except in advanced disease of the lungs and larynx and because the resulting dysphagia is particularly severe. This operation has until recently been little practised.

In the 12 months from December, 1904, to November, 1905, I had 13 cases of massive infiltration of the epiglottis in the wards of the Mount Vernon Hospital. In eight of these I removed the epiglottis; of the remaining five one had no pain on swallowing, in two the pain was very slight, and in the other two there was marked arytenoid swelling and pieces were removed from this region with the result that the dysphagia was entirely relieved in one case and very much improved in the other. So that I operated in every case where severe dysphagia was due to epiglottic infiltration. The operation is rapidly performed, is hardly painful after the careful application of cocaine, and is never followed, in my experience, by more than the most insignificant bleeding. It may therefore be performed on almost any patient, however ill. Of the eight cases of excision I have already described one in which a complete local cure resulted. This is altogether an exceptional case, for the epiglottis is seldom attacked until the rest of the larynx and the lungs are extensively diseased. Lake has met with a similar case.² Of the remaining cases of excision, as also of the five in which excision was not performed, all are now dead, as was to be expected, for they were in the last stages of disease; but in every case of excision the

dysphagia, which was severe, was much relieved and nearly always completely abolished, nor did it ever become severe again till death. Two patients left the hospital in fairly good health and remained alive for rather over three months; one of them, indeed, was seeking employment. The others remained alive for six and a half weeks, four weeks, four weeks, 25 days, and seven days respectively. In none was life shortened; in most it was undoubtedly prolonged, and in all the end was made incomparably easier. I should like to point out that I have only performed this operation when dysphagia was severe; where a good quantity of food could be taken I have held my hand, keeping to the rule that the treatment of these cases of advanced disease should be purely symptomatic.

It will be seen that, as I said at the beginning, the treatment of tuberculous laryngitis is difficult, never in the main brilliant, but not, I believe, unproductive of good results if the cases suitable for treatment are carefully chosen. Indiscriminate operation has done much to bring the treatment of this disease into disrepute. The pendulum has swung from enthusiasm to despair, as has so often happened in the treatment of tuberculosis in general, but I hope that professional opinion will soon steady itself and perceive both the limitations and the advantages of the active treatment of this distressing affection.

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IS SULPHATE OF SODA A TRUE INTESTINAL ANTISEPTIC?

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THE answer which the majority of the medical profession will give to this question is doubtless a very decided negative, and yet I submit that there are grounds, clinical and possibly chemical, for thinking that an affirmative one affords a better explanation of the action of the drug under certain conditions. This at any rate is my contention, and whether I am correct or not in that contention there are at least sound reasons for considering that sulphate of soda has an action over and above that of a mere aperient and liver stimulant, one which points strongly in the direction of its being an intestinal antiseptic.

Some years ago Major W. J. Buchanan, I.M.S., published a paper in the *Indian Medical Gazette* (December, 1898) on the treatment of dysentery by means of magnesium sulphate and later the records of a series of cases successfully treated with sodium sulphate. After reading those papers I carefully carried out his treatment with one-drachm doses of sodium sulphate given every six hours in a large number of cases of dysentery and obtained excellent results. In his paper on magnesium sulphate Major Buchanan stated that it was necessary to secure "free gentle purgation," but in the cases which I treated with sodium sulphate I found that purgation was not necessarily produced but rather appeared to be undesirable; in fact, in the most successful cases the motions rapidly became less frequent, lost their dysenteric character, and became feculent and of normal consistence in from two to four days, in spite of the continued exhibition of the drug. These results set me thinking and I began to question whether the accepted "gentle purgation" theory was a correct explanation of the action of the drug. With the object of obtaining a solution to the question I commenced giving the drug in infantile diarrhoea. In the first cases in which I tried it I found that it produced irritation, and although the character of the stools improved somewhat they did not decrease in frequency. Continued experimental administration, however, taught me that if I reduced the dose of the drug sufficiently to avoid any aperient action the motions in the majority of cases became less frequent, rapidly lost their objectionable odour and character, and became normal without other medicinal treatment. Another marked result was that the vomiting, which is so frequently a troublesome complication in these cases, ceased after one or two doses. (Milk diet was of course avoided as far as possible.) Since obtaining these results I have gradually relied more and more on sulphate of soda in the treatment of all septic bowel complaints and have become perfectly convinced that the drug given in proper doses is a true bowel antiseptic, independently of any aperient action, and further that if we wish to obtain this antiseptic action we must avoid doses which have

