of injury to the child. The induction of premature labour may be essential for the wellbeing of the mother, while for the infant a Caesarean section at term would be a safer procedure. The use of anaesthetics and opiates may be necessary for the mother, but it cannot be advantageous for the infant to arrive in its new surroundings in a drugged state. Ante-natal treatment must prove of advantage to both mother and child. Treatment can sometimes be instituted so that pregnancy may be allowed to go to term and malpresentation can be rectified before labour commences. By ante-natal care there should be reduction in both the maternal and neo-natal death rates.

SUMMARY

The points in the recognition and treatment of birth injuries that I would emphasize are:

1. The prevention of sepsis in even the smallest superficial abrasion.
2. The recognition and treatment of fractures.
3. The recognition and early treatment of injuries to nerves.
4. The careful nursing of the infant with intracranial damage.

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SORE THROATS OF OTHER THAN TONSILLAR ORIGIN*

BY

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The aim of this paper is to emphasize the importance of the nose in the production of faucial and pharyngeal complaints. The way in which tonsils affect the nose is well recognized, but the converse is also true. There is nothing new in the idea—I find the connexion mentioned in the textbooks; but I think that this connexion is often missed to the detriment of the patient. I am assuming that dental sepsis has been eliminated in all the cases under discussion, and that the alimentary canal is healthy.

Now it is unfortunately impossible for a laryngologist to follow up all his cases of tonsillectomy and see if the operation has always succeeded in stopping sore throats, but general practitioners have sometimes the thankless task of so doing, and I suggest that they have sometimes been disappointed in the results of tonsillectomy done for this purpose. One reason why this aspect of sore throats has to be examined afresh is a change that has arisen with regard to the skill displayed in tonsillectomy. Before the war, the explanation of the failure to cure symptoms was often that portions of the tonsils were still present after operation, especially during the period of enthusiasm that followed the demonstration by Sluder and by Whillis about 1910 that one could completely enucleate tonsils with the guillotine; and for ten or fifteen years the prevalence of tonsillar remnants and of scarred-up palates sufficiently explained the many failures to cure throats by tonsil operations. But although skill acquired by practice has led to a noticeable decrease in the number of incomplete operations, yet we not infrequently see cases, both in children and adults, of sore throats persisting in spite of careful removal of tonsils and adenoids, especially in certain years. This was the case in 1919 and 1929; and also this year—a point to which I will return later.

PHYSIOLOGY OF NOSE AND THROAT

It would be well here to consider for a moment some of the physiology of the nose and throat. Too little work has been done in this direction; and so difficult are the problems that there is not even yet a well-defined and generally held belief in the function of the tonsil and the rest of the lymphatic tissue in the nasopharynx. One has one's choice of beliefs, therefore; and I would range myself on the side of those who regard the tonsil as a sort of immunity-factory. Long after any nasopharyngeal infection, and often during epidemics in which the individual has escaped infection, one can find in the tonsillar crypts the epidemic organisms in the act of being ingested by white corpuscles. And having regard to the lack of epithelium at the bottom of the crypts and to their close relationship with the deep cervical lymphatics, it is reasonable to suppose that the endotoxins thus liberated are passed via the tonsillar lymphatic channels and the thoracic duct into the bloodstream, with a view to the production of antibodies against the organisms in question. Be the interpretation what it may, however, it does seem that it is the proper function of the fauces to inflame at the intrusion of micro-organisms. An illustration of this, more familiar to laryngologists than to practitioners, is the rare case in which the patient complains of sudden sore throat on one side, associated with the occurrence of secretion in the throat for which there appears to be no origin. I saw such a case in which the nose was demonstrably guiltless, and yet there was the pus whenever the throat was inflamed. One day a large discharge of pus was seen issuing from the mouth of the Eustachian tube, due to an overlooked otitis media in which presumably an infection had persisted long after the pharyngeal part of it had cleared up, and the cause of the sore throat was clear. While on the subject of what may be termed this "watch-dog" function of the fauces, it is illuminating to remark upon the absence of this property in the buccal mucous membrane. This mucosa takes little or no notice of dental sepsis, at a time when the fauces may be responding most actively to this very same insult. Some change, then, takes place in the function of the mucous membrane at the anterior pillar of the fauces; the faucial mucosa and the buccal mucosa are very different organs. I contend that one of the duties of the faucial mucosa is to register indignation at the arrival of strangers at the gates, in which case a sore throat may sometimes have to be regarded as a remedial effort—an

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attempt to draw attention to infection from elsewhere. And rather than try to stop the dog's bark, we should try to find out what he is barking at!

