of the operation is, however, the free access of air which favors rapid evaporation and prevents the parts being macerated by the secretions which occur from even normal skins and mucous membranes. Such dried secretions and also exfoliations of epidermis and dust can readily be washed or wiped away by the patient or his friends and thus the parts kept in a healthy condition. To maintain healthy skin on any part of the body, freedom from filth and moisture is absolutely necessary.

After a simple mastoid operation, rendered necessary because of caries of the mastoid resulting from acute suppuration of the middle ear, a radical cure with almost or complete restoration of normal hearing may be expected. When, however, mastoiditis occurs in the course of chronic suppuration, the results of a simple mastoid operation are far otherwise. In some cases an apparent cure of the tympanic suppuration is brought about and may persist for years; but under such circumstances the attic and mastoid antrum gradually fill up with cholesteatomatous masses and ultimately, perhaps years after the first, a second mastoid operation is required. Should this consist of a simple mastoid operation, the same process is repeated and a third operation is required; but nature ultimately establishes a cure by means of a permanent retroauricular opening. Through this opening the parts are readily cleansed should a relapse occur, and a cessation of the discharge occurs within a few days or weeks. At the present time there are two or three cases with a history similar to the above, and one with a permanent retroauricular opening resulting from an old mastoiditis that was not operated, that occasionally come to me. If these cases keep their middle ears clean, suppuration does not occur, but if accumulations of dried secretions and epidermis are allowed to accumulate for a year or more suppuration ultimately results, but is very readily cured. It was my experience in the treatment of these cases that first called my attention to the great practical advantages of a permanent retroauricular opening.

For the same reason that a simple mastoid operation in chronic suppuration is usually little more than a placebo as far as a permanent cure of the suppuration is concerned, the same remarks may be applied to the simple removal of the remains of the drumhead and ossicles. If, as I believe, cholesteatomatous masses are the great cause of polypi, necrosed ossicles and continued suppuration, then the relapses into the former condition after a simple removal of the ossicles must be very numerous and an event confidently to be expected. The procedure no doubt does good in enabling the aurist to more readily remove accumulations from the attic as they occur from time to time and thus bring about a more speedy cure when a relapse does occur. If removal of the scute is practiced in addition to removal of the ossicles, the procedure is certainly much more valuable in the treatment of chronic suppuration but still scarcely adequate or likely to be permanently successful. To a less degree these remarks apply to the radical mastoid operation without permanent retroauricular opening. The patient is still unable to keep his middle ear clean and must from time to time apply to the aurist.

The history of the cases is, briefly, as follows: The man had had his ossicles and a large portion of his scute removed in Leicester two years ago. The otorrhea never ceased, although better after the operation. Last fall he came to me with the request that

I do a radical mastoid operation. Instead of complying immediately I treated the case for four or five months, but did not succeed in curing the discharge. At the operation the antrum was found to contain cholesteatoma and granulations. The woman was operated on for mastoiditis one year ago last October, in Leeds, England. After the operation she wore a gold-wire tube for six weeks. It became necessary to do a second mastoid operation the following March. Her chronic discharge was not cured as the result of either of these simple mastoid operations. At my operation the antrum was found packed with cholesteatomatous material.

NASAL BACTERIA.*

THE RELATION THEY BEAR TO DISEASE.

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Within the past few years there has been considerable investigation as to the import of bacteria present within the nasal chambers, and the relation of such bacteria as causal factors in disease processes. Opinions differ as to the presence of pathogenic bacteria in the normal nasal secretions and normal membranes. This raises the question as to what constitutes a normal nasal mucous membrane. While the membrane may be normal as to its function, yet the construction of the nasal cavity may be such as to permit of the accumulation of normal secretion within that cavity. This accumulated normal secretion forms a suitable nidus for the lodgment of dust and other irritating materials, which would soon cause local alteration, besides perverting secretion and being nutrient media for the development of bacteria, which are constantly being inhaled and find lodgment in the localized irritated areas. Inoculations from a nasal cavity, in which, as regards structure, anatomic relations, and physiologic functions, the tissue is what is called normal, in the majority of cases will show bacteria present; however, unless the normal secretion has been retained and has undergone some chemic change, it does not form a suitable nidus or medium for the development of bacteria. Another important question which arises is the pathogenesis of the bacteria present. Although of the variety known as pathogenic, they may be non-virulent, and if the mucous membrane is not subjected to some irritation giving rise to lessened physiologic resistance of the epithelial cells, these bacteria do not find a nidus for proliferation and are practically harmless. From my own investigations,¹ which include over two hundred inoculations, I have been unable to draw any definite conclusions; however, the surroundings of the individuals have much to do with the presence or absence of bacteria, as well as the variety, found within the nasal chambers. For example, inoculations made from nasal cavities which presented normal appearances, made under different surroundings, gave entirely different results. Repeated inoculations were made from the same individual, from the nasal mucous membrane, on rising in the morning, after staying in an office or room for several hours, after having been exposed to the street dust, and after hav-

*Read before the Section on Otolaryngology and Laryngology of the College of Physicians, Philadelphia, April 19, 1899.

