(4) *Chronic disease of the roots of teeth* tends to thicken the floor of the sinus and renders the cavity *less*, not *more* accessible through an alveolar opening.

(5) *The early loss of cheek teeth* raises the floor of and diminishes the capacity of the sinus.

(6) These conditions can be diagnosed during life by a surgeon who has been a careful student of the dental aspect of the case. That is, he can with tolerable accuracy pronounce upon (*a*) the capacity of a given antrum; (*b*) the state of its floor as regards level and to a limited extent the presence of septa, from an examination of the mouth in the living patient. It appears to me that such information must prove valuable to the operating surgeon in assisting him to form a more exact forecast of the dimensions and general conditions of the cavity on which he proposes to operate.

BRITISH MEDICAL ASSOCIATION.

Meeting at Sheffield, July, 1908.

Section of Dental Surgery.

President, Frank Harrison, M.R.C.S.Eng., L.D.S.Edin.

Discussion on Antral Disease in Relation to Special and General Surgery.

Dr. Herbert Tilley opened the discussion with a paper on "Diseases of the Maxillary Antrum from the Point of View of the General Surgeon, the Rhinologist, and the Dental Surgeon" (*vide* p. 607).

Mr. A. S. Underwood continued with a paper on "Some Recent Researches on the Anatomical and Pathological Conditions of the Maxillary Sinus in Relation to the Teeth" (*vide* p. 620).

The discussion was continued by Professor Urban Pritchard and others.

Dr. Urban Pritchard (London) said: Dr. Tilley has in his paper gone so thoroughly into the treatment of these cases of antral suppuration that there is very little left to be said; but I should like to say that I quite agree with him that the radical operation, opening right through from canine fossa to the inferior nasal meatus, should be

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adopted in all bad cases. I also agree with his warning not to remove or seriously injure the mucous membrane by over-curetting—the soft polypi, etc., are best wiped away, as it were, rather than curetted. Mr. Underwood's researches are very instructive. The septa, if they cut off a separate cavity, may have to be reckoned with when operating from the alveolar process. In regard to the smallest antral tubes shown by Dr. Tilley, I feel sure he will agree with me that they should always be avoided.

Mr. F. J. Bennett (London) quoted the dictum of John Hunter, that the size and shape of the antrum of Highmore depended on the position of the fangs of the teeth, the branching of the molar fangs bounding the walls to some entent. With regard to the presence of septa in the antrum, the speaker had pointed out on a previous occasion the close dependence of the septa on the original posterior wall of the maxilla. As the antrum increased in size in a backward direction, due to the lengthening of the jaw, due in its turn to the eruption of the posterior molar teeth, that which was the posterior wall became part of the antral cavity, and traces of this posterior wall still persisted through life as the antral septa.

Mr. K. W. Goadby (London) said: It occurred to me that a few remarks relating to the bacteria found in cases of chronic antrum suppuration might not be entirely foreign to the present discussion. I have therefore compiled the accompanying tabular statement, from which it will be seen that the infecting organisms differ considerably, and that in many cases mixed infection has taken place. The organisms noted were in all cases identified by cultural methods, and in cases Nos. 3, 5, 6, 7, 12 the *Staphylococcus aureus* isolated were tested on rabbits—0·5 c.cm. of an emulsion of a twenty-four hours' growth on agar in 5 c.cm. of broth produced death when injected intra-peritoneally. The saccharomyces isolated were also tested and in two instances produced death—Nos. 5 and 7. On the death of the animal, large masses of growth in the lungs and kidneys were found simulating sarcoma to the naked eye. This organism I have found in cases of pyorrhœa alveolaris on several occasions, and inoculation into animals has proved pathogenic. The other organism to which I desire to draw special attention is the *Bacillus fusiformis aërobius*, apparently an aërobic variety of the one first noted by Vincent as occurring in a special form of angina, and also frequently found in alveolar pyorrhœa. The characters of the organism are as follows: It stains by the ordinary aniline dyes, but not by Gram's method. On agar the growth is scanty, and development takes place best upon serum agar. Subcutaneous inoculation into guinea-pigs is followed by a local swelling at the point of inoculation, which persists for a week or more, gradually resolving; the swelling, if incised, is found to contain pus, in which the organisms may be found during the first few days. Two points I desire particularly to emphasise: first, that antral suppuration occurs by infection from the alveolus without the intervention of carious or abscessed teeth. In alveolar pyorrhœa masses of granulation tissue seen on extracted teeth show on section a process of rarefying osteitis spreading into the bone, often with small masses of bone buried in the tissue, while the tissue farthest removed from the advancing inflammation shows fibrous sclerosis. In cases Nos. 5, 7, and 11 this alveolar infection was present, the removal of a suspected tooth showed no suppuration due to dental cause, while in one case—No. 7—a probe could be passed through the alveolus into the antrum although all the