These suggestions are not scientific, I am afraid; but I find no need to apologize for this. It is not given to all of us to have the time or the special ability to make the long series of controlled observations necessary for definite statements; but I submit that there is value in clinical impressions remaining after numerous observations, even if uncontrolled. Luckily there are some among us who, though in active practice, have the divine spark of curiosity coupled with the necessary mental outfit; and our specialty occasionally gets the benefit of the light thrown by methodical examination upon clinical material.

The cilia were rediscovered by StClair Thomson in 1895. And again Mr. Yates in his *Modern Treatment of Catarrh* has shown us how to appreciate just what a prominent part these much neglected little organs play in the hourly war which the nasopharynx is waging against inspired organisms. For the benefit of those who may have had time to keep up with recent work, we will touch briefly upon some of his researches. If Indian ink is introduced into a sinus, it presently appears at the mouth thereof, and thence proceeds as a thin black line by quite a definite path, to a position in the nasopharynx above the Eustachian orifice. The ink then descends behind the Eustachian cushion, and finally reaches the opening of the oesophagus, where it is duly swallowed. The black line can occasionally be seen to send an outlier which passes over the posterior pillar of the fauces—runs over the tonsil, and then rejoins the parent stream. When one knows the classical pathway, it is most intriguing to watch mucopus following the path (which it can be seen to do during a sinusitis, before definition becomes swamped by a large amount of discharge). And when one has become familiar with the route, one can, from the position of the redness in the pharynx, get a fairly good idea whether a sore throat is nasal in origin or not. Yates did another important piece of work of clinical value by showing that if indigo-carmine be introduced into a nose in which the ciliary activity is normal, it is swept down via the usual pathway in blue lines, which can be wiped off; whereas from a nose in which ciliary activity is depressed or absent the dye appears in blue lines *behind* the pharyngeal mucosa—lines which cannot be wiped off and which are sub-mucosal lymphatics. This is a most convincing test, which anyone can carry out without special technique, and is easily demonstrable in the type of case I wish to discuss, that of faucial inflammation caused by sinusitis. A little more of physiology before we consider the clinical aspect. Is it ever recognized what a huge area of mucus-producing membrane there is in the nose and accessory sinuses? I have not been able to think out how to measure it accurately, but if one calls the septal area four inches by two, it is evident that the total area is 30 square inches or more; this explains in some measure where all the phlegm comes from. Further, the nasal mucosa should, in health, be of a nice pink colour, and should be moistened with clear transparent mucin; these conditions should normally be present upon both sides of the nose. Finally by transillumination, light should glow evenly and clearly through symmetrical crescent-shaped areas in the infra-orbital region, and all sinuses should be translucent to x rays.

CLINICAL FEATURES

What, then, are the symptoms and signs in a case of sore throat which should lead us to the idea that the inflammation may not be primary in the throat but that it is a mere result of infection higher up—in fact, what one might term a "nasal" sore throat? I think that perhaps the most characteristic thing about a nasal sore throat is its onset. When interrogating a patient, we are always taught to ask, "How long?" It has now become one's practice never to omit two other questions—"What began it?" and, "Is this the first time?" The patient may have no idea as to the origin of his trouble. But surprisingly often he may answer that it began after a pyrexial attack which occurred in February 1929, or even during influenza just after the war. To the second question he may answer that, having begun one winter, it now comes regularly whenever he gets a cold. Now if these answers were only to be obtained from patients with tonsils, we would be no wiser with regard to diagnosis. But the whole point of this paper is that these answers are characteristically obtained from patients in whom the tonsils have been correctly removed. Indeed, patients occasionally say that their habit of sore throats dates from tonsillectomy. (So much so as to give rise to a fleeting pang of doubt as to whether nasal sore throats, or in other words sinusitis, were not actually to be caused by the removal of some necessary function of health vested in the tonsil.)

Another thing which may point to a nasal origin for a sore throat is its frequent asymmetry. Indeed, I would say that one should always suspect a nasal origin when one side of the throat is noticeably worse than the other, even in children. I will quote from a letter of an observant doctor:—

"Feb. 12th, temp. 102° F., cold and cough. Feb. 15th, temp. 100° F., rt. ear drum red. Large gland rt. mandibular angle. Rt. tonsil enlarged with white patch."

