He was ordered to suck ice, and to inhale, by means of Leduc's tube, a powder consisting of equal parts of anæsthesin and orthoform. A week later the pain had considerably diminished, and several shallow lenticular ulcers with white edges were seen on the infiltrated regions on the left half of the larynx.

Dr. DUNDAS GRANT added that the question was whether it was a case of localised miliary tuberculosis, or a herpetic condition on top of a tuberculous infiltration. It was confined to one half of the larynx, and when he saw the case nine days ago there was acute inflammation, with appearances on the surface which resembled blisters. The question was whether they were herpetic. If they were so they might shrivel up. He would report on the case later.

PROCEEDINGS OF THE SOCIETY OF GERMAN LARYNGOLOGISTS.

Eighteenth Annual Meeting at Frankfort-a-M. on May 31 and June 1, 1911.

Condensed Report by the Secretary, DR. RICH. HOFFMANN (Dresden).

President—Prof. KILLIAN (Berlin).

May 31.

Demonstration of a Series of Stereoscopic Photographs. bearing upon the Development of the Nose and Naso-pharyngeal Tonsil during Embryonic Life. Also a large Model of the Larynx for Teaching Purposes, with Mirror; Preparations in Wax of Interesting Conditions; Coloured Diapositive; New Examination Lamp; Speculum for Dilating the Hypopharynx; and an Instrument for taking Measurements in the Trachea and Bronchi.—**Killian** (Berlin).

June 1.

Research bearing upon Important Questions in the Domain of Tuberculosis.—**E. Rumpf** (Ebersteinburg).—In his introductory remarks Rumpf laid stress on the frequency of early laryngeal tuberculosis among patients in sanatoria, and the favourable influence on such cases of complete silence, rest, and general tonic treatment. Moreover, he had often observed a much more marked and rapid improvement of the lung condition after the establishment of free nasal breathing.

Rumpf then referred to the work of Römer, of Marburg, who assumes that when once a tuberculous infection has occurred, a protection is conferred against a new tuberculous infection. This has been shown experimentally by the results of secondary infection in apes and other animals, and is further suggested by the extraordinary frequency of tuberculous infection in man, and especially by the fact that among the civilised races almost every individual after childhood must be regarded as infected.

In favour of the view that the tuberculous individual enjoys

immunity against further tuberculous infection, Römer puts forward many plausible arguments apart from the analogy with the results of experiments on animals. A fresh tuberculous infection is not acquired in sanatoria and consumption hospitals, nor by tuberculous children from their elder brothers or sisters who are severely infected, nor in the married state, nor in occupations which entail especial exposure to tuberculous infection; relative infrequency of a secondary laryngeal and intestinal tuberculosis in comparison with the great opportunity for infection; harmlessness of subcutaneous infections with virulent tubercle bacilli in tuberculous (because adult) patients (Baumgarten and Klemperer); immunity of persons with pulmonary tuberculosis against the use of tuberculous cow's milk (as established by the Board of Public Health); frequency of the presence of tubercle bacilli in the blood of consumptives (*vide infra*) without any appreciable effect. The immunity of man against reinfection is, like all immunity, relative; too severe a re-infection leads to pulmonary consumption. Re-infections which lead to phthisis arise, not from without (*c. s.*), but from within. The possibility of the occurrence of such severe re-infections depends upon the severity of the infection which took place in childhood. For, as a matter of experience, it is just those persons who no doubt as children, especially in the family, were exposed to severe tuberculous infection, that tend to contract phthisis (such cases being formerly wrongly regarded as hereditary). Prophylaxis of consumption must, therefore, above all aim at the prevention of severe infections in childhood.

Rumpf then proceeds to deal with the reports of the discussions of the International Tuberculosis Congresses so far as they are concerned with the question of the points of entrance of the infection and the spread of tubercle bacilli in the human body. While formerly the great majority of observers believed in the preponderance of infection by inhalation, it must be admitted after the discussions at the Hague and in Vienna that alimentary or deglutition tuberculosis is, in man, especially during childhood, by far more frequent.

A tendency to give up the inhalation hypothesis is noticeable inasmuch as more observers declare themselves in favour of the view of the tuberculous infection of the lungs by way of the blood-stream, as Orth did twenty years ago, and as now do Ribbert and others still more decidedly, and for some years Aufrecht most vigorously of all. The latter says, "The tubercle bacilli pass in all cases by way of the lymph gland into the blood and thence to the organs affected, not by inhalation into the lungs. The lungs are infected only from the cervical and bronchial glands which are previously diseased. Pulmonary tuberculosis in man originates only from the diseased walls of the smallest vessels; the lymph-glands are the barrier against the inundation with tubercle bacilli."

Rumpf himself, in Vienna, drew attention to the fact that a remarkable number of observers, while in other respects of widely different views, all agree as to the importance of the pharynx and especially of the pharyngeal tonsil as a point of entrance of infection. He recalls the work of Hugo Beckmann, who regarded as of primary importance in combating tuberculosis the closure of this main entrance-way of infection by the completest possible removal of the pharyngeal tonsil, and, if required, treatment of the nose, the palatal tonsils, and the cervical glands. Of recent experimental work Rumpf mentions that of Baumeister, which was intended to throw light upon the tendency to infection of the apices. Baumeister fixed a loose wire noose round the first pair of

ribs of young growing rabbits. When the animals were then infected with tubercle bacilli, there developed immediately an isolated apical tuberculosis as the growing lungs became engaged in the too narrow "costal ring" (Freund); and, moreover, an isolated apical infection could never be produced through the air-way, but only by way of the blood-stream (infection from an inguinal gland).