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teeth had live pulps and were not carious. J. G. Turner[1] describes a similar case where antrum infection took place in both antra at different times through the alveolus although all the teeth were sound. The second point is the method of vaccine treatment. In the cases I give three are still under treatment, and the tuberculous one was not treated by tuberculin; of the remaining ten all were of more than a year's duration, one of fifteen years and one of eight years, and in all a copious discharge of pus was present. All the cases were being washed out twice daily by the sufferers. Without going into elaborate details, the treatment adopted was the determination of the infecting organism by bacteriological and opsonic means; secondly, immunisation by means of vaccines, starting with an appropriate stock vaccine, and finally, whenever necessary, with a vaccine prepared from the patient's own organisms. Bacteriological examination was further made from time to time, and the diminution or an absence of the organism immunised against noted and the case treated accordingly. The results of the treatment have been most encouraging; in all cases a great improvement in the patient's general health has occurred, and the anæmia and toxæmia, which is present in practically all cases of chronic antral suppuration, disappeared. The headache when present was also relieved. In most cases a diminution in the pus has taken place, in six cases the discharge has stopped, in one case the discharge is now intermittent. There is no disguising the fact that in certain cases antral suppuration persists for many years despite operations, constant use of antiseptic lotions, etc. The discharge in some instances tends to gradually diminish, due no doubt to the gradual immunisation of the patient to the infecting organisms, so that an attempt to accelerate the process by immunisation is a directly proper procedure. The inoculations necessary are by no means frequent. Free drainage is essential, but free drainage is not necessarily the removal of the whole anterior wall of the cavity. But in those not infrequent instances where the patient shrinks from the complete operation, and where also the frontal sinus is involved, the method should certainly be tried. No. 8 was such a case, and the patient, from being a chronic invalid, is now able to play in tennis tournaments.

Mr. Stuart Low (London) attached the greatest importance to dental caries as a causative factor in antral pathology, and directly or indirectly this was in his experience the commonest cause. The nose often became affected from the septic mouth through the naso-pharyngeal route, just as the ear frequently did through the Eustachian tube route. In such a way the nose became blocked and the antrum diseased. This means of contamination had not hitherto been insisted upon, but was undoubtedly a real cause of antral implication. In acute and subacute conditions he differed from Mr. Tilley on the practice of alveolar puncture, having ceased to perform it, giving preference to Lichtwitz's puncture, and, if failing in this way to effect a cure, he then made use of Killian's method of sinus ablution through the natural orifices after enlarging them. In the treatment of chronic cases Mr. Stuart Low preferred to carry out the radical operation from the canine fossa. He again differed from Mr. Tilley in demurring to his plan of removing the anterior half of the inferior turbinal, removing instead the middle third. This gave free, unhindered, and spontaneous drainage. He hoped Mr. Underwood would continue his researches.

[1] *Trans. Odont. Soc.*, 1902.

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Bacteriological Examination of Fourteen Cases of Antrum Suppuration, by Mr. K. W. Goadby.