Transillumination showed that the right antrum was opaque and the left translucent. This is confirmed in the radiograms shown. The age of that patient was, and still is, just over three years. Before the war the existence of sinusitis in children was not widely recognized, and we owe a great debt to Cleminson in this country and Dean in America for demonstrating not only that it could occur, but that it occurs very commonly, if only transiently.

So far, then, we have the onset and the asymmetry to guide us. The nature of the soreness, best recognized in the tonsil-free patient, may help in diagnosis. It is usually worse in the morning, and persists until the patient has brought up some phlegm from the back of the nose or the throat. Other indications of nasal origin are rashes upon the skin of the nose and lips, redness of one eye, pain or inflammation in one ear, and an excess of secretion sticking upon the hairs of one nostril. In the throat itself, one can get more direct evidence by examining the posterior pharyngeal wall, upon which there is often a very obvious coating of yellowish discharge. If one is obsessed with the tradition that tonsils are the sole cause of sore throats, one can disregard this film as completely as one can disregard the messages from the unemployed eye when using a microscope. The attitude which is content to assume that this evidence of nasal inflammation is merely an example of nasopharyngitis produced by inflammation in the tonsils is falsified when one realizes that the same appearances are found in the tonsil-free patient. If the film is transparent and difficult to see, it can be made obvious in a tolerant patient by lightly sweeping a blunt probe across the posterior pharyngeal wall. Whatever the condition of the tonsils, the presence of a large sheet of post-nasal mucus must cause one to suspect the nose; the mucus glands in the post-nasal space are not enough to produce a large and constantly moving sheet of discharge. As a practical point, great relief may be afforded by removal of sticky secretion that has defied the patient's own efforts. Another very important piece of evidence is to hand if there are laryngeal symptoms, or a cough, accompanying the sore throat. Personally, I have begun to doubt whether

laryngeal symptoms ever occur with what I call a "primary" tonsillitis; the nose and larynx work together in these affairs, and if tonsillitis be present as well, it is often to be regarded as a mere *result* of the nasal disturbance. Tonsillectomy in such cases is worse than useless. One may instance the parallel of the erstwhile fashionable operation of cutting off a piece of a lengthened uvula, with a view to curing a cough. Although it was utterly unsuccessful in achieving its purpose, although laryngologists no longer advise it, and although, from the position of the uvula and its relationship to other parts, the operation could never have been reasonably expected to cure a tickling cough, yet it was earnestly carried out all over the world during a period of, say, twenty years. One still gets patients sent up for it to be done. Similarly, the removal of tonsils is earnestly carried out with a view to curing what is obviously a nasopharyngitis, although the trouble can be seen to go on occurring just the same in spite of the operation.

To return to our review of the circumstantial evidence which should make us suspect a nasal origin for a given sore throat. I have confined myself so far to signs evident without special instruments or special training. In the nose the most obvious thing is the colour of the mucosa; any departure from the normal, especially if on one side, increases our suspicions, and any departure from normality in the amount and nature of the discharge takes us a step further. The most difficult cases, and this year a type very commonly met with, are those in which the appearance of the front of the nose is above suspicion, and transillumination normal. In these one should examine the post-nasal space shortly after a shrinkage of the nasal mucosa followed by a gentle wash-through of the nasal passages with a 2 per cent. solution of sodium bicarbonate. If one is persistent, and lucky in choosing the moment, one will discern an exiguous trickle of muco-pus appearing over the top of the posterior end of the middle turbinate, and will be able to make a presumptive diagnosis of posterior ethmoiditis or sphenoiditis. Whereas also the faucial symptoms are singularly unrelieved by the usual paints and gargles, immediate improvement follows the removal of the load of phlegm with which the cilia have been unable to cope because of its viscosity. Most people over the age of five can be taught to wash the nose out with a couple of drachms of a warm 2 per cent. solution of sodium bicarbonate from a coarse spray, repeated in about ten minutes. The first application softens the phlegm, and the second initiates a process of removal which can thenceforward be carried on by the cilia. The relief thus obtained lasts for about an hour—that is to say, until the next lot of phlegm has taken the place of that removed.