² Lake and Barwell: Laryngeal Phthisis; second edition.

an aperient action. The doses which I am in the habit of giving commence with about six grains for a baby under six months old, increasing up to one drachm in the case of the adult, given every six hours in one of the flavoured waters such as fennel. Children over six months old are very tolerant of the drug and seldom exhibit any aperient effects from doses of from 10 to 20 grains. Having arrived at these conclusions with regard to the action of the drug, I extended its use in my practice to typhoid fever and was very interested to find that the results anticipated were obtained—namely, that the motions were loose and foetid became more normal in appearance and odour, with the natural result that the temperature was lowered and ran a more benign course.

There are cases in which the drug absolutely fails to produce any effect and for which it is very difficult to find an explanation, unless it be that there is some obscure change in the intestinal mucous membrane which interferes with what may be considered the normal splitting up of the salts. The question now naturally arises, Is it possible that a body such as sulphate of soda can have any antiseptic action, and if so to what is it due? There has always been an impression in my mind that possibly the action may be due to the setting free of oxygen during the process of chemical decomposition of the drug in the intestines, and the interesting experiments published by Hay on the action of the saline cathartics in the *Journal of Anatomy and Physiology* in 1883-84 lend at any rate some colour to such an argument, or rather perhaps enable one to build up a hypothesis which gives some support to that contention. In these experiments Hay showed that sodium sulphate produced copious intestinal secretion according to the amount of the dose and the strength of the solution. He showed further that the sulphate was split up in the intestines; the acid, being more easily absorbed than the base, disappeared partially from the small intestines to return shortly afterwards. In the meantime the base was gradually undergoing absorption and excretion by the kidneys and never pursued the same peculiar course of absorption and re-excretion as the acid. That portion of the salt which remained within the bowel unchanged caused the secretion of intestinal mucous fluid and consequent purgation and not the portion absorbed into the blood.

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THE SPIRILLA OF THE MOUTH.

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In a paper in THE LANCET¹ attention has been directed to the occurrence of spirilla in certain pathological conditions of the mouth and fauces described by Vincent as constituting a special form of angina and named by him "Vincent's angina." The organism described by Vincent² is a spirillum, showing also bacillary forms. It has not been obtained in pure culture by any recent observers. As comparatively little attention has been paid to the presence of spirilla in the mouth it seems not out of place to call to mind the various forms of spirilla that are from time to time met with in or about the mouth and which are for the most part uncultivable. I can add my own experience to that of the authors in the paper quoted, that the spirilla and bacilli described by Vincent under the common term of bacillus fusiformis do not grow readily, if at all, upon the ordinary laboratory media. During the course of the last ten years I have been engaged with various problems concerned with the bacteriology of the mouth and have made use of a very large number of media of all sorts of composition and percentages of alkalinity, and I have rarely succeeded in obtaining satisfactory cultivations of the bacilli redescribed by Vincent on any of the media I have employed with but few exceptions—namely, the use of a potato gelatin, &c., described by me,³ by means of which I was enabled to isolate from some seven or eight cases a spirillum which gave the same cultural characters and which is fully

described, together with photographs, in the "Mycology of the Mouth."