No. and sex.	Antrum affected.	Method of infection.	Direct smears from pus.	Organisms isolated.	Other sinuses involved.	Vaccine treatment.	Notes and result.
1. F.	Left	Pyorrhœa alveolaris	Fine bacilli, thick bacilli, both related to Fusiformis, diplococci, and cocci in clumps	Streptococcus brevis, Staphylococcus aureus and albus, B. fusiformis aërogenes; fine bacilli not identified	No	Streptococcus, staphylococcus, B. fusiformis	Several acute attacks of periostitis and osteitis, with great swelling of lip, associated with staphylococci, which were obtained three times from the maxilla during attack. No attack last 6 months. No pus.
2. M.	Right and left	Dento-alveolar abscess from tooth, first premolar	Streptococci; some short bacilli	Streptococcus brevis, Bacillus Friedländer	No	Streptococcus, B. Friedländer	No pus for 3 months in either antrum.
3. F.	Left	Ditto, first molar	Cocci in pairs and chains; a few short bacilli	Staphylococcus aureus, Bacillus Friedländer, Streptococcus brevis	Sphenoid, ethmoid, frontal; all operated on	Staphylococcus, B. Friedländer	Headaches cured. Suppuration still present; worse when patient "catches cold."
4. F.	Right	Ditto, first premolar	—	Staphylococcus albus; bacillus not identified	No	Staphylococcus albus; bacillus	No suppuration for 2 years.
5. M.	Left	Pyorrhœa alveolaris	A few cocci, some in cells	Staphylococcus aureus, Saccharomyces neoformaris	No	Staphylococcus aureus, Saccharomyces neoformaris	Under treatment.
6. M.	Right	Pyorrhœa?	Yeasts, some with a distinct mycelium; few cocci	Staphylococcus albus, Streptococcus brevis, Staphylococcus viscosus, Saccharomyces neoformaris	No	Staphylococcus albus; yeast	After four injections the suppuration practically ceased. Owing to accident to patient treatment suspended. No increase of pus has occurred.

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7. F.	Left	Pyorrhœa alveolaris	Diplococci, yeasts, spirochætes, and threads	Staphylococcus aureus, Staphylococcus albus, Streptococcus brevis, Saccharomyces neoformaris	No	Staphylococcus aureus, Staphylococcus albus; yeast		
8. F.	Left	Nasal?	Diplococci, some fine threads	Staphylococcus albus, Staphylococcus aureus; bacillus not identified	Frontal ethmoid? not opened	Staphylococcus aureus, Staphylococcus albus; bacillus	Suppuration intermittent; patient perfectly well; intervals between slight discharge becoming longer last 3 months.	
9. M.	Left	Dento-alveolar abscess, tooth first molar	Diplococci, some in cells	Staphylococcus aureus	Frontal extirpated	Staphylococcus aureus	Patient under treatment.	
10. M.	Right	Dento-alveolar abscess, tooth second premolar	Diplococci	Staphylococcus albus, Staphylococcus viscosus, Streptococcus brevis; bacillus not identified	Frontal not opened	Staphylococcus albus, bacillus, streptococcus	Acute frontal sinusitis following influenza. Treated 3 months; pus diminished. Patient disappeared for 6 months, returned with increased pus. Treated 3 months. Suppuration ceased now 6 months.	
11. M.	Right	Pyorrhœa alveolaris	Short bacilli, few cocci, spirilla, and spirochætes	Staphylococcus citreus, Staphylococcus albus, Streptococcus brevis	No	Staphylococcus citreus, Streptococcus brevis	No suppuration for 4 years.	
12. F.	Right	Dento-alveolar abscess, tooth first premolar	Diplococci and streptococci; cocci in cells	Staphylococcus aureus; Streptococcus longus	Frontal extirpated	Staphylococcus aureus, streptococcus	Suppuration after operation. Three months' treatment. No pus 18 months.	
13. F.	Left	Pyorrhœa alveolaris	Diplococci and streptococci, some in cells; spirilla and spirochætes; fusiform threads	Staphylococcus albus; Staphylococcus viscosus; Streptococcus brevis; B. fusiformis acrogenes	No	Staphylococcus albus, B. fusiformis, streptococcus	Acute attacks of periostitis and osteitis, associated with staphylococcal infection. No suppuration 4 months.	
14. M.	Right	? Lung	Diplococci	B. tuberculosis by inoculation into guinea-pig	No	Operation only	Three months subsequent to operation tuberculous epididymitis; operation.	

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Mr. C. Edward Wallis (London) said: The point to which I want to refer is the method to be adopted for closing the orifice in those cases in which alveolar drainage has been employed. The plan of inserting a tube made of gold or other metal I will not refer to except to state that I entirely agree that it is unsatisfactory, and usually impedes rather than facilitates drainage. The plan that I adopt myself is to make a solid vulcanite plug in such a way that it fits exactly the orifice that has been made by the trocar. My own plan is first of all to take an impression with modelling composition not only of the alveolar orifice, but also of the mucous membrane adjacent, so that a solid vulcanite plug can be made which perfectly occludes the alveolar passage, but which is also provided with a flange or small piece of plate and gold clasp fitting round an adjacent tooth; by this means not only is the orifice closed, but the mucous membrane around is protected, and the plug kept absolutely steady. One other matter to which I desire to refer is a difficulty which sometimes arises between a dental surgeon and the medical practitioner owing to the fact that the practitioner frequently mistakes a tooth that has been stopped efficiently and aseptically, but which has become discoloured by copper amalgam for a tooth of which the pulp has died or become otherwise diseased; the same difficulty arises also when a general practitioner or throat surgeon fails to recognise the phenomena of arrest of caries, in which carious dentine has become perfectly hard and healthy again, and sends the dentist an imperative message to remove such and such a tooth, in spite of the fact that it has a living healthy pulp, and that the antral trouble has no relation thereto.