TREATMENT

Granted, then, that we have a case of sore throat presenting all the above-mentioned stigmata of a nasal origin, what line of treatment should we follow? In a case of an antrum which is dark to transillumination, and obviously overflowing into the middle meatus of the nose, the indications are easy—we must wash out the antrum. Such a procedure should precede or replace any question of tonsillectomy. For one thing, tonsillectomy is not of much avail when the cause of the trouble is still maintaining its bombardment of the virtuously indignant pharynx; and for another we cannot hope for an easy passage as regards operative, reactionary and secondary haemorrhage where there is still in the nasopharynx a cause of reflex vasodilation. I am beginning to think that bleeding with tonsillectomy is now a thing to be surprised at, and that it seldom occurs except in cases where we have overlooked some unresolved inflammatory process. Persistent pain, too, is rare after tonsillectomy, and its occurrence should make one suspect something outside the tonsils. I recall a case in which I had been satisfied with the appearance of the teeth and had found the antra translucent. Tonsillectomy led to pain on one side, with pyrexia persisting till the sixth day; transillumination then showed that one antrum had become opaque, the trouble having arisen from a "flare-up" in connexion with an overlooked dead tooth in the floor of the antrum. This is a digression: we were discussing the treatment of nasal sore throat, and agreed to wash out the antrum if obviously full up. There are numerous cases of latent sinusitis, however, in which diagnosis is not so simple. How shall we decide when we are dealing with one of these more recondite cases of sinusitis—an antral infection, say, which needs treatment? A perusal of most of the available textbooks will leave the student with the (perfectly safe) belief that if proof-puncture produces pus, then there is pus in the antrum! And this, furthermore, seems to be the only permissible indication for drainage.

Laryngology is not a very old subject; and before the war the number of observers who had the opportunity of becoming familiar with the vagaries of antral infections was limited; so that it was at that time desirable that indications for treatment should be outstandingly definite and incontrovertible. I submit that, in view of the increased number of trained workers, and of the long period during which the subject has now been studied, it is permissible and desirable to widen the indications for operative treatment of antral infections. If operative treatment of an infected antrum is withheld until one can definitely say there is an empyema, a very large number of people will continue to suffer from curable disease, not only from the sore throats we are here to discuss, but from catarrh, deafness, headaches, gastro-intestinal troubles, rheumatism and the like.

Now if the only antral operation is to be the Caldwell-Luc operation, carried out through the mouth as well as the nose, then perhaps it is best to defer operation unless there *is* an empyema, diagnosed with all the solemn and redundant ritual of proof-puncture; for if we are to await the ciliary breakdown which obtains in this degree of sinusitis it is probable that anything less than a Caldwell-Luc operation will be inadequate. But I, personally, have only performed this radical operation twice since the war, and as I find that a great many surgeons seldom perform it, I feel that there is a legitimate case for adopting another attitude about antral operation. I hold that we should operate earlier upon infected antra, and that the operation should consist merely of the provision of an intra-nasal opening, perhaps not more than half an inch in diameter, through which the patient can perform the regular lavage; and if the configuration of the nasal passage permits us to make this opening without touching the inferior turbinate, so much the better. We should rely more upon after-treatment; and the operation should not be regarded so much an attempt to wipe out the disease at one fell swoop, as the provision of an aperture to permit ventilation and to prevent the accumulation of discharge. The first aim of a sinus operation should be by ventilation and drainage, to encourage the restoration of ciliary activity, and the more we limit the severity of the operation, the less do we inhibit the return to normal. Our chances of being able completely to cure a sinusitis by a small operation diminish *pari passu* with the time we allow it to persist. There is this traditional belief that operation upon an antrum should be delayed till pus can be washed out of it, and radiologists even go to the length of devising ingenious methods for showing a fluid level in an antrum. A high fluid level certainly indicates a breakdown in ciliary activity; but there are many gradations between normal activity and complete

breakdown, and if we wait for complete ciliary palsy it is a difficult business getting the cilia to function again.

We have in the history of appendicectomy what may prove to be in some measure a parallel to the treatment of antral infections. One of the chief indications for appendicectomy used to be a bulging of the abdominal wall by the abscess; and those who first advocated removing the appendix early enough to prevent such a state of affairs were regarded as enterprising, to use the least radical term. But the profession now prides itself upon early diagnosis, and upon removal of the appendix before it has made the patient really ill! Similarly we now do tracheotomy in time to prevent the very things which used to be given as the indications for tracheotomy. Surely the time has come to adopt a similar attitude with regard to antral infections, and to operate in time to prevent the occurrence of empyema.