¹ I have omitted from this paper, on account of the lack of space, the laboratory technic and experiments necessitated by these investigations.

ing attended places of amusement. The results were as varied as though the experiments had been carried on in different individuals. Again, inoculations made from individuals having various forms of catarrhal inflammations of the nasal mucous membrane gave the same varied result; however, in many instances I believe that the bacteria bore an important relation to the inflammatory conditions present, but that their etiologic relation was secondary and not causal, and that before the bacteria found access to the mucous membrane there was some alteration in the epithelial surface, brought about either by external or internal irritants, which lowered the physiologic resistance of the individual epithelial cells. Besides pathogenic bacteria, there are associated varieties of the blastomycetes, which, while not possessing any pathogenic properties, are capable of producing irritation and admit of absorption of saprophytic products. If the nostril is thoroughly cleansed, under the strictest antiseptic precautions, and a pledget of sterilized antiseptic cotton placed within the nose, which in turn is protected by antiseptic measures, in the majority of cases the secreted mucus will be free from bacteria; but from my own experience it is almost impossible to render the mucous membrane thoroughly aseptic. As to the antiseptic properties of the nasal mucus, I am willing to grant that in certain individuals the secretion possesses such properties, depending on the chemic reaction of the secretions—which differs in individuals—and it is largely controlled by the general health of the individual and by constitutional diathesis. In persons with irritated mucous membranes, and with excoriations about the nasal orifice, in which from urinary examination and from testing the nasal secretions, it was found to be decidedly acid, the bacteria present were non-virulent, and where growths were obtained on blood serum, they were feeble and slow of development. This can be explained by the fact that, with few exceptions, pathogenic bacteria require alkaline media. In diseases of the nasal cavities, in which there is accumulation of secretion, as is the case in the various forms of atrophic rhinitis, the bacteriologic examinations present such a variety of bacteria that no special one can be assigned as an etiologic factor. Besides, there are always present the bacteria of decomposition—the saprophytic bacteria; however, in such conditions it must be remembered that the products of these germs are constantly being absorbed from the mucous membrane surfaces, and in many cases may account for some of the ill effects on the general health of the individual, nearly always present in the advanced stage of disease. While the bacteria present may have largely lost their virulent properties, yet with suitable chemic constituents and reaction of the secretion, proliferation of the germ is favored and its normal virulence regained. Accumulated secretion in the nasopharynx and pharynx during sleep is frequently unconsciously swallowed by the patient. This infected material may bring about gastric disturbances, as is shown by the frequent association of gastric lesions with those of the upper respiratory tract; however, this does not explain many of the associated conditions, but often, when such apparent relation exists, the local lesions were induced by and dependent upon some constitutional condition which brought about the lowered resistance on the part of the local epithelial structures.

The bacteria found present on the nasal mucous

membranes and in the secretion include many of the pathogenic cocci and bacilli, besides many unclassified non-pathogenic germs. The bacteria most commonly found are the staphylococci or micrococci, especially the staphylococcus pyogenes aureus, citreus, and albus, the micrococcus pneumoniae (Frankel), bacillus tuberculosis, Friedlander's bacillus, Klebs-Löffler bacillus, Von Hoffman's bacillus (bacillus of pseudodiphtheria), the bacillus fetidus, Löwenberg's ozena diplococcus, and also various forms of sarcina. Quite frequently the streptococcus is present, although in the majority of instances it was associated with an acute inflammatory process. With this exception, frequently the isolated bacteria were not associated with any special inflammatory condition. The bacillus of diphtheria was found on the apparently healthy mucous membrane, after the individual had been exposed by passing through the diphtheritic wards in the hospital, although there was no associated inflammatory process. Frequently the bacillus of tuberculosis was found present after the individual had been exposed to dusty air of the street, the inoculations being made from the nasal mucous membrane after one-half hour's exposure to the dust. While I do not mean to belittle the importance of bacteriologic investigation, nor the important relation of bacteria to disease, yet I do believe that, in a great many cases of lesions of the mucous membrane of the upper respiratory tract, the part played by the bacteria is purely secondary. If the anatomic structure of the nasal cavities is such as to permit of accumulation of secretions and dust, or the physiologic resistance of the membrane is lowered by constitutional diatheses or organic lesions, the altered and accumulated secretion forms a suitable nidus for bacterial proliferation.

While the virulency of all the germs found present was not tested, yet this was done in a sufficient number of cases to warrant conclusions. Inoculations were made from the anterior nasal chambers, from all parts of the surface from the mucocutaneous junction to the nasopharynx. Fewer germs were found on the convex turbinal surface, especially the middle turbinal, than any other portion of the cavity. More bacteria were found in the atrophic rhinitis, due to contraction, than in any other diseased tissue. This is no doubt due to the fact that the accumulated secretions within the nasal cavity form a suitable nidus for bacterial proliferation. While the results obtained are almost directly opposite to those obtained by Thomson and Hewlett, or Würtz and Lermoyez, yet they to a great extent confirm the results obtained by Park and Wright.

ARM-TO-ARM VACCINATION.*

NASOPHARYNGEAL SYPHILIS A RESULT THEREOF.

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The extreme rarity of the transmission of syphilis by humanized lymph, as well as the clinic interest in this case, has induced me to report it. The patient was referred to my clinic at St. Agnes' Hospital on Feb. 20, 1899, by Dr. John P. Mulrenan, to whom I am indebted for the following history:

Charles S. was born April 4, 1885, of healthy parents,

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