Dr. Donelan (London) remembered when it used to be looked on as a sort of surgical triumph if by means of an alveolar puncture pus could be regularly forced through the antral ostium. He could not recall that any serious consequences followed. For the last seven or eight years he had been in the habit of operating in the first instance through the inferior meatus after removal of any teeth affecting the cavity. At first he removed the anterior end of the inferior turbinal, but more recently reflected it forcibly upwards with subsequent replacement. By increasing the length of the antral opening efficient drainage was procured in most cases, and for this purpose he had found a rectangular chisel he had had made very useful. It was only in cases in which this treatment failed he now proceeded to the Caldwell-Luc operation.

Dr. William Hill (London) remarked that it had been tacitly assumed by most of the previous speakers that dental disease occupied a prominent place in the ætiology of antral suppuration. The prevailing view twenty years ago certainly was that chronic antral disease must be treated on this assumption, and most satisfactory results were claimed for alveolar puncture and lavage. As our knowledge of nasal disease improved with improved methods of investigation, the nasal origin and nasal treatment of chronic sinusitis became so emphasised that the dental aspects of this question were relegated to a very back position. The alveolar treatment, formerly so lauded, was discovered to be quite unsatisfactory in the majority of cases, and was only recommended in acute cases of undoubted dental origin—an insignificant number, at all events, in any rhinologist's practice. The recognition of the inadequacy of alveolar treatment and that of the frequency of the intra-nasal origin of chronic sinusitis had forced upon many of us the consideration of the question whether dental disease was, after all, more than an insignificant factor in the etiology of chronic sinusitis. On *à priori* grounds nothing

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appeared to be more likely than that dental and alveolar lesions must be a frequent cause of antral sinusitis. Diseased teeth were present in the upper jaw of almost every individual, and abscesses in connection with the alveolar processes were not infrequent, and the close proximity of these lesions to the floor of the antrum seemed to lead irresistibly to the conclusion that the dental factor in causing sinusitis must be an exceedingly prominent one. This assumption was not, however, borne out by the speaker's experience, for, when looking on the anterior wall and floor of the orbit for evidence of antecedent gross lesions, such as fistulæ, bare roots, roughened bone necrosis, these including even bony thickening, were conspicuous by their absence when the antrum was opened for thorough exploration by the Caldwell-Luc method. The morbid contents of the antrum in chronic sinusitis exactly resembled what was found in the frontal sinus when diseased. The granulomatous, polypoid-like thickening of the mucosa often filled the cavity, and when this was removed it was most exceptional to find even roughened bone. Though antral, in common with other forms of sinusitis, was often of infective origin, and suppurative *ab initio*, this was by no means always the case, as in some instances the degeneration of the mucosa, resembling and in association with turbinal polypus, was the first pathological change, suppuration being secondary. It was possible that a rhinologist, seeing, as was natural, such a large proportion of cases of sinusitis associated with polypi or following an acute nasal infective process, might have under-estimated the importance of dental disease as a causative factor. The presence, even in marked abundance, of any of the common micro-organisms associated with suppuration in both the antral and pyorrhœal discharges afforded no ground for drawing any reliable inference, but the fact that Mr. Goadby had found so many as three cases in a small number of observations, that identical rare organisms were present both in the alveolar and antral discharges, provided criteria of a very different character, and compelled one to reconsider one's position, and it was possible that the dental factor was of far more importance than he (the speaker) had previously been inclined to admit. He was astounded at the remarkable results obtained by Mr. Goadby in selected previously intractable cases by vaccino-therapy. Of the value of this method of treatment in debilitated subjects after operation in the subacute stage there was, he thought, no room for doubt, but that equal success attended the adoption of Wright's vaccine treatment alone in chronic antral suppuration unrelieved by previous surgical measures would, he thought, come as a surprise to many, and if Mr. Goadby's results could be confirmed by others the outcome of that day's discussion would have justified the officers of the Dental Section in devoting the whole morning to this important subject.