LATENT SINUSITIS

There are some antral infections which begin suddenly, with obvious suppuration—inflammations which may yield permanently to one or two lavages. But the commonest antral infection is an insidious affair, the origin of which seems very often to be traceable to one of the big influenza epidemics, as mentioned earlier. It may occur in noses apparently quite normal in structure, but it is usually found in cases where the nose offers some pronounced mechanical predisposition. (In this connexion, perhaps someone at this meeting will be able to give us some fresh ideas as to why, in a nose with marked disparity between the two sides, the antrum on the roomier side is so often the one to show signs of infection first.) But even in the absence of mechanical troubles there are definite signs. The first thing to notice is the general appearance of the nasal mucosa. Is it moist, and pink as a kitten's tongue? No. On one or both sides the mucosa has the appearance of raw steak that has been allowed to dry, and in place of the colourless mucin which should moisten its surface there is a dryish, scanty film of muco-pus which over the middle turbinate is usually aggregated into small flakes. This appearance of the middle turbinate as a sign of recondite sinusitis is of the greatest value; but it is difficult to be sure of any diagnostic difference between its appearance in frontal, ethmoidal or antral infection. On palpation it is found that the mucosa over the middle concha, which should fit the bone like a glove, may be several millimetres thick, and may in ethmoiditis be actually oedematous.

Now for transillumination. There are laryngologists who soar above the evidence obtainable by this test. The meaning of a relative opacity may not be obvious, but it is not to be regarded as a criterion of normality. Transillumination cannot be dismissed with a wave of the hand; and it is surely our function to supply guidance as to the possible significance thereof. It is of particular importance in cases in which a previous transillumination has shown a symmetrical translucency. During the early stages of a nasal infection one usually finds that in place of a pair of clearly defined infra-orbital crescents, there are two equally vague and undefined sub-luminous areas—not black, but lacking their former clear-cut translucency. After a week or so, one infra-orbital crescent may clear up, while the other remains vague. Now what is the significance of this diminution of the normal light? Antral lavage at this stage may produce nothing, or at most a small "blob" of muco-pus—much too small to prevent the transmission of light. The dimness is due to hyperaemia or to oedema of the lining, and its existence is duly noted, chiefly for future reference, for hyperaemia on one occasion is no indication for operation. The importance of the discovery is that it is a contraindication to light-hearted tonsillectomy later on.

Let us suppose that we have a sore throat which presents all the stigmata of a nasal origin, and suppose the symptoms duly subside. We are in a stronger position when it recurs (for recur it will, if the antral lining is deeply infected) because we can note the reconstitution of our chain of circumstantial evidence as the separate items arise again. The first thing complained of is probably the sore throat; but I would here remark that there are probably always premonitory signs before the sore throat if one is lucky enough to see the patient at the right time. How often is a house-surgeon frightened by a rise of temperature after some clean operation, only to find 48 hours later that the patient complains of a sore throat. The temperature is not the only sign that precedes the sore throat. If in a suspected case you make a practice of transillumining the antra, you will suddenly one day find a dimness where there was usually translucency; whereupon you can safely tell the patient he will have a sore throat or a cold in a day or so. Sooner or later there will be a glazed look upon the middle turbinate, and a pharyngeal film, with tenderness of the glands. The presence or absence of the tonsils naturally leads to some alteration of the picture, but the knowledge gleaned during the previous attack will permit one to see the tonsillar involvement in its right perspective—namely, as a result rather than a cause.

CONCLUSIONS

It will be seen that this paper, ostensibly upon throats, is really a covert attack upon the antrum. I freely admit this, except that I would include hidden ethmoidal infection as being at least as frequent.

I urge no operation upon the ethmoids in this connexion, but I submit that there is a case for an early and not extensive operation upon the antrum; and believing as I do that it is doubtful whether the mucosa can ever return really to normal when once it has got to the stage of chronic empyema, I ask for the pontifical blessing of the Section upon indications for drainage based on the repetition of a convincing chain of circumstantial evidence rather than a belated positive result to a proof-puncture.

SUB-ARACHNOID BLOCK

GENERAL ANALGESIA; "SPINAL" ANAESTHESIA; RESPIRATORY PARALYSIS; FALLACIES AND METHODS *

BY

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The title of this paper comprehends all the results obtainable on the nervous system by the injection of analgesic substances within the sub-arachnoid space. It includes nothing which was not observed as a result of the earliest employment of cocaine, but the interpretation of the results over the intervening period has been clouded with error, copied from one textbook or paper into another, and persisting in some of the latest publications. The basis of understanding is anatomical and physical.

ANATOMY AND PHYSICS

"The arachnoid membrane is a gauzy reticulum of almost web-like delicacy which in reality pervades the space it occupies. Its outer surface, or that closely related

* Read in opening a discussion in the Section of Anaesthetics at the Annual Meeting of the British Medical Association, Eastbourne, 1931.