Miller in "Micro-organisms of the Mouth," p. 76, et seq., calls attention to three separate forms of spirilla which are to be found in the human mouth and if a cover-slip preparation be made from the pus in almost any case of gingival inflammation at least three morphological forms of spirilla may be observed, as follows: (1) thick comma-shaped bacilli with ends pointed and two terminal flagella; (2) true spirilla with regular spiral formation of from five to seven turns and pointed ends; and (3) spirochætæ, irregular filaments considerably longer than the regular spirilla and often running up to 15 or 20 μ in length. The spirochætæ themselves show considerable irregularity in the number and turns in the thread which is also curved. The two former spirilla—that is to say, the comma form and the true spirilla—are actively motile, while the spirochætæ only exhibit a slight oscillating movement. All three forms stain somewhat badly with the ordinary aniline dyes and decolourise by Gram's method, by which they are distinguishable from the fragments of mycelium of the streptothrix buccalis, which retains Gram's stain. In stained preparation made directly from the mouth it is not infrequent to find with many of the spirilla forms darkly staining masses, apparently attached to the spirilla and forming part of the thread. These I have not observed in connexion with the comma forms but may be frequently seen with the spirochætæ. In cultivations upon saliva set with agar or in sterilised saliva with peptone added, as well as upon the medium I have elsewhere described—namely, potato gelatin—a development of extremely minute pinpoint colonies may be seen which on microscopic examination are seen to be spirilla, for the most part degenerated. In the liquid media, potato-gelatin at 37° C., and on the other media a certain number of degenerated spirilla forms may be found for several days in the fluid at the bottom of the tube. Anaerobic cultures do not give any better result, with the exception of plates kept in an atmosphere of CO₂, when a slight development of mixed spirilla and threads may sometimes be observed. In the liquid media, particularly when the culture has been kept for some days, spirilla forms with attached rounded darkly staining masses may be seen, closely resembling the spirilla seen in the mouth. In the cultivations I was able to obtain some time ago this formation of apparent involution forms was well marked at the end of seven days.

The presence of spirilla is a marked feature in all pathological conditions of the mucous membrane of the mouth. I have frequently observed them associated with the diphtheria bacillus⁴ in cases of genuine diphtheria from which I have been able to isolate the diphtheria bacillus; from almost all cases of alveolar osteitis, even in advanced stages; in acute and chronic simple gingivitis, and in several cases of disease of the antrum of Highmore. The spirillum, together with both the spirochætæ and comma-shaped forms, appears to be always inclined to develop with any pathological condition of the mucous membrane of the mouth. This fact was pointed out long ago by Bernheim,⁵ who considered the spirilla to be the active agent in ulcerative stomatitis, and it is true that both the spirilla and the fusiform bacillus or "fusiform bacillus of Vincent," which is rather of a lanceolate than a fusiform shape, are almost invariably present in ulcerative stomatitis or tissue necrosis of the gingival margin. That the spirillum and the fusiform bacillus, together with a large number of other morphological forms of bacteria, some of which I have succeeded in isolating and describing elsewhere, are to be found in the mouths of persons not in themselves exhibiting either the conditions of ulceration of their fauces or mouths, or showing any impairment of their health with sore throat, furred tongue, or other marked constitutional symptom, is common knowledge to anyone who has examined preparations made from the mouth. In a series of 85 cases of chronic alveolar osteitis, acute alveolar osteitis, and simple gingivitis, I have observed the spirilla in 75. Some few of these 75 cases showed certain general constitutional symptoms which, however, would seem to have been associated with other bacteria, notably those of the group of pus cocci, rather than to the spirilla, but the question of the relation of these organisms of pyogenic variety to oral pathology and associated general disturbance it is scarcely necessary to discuss here.

¹ Stomatitis and Tonsillitis, W. Harwood-Yarred and P. N. Pantou, THE LANCET, Feb. 17th, 1906, p. 438.

² Organism described by Vincent, THE LANCET, May 13th, 1905, p. 1260.

³ Mycology of the Mouth, p. 196.

⁴ Ibid., p. 194.

⁵ Bernheim: Semaine Médicale, 1896.