Mr. Lewin Payne (London) said that whether teeth were considered to be a frequent cause of antral suppuration or not, the anatomical relationship was an exceedingly close one, and this had been emphasised by the pictures already thrown on to the screen. In cutting sections of a few skulls, one had been a little surprised to find that two out of eight showed the roots of molar or premolar teeth actually perforating the bony wall of the antrum. This proportion might be larger than normal, but it gave additional evidence as to the frequency of this association. Chronic suppurative periodontitis, or pyorrhœa alveolaris, was often found in connection with a tooth containing a live pulp, and it might cause empyema of the antrum. Such a case occurring in a lady, aged thirty,

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was quoted. The onset of the trouble seemed to be quite acute. She had typical pain and high temperature, followed later by a discharge into the nose on the left side. The patient consulted a rhinologist, who found nothing in the nares to explain the cause. On mouth examination two or three small cavities were observed in various teeth, but the left upper premolars and first molar had been extracted, and the second and third molar teeth on that side were quite free from caries. The pulps were alive, and gave the normal response to the heat test. Around the necks of both teeth, however, there was a rim of dark tartar, and a distinct pocket of gum from which pus oozed upon pressure. Recognising these teeth as a possible cause of the trouble, they were removed, and it was found that the socket of the palatine root of the second molar communicated directly with the cavity of the antrum. This was an undoubted case of antral suppuration due to pyorrhœa alveolaris, in which the pulp of the tooth had retained its vitality. Mr. Payne mentioned the case of a patient who developed chronic antral suppuration in the left side, following influenza, and then two years later, during a recurrence of influenza, suppuration started in the right antrum.

Dr. W. S. Syme (Glasgow) asked Mr. Tilley if he had come across cases in which a tooth had been found in the antral cavity. Such a case came under his notice, in which part of a tooth was removed from the antrum after remaining in the cavity for eighteen months. At that time the patient's medical man had attempted to extract a first molar, but was only partially successful. An antral sinusitis resulted. Later a neighbouring tooth was extracted, and it was found that the floor of the antral cavity was absent. Through this opening the part of the former tooth was felt with a probe in the molar part of the antrum. It was easily removed with a hook. The antral empyema would require a radical operation.

Mr. G. A. Peake (Cheltenham) said: Rhinologists often condemned teeth unnecessarily; for example, they often sent patients with peremptory orders to have extracted teeth that are perfectly sound but discoloured from the filling, also crowned teeth that are quite sound and aseptic. Care should be exercised in diagnosing harmless from harmful crowned teeth. As for syringing antrums through an opening in the alveolus, was this likely to infect the nasal passages? He had a case in which the patient was sent complaining of slight antrum symptoms; eventually the antrum was opened and a slight amount of pus let out. After three to four weeks of syringing through the tooth socket chronic suppuration of the ethmoidal cells became evident, and this had gone on ever since. Was the nasal trouble infected from the antrum, or was the antrum trouble secondary to the nasal? Would it not be more advisable always to syringe through the nasal opening and out either through the canine fossa or through a tooth socket?

Dr. Dundas Grant (London) regretted that he had not heard the preceding part of the discussion, as he had been detained in the Section of Laryngology; he thought it would have been desirable for the discussion to have taken place at a joint meeting of the two sections. There were cases in which the intra-nasal route is obviously the best, as, for instance, when the teeth were typically perfect, as in one of the very earliest cases in his career (a young lady unexpectedly cured by two irrigations by means of Lichtwitz's trocar), and in one of the most recent (a Russian girl, whom he brought before the Laryngological Society, cured by means of intra-nasal opening), also in cases of young children

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whose second teeth were still buried in the superior maxillary bone (as in a little girl, aged six, on whom he used Krause's trocar under anæsthesia by Mr. Carter Braine). On the other hand, there were cases where the alveolar opening was as strongly indicated owing to the presence of an obviously diseased tooth. There were, however, cases in which there was room for doubt, and in these he thought the nasal route should have the preference. We had to remember that an opening between the antrum and nose was normal, and one between the antrum and mouth abnormal, and a source of infection. The argument that the alveolar opening was lower than the nasal one, and therefore more favourable for drainage, was of no value whatever. The alveolar opening was not for drainage, it was for irrigation. The great and the only advantage of the alveolar opening was its unequalled convenience for irrigation by the patient. Moreover, those who had considerable experience and reasonable patience had seen numbers of cases recover under no other treatment. However, if steady diminution of the suppuration did not take place, something further must be done, and this ought, if possible, to be an intra-nasal operation. The canine fossa opening had enormous advantages so far as free access to all parts of the antrum was concerned, and when the teeth corresponding to it were absent or diseased beyond repair he had no compunction in opening this region quite freely. On the other hand, it was unjustifiable in children—useless, indeed, in the cases of so-called antral abscess in infants, which is more usually an osteitis, sometimes tuberculous. He avoided it also in adults as interfering with the nervous and vascular supply of the teeth. For the alveolar opening he employed a dental engine or motor, and flexible shaft with a small trephine. This took out a little cylinder of bone and left an opening which lasted as long as it was desirable to use it. In point of fact it could be kept from closing by introducing the point of the antral irrigation tube after irrigation was given up. If the discharge did not greatly diminish or disappear before this closed a radical operation was required. He ventured to disparage the ingenious tubes made for the alveolar opening. There was no doubt they were often models of perfection. They were always foreign bodies, and in time—in some cases all the time—a cause of irritation. He had seen so many cases in which the irritation from the tube seemed to survive its use that he had come to think it often a perpetuator of the disease. In fact, when a case of antral suppuration which had persisted for months in spite of syringing through a tube came before him, the first step he took was to order the removal of the tube, and in numerous instances the disease subsided after the removal of this mechanical irritant. If a tube was employed at all, it must be of the most perfect make and material. A simple spiral wire tube was a conductor of infection from the mouth to the antrum. If we could clinically differentiate cases of nasal origin from those of dental origin, we should treat the former through the nose, the latter through the alveolus, but in cases of doubt open through the nose. In undoubted odontogenic cases, or when the patient was left to his own resources, open through the alveolus.

The PRESIDENT (Mr. HARRISON) in concluding the discussion, remarked how the features of our ancestors, as portrayed in old paintings, showed a greater development of the facial bones, and he would suggest to Mr. Underwood the investigation of this point in his further researches. In reviewing his own experience of diseased antrum from dental causes, he was bound to say that the dental cause was very small, and, considering the large amount of dental suppuration, antral disease was relatively

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smaller. Perhaps sometimes the teeth were secondarily infected from the nose.

Mr. Herbert Tilley, in reply to the discussion, said that he had two teeth in his possession in which alveolar suppuration was associated with antral empyema, and the teeth were apparently sound; this seemed to bear out Mr. Goadby's assertion. He joined issue with Mr. Stuart Low, and maintained that if an antral empyema were obviously of dental origin, the infecting tooth or focus should be dealt with before other treatment was instituted. The speaker removed the anterior end of the inferior turbinal in the Caldwell-Luc operations because he had found cases drain better when the small preliminary was carried out. The loss of the anterior end of the inferior turbinal was of no practical moment. The vulcanite antral plug he used was quite easy to sterilise. He thought that the reason many cases of antral suppuration were unrecognised was because medical men would not take the trouble to examine a patient's nose when the latter complained of "catarrh"; if they would do so, many of such cases would prove to be antral empyemata. The speaker had seen one loose tooth in the antral cavity, and he had opened some five hundred; he had frequently found drainage-tubes, etc. Dr. Grant thought dentists made a mistake in leaving antral tubes in too long; surely this suggested the unwisdom of "tubes" for most cases, and the necessity for a better method of drainage which the speaker was advocating.

Mr. Underwood said the specimens and slides he had shown demonstrated that long-continued suppuration in a tooth tended rather to avoid than to perforate the antrum. The septa in the antra were all vertical. The skulls examined were not prehistoric, but were about sixty years old, and were from various sources. With Professor Keith's assistance he proposed to continue his investigations.

THE SOCIETY OF SOUTH GERMAN LARYNGOLOGISTS.

Fifteenth Meeting held at Heidelberg, June 7 and 8, 1908.

Brünings (Freiburg) read an interesting paper on *The Principles of Illuminating Endoscopic Tubes.*

There are three methods of illumination available: (1) Lamps within the tube; (2) lamps external to the tube; (3) lamps external to the tubes, with also a separate path for the rays of light within the tube.

Tubes with internal lamp, though most suitable for cystoscopy, are not suitable for illuminating the air-passages, for although the illumination at the mouth of the tube is brilliant, the light is not

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