Rumpf then draws attention to the analogy with tuberculosis of the female genital organs, where there exists a canal lined with mucous membrane having a wide communication with the exterior and therefore exposed to infection by this path. Jung, however, at the last Gynaecological Congress, says: "By far the greatest number of cases of tuberculosis of the female genital organs originate by secondary infection from the blood-stream."

In conclusion Rumpf calls to mind that the more recent researches have shown that tubercle bacilli circulate in the blood much more frequently than was formerly supposed, not only in miliary tuberculosis, but even in chronic tuberculosis: according to Schmitter in 32 per cent. Bippmann in 44 per cent., Rosenberger and the Japanese, Kurashize, in 100 per cent.

The latter examined the carefully centrifugised blood, treated with glacial acetic acid and antiformin, of 155 patients with lung disease, and found tubercle bacilli in the blood-stream of as many as 59 per cent. of healthy medical men and nurses, several of whom, of course, later suffered from pleurisy or had an initial hæmoptysis. In several instances he was able by inoculation of guinea-pigs to prove beyond question that the acid fast rods were, in fact, tubercle bacilli. In his opinion a poor condition of health and a lowering of the resistance, as well as the degree of vitality and virulence of the bacillus, are of essential importance in regard to the outbreak of a disseminated tuberculosis. Even in the very earliest stage of tuberculosis there is an apparently continuous circulation of tubercle bacilli in the blood. Tuberculous disease, according to Kurashize, consists essentially of a primary bacillæmia, or at least of a disease generalised from the beginning, and the scattered foci, as, for example, in the lungs, represent merely secondary changes in *locis minoris resistentie*.

BRÉGER (Breslau): Tuberculosis of the pharyngeal tonsil is far more often secondary (to latent lung tuberculosis, etc.) than primary. It would be of value to have more exact information as to the frequency with which sanatorium treatment alone exerts a favourable influence on laryngeal tuberculosis.

BOENNINGHAUS (Breslau): A negative result in examining the naso-pharyngeal tonsil for tuberculosis is no proof that it has not been the channel of infection. The bacillus need leave no trace of disease at its place of entry.

RUMPF (in reply) said that the view just expressed was constantly gaining wider acceptance. Tuberculosis of the pharyngeal tonsil can certainly also arise secondarily by way of the blood-stream. Spontaneous healing of laryngeal tuberculosis in sanatoria is well established, and the percentage of permanent cures has been accurately ascertained. Laryngeal tuberculosis is given in the institutions the most thorough attention (Dissent.) It is, however, the fact that laryngeal tuberculosis is usually secondary to pulmonary disease.

Analysis of Artificial Vowel Sounds.—Gutzmann (Berlin).—The artificial vowels are produced by conveying into the mouth the sound of a membranous reed-pipe. When the cavity of the mouth is

shaped as during the natural production of the vowel, the artificial vowel sound is obtained in a clear and very characteristic manner. The speaker had made photographic records of a number of these artificial vowel sounds, and had systematically analysed the tone-photographs thus obtained. The artificial vowels were found to show the same areas of augmentation as the natural. Especially interesting is it to compare the analysis of the simple pipe sound with that of the artificial vowels. By this means it is possible to appreciate at once the signification of the various forms assumed by the cavity of the mouth in the production of vowel sounds. There appears in correspondence with Hermann's observations a definitely characteristic augmentation area, while the strongly marked primary tone of the simple pipe sound falls into the background—compared with the higher notes of the artificial vowel sounds. The speaker demonstrated a number of the curves he had obtained.

VOUSEN (Frankfort) asked whether the tones produced in the naso-pharynx were observed in addition to those formed by the mouth.

GUTZMANN (Berlin) replied that the mouth tones alone were observed; in forming the vowel "a" the soft palate was raised, and in forming "o" and "u" the naso-pharynx was completely shut off.

The Diagnosis and Treatment of Functional Disorders of the Voice.—GUTZMANN (Berlin).—The speaker demonstrated some instruments for assisting in the diagnosis and treatment of phonasthenia. (a) A small pocket tuning-fork with movable scale, which served not only for diagnostic purposes (for example, determination of vocal pitch and variation of pitch in singers) but also for control of vocal exercises. (b) An arrangement of electrically driven tuning-forks intended to produce an electrification and vibration of the larynx synchronous with the pitch of the fork employed.

The Exactitude of the Reproduction of Tones by Professional Singers.—LOKOLEWSKY (Königsberg).—Systematic observations with the object of determining the correspondence between given and reproduced tones were made by Klünder, in whose experiments, however, both tones were in all cases produced synchronously. There were wanting, therefore, observations of great importance in regard to the physiology of the singing voice, namely, how exactly an interval to a given tone could be sung, and how exactly a given tone could be struck after it had ceased to sound. The following experiments are intended to fill these gaps:

The apparatus employed by the author for registering the tone vibrations consists of a combination of Einthoven's string galvanometer and Weiss's phonoscope. The tone produced by the organ pipe was registered by the string galvanometer and the reproduced tone by the phonoscope.

The experiments were carried out on four ladies and three men belonging to the opera. The first two series of observations—(1) reproduction of a given tone sounding at the same moment, and (2) reproduction of a given tone after it has ceased to sound—showed how extraordinarily exactly the human larynx can strike the true pitch. The best result attained showed an error of only .07 per cent. The third series—singing of intervals to a given tone sounding at the same moment—gave a surprisingly different result from those of the first two series. The errors were considerably greater (as much as 4.54 and 5.51 per cent.). It was striking that the fifth was sung with the least truth.

The author explained the great inexactitude in singing the intervals by

the fact that the errors, inseparable from the difficulty of singing quite true intervals, become combined with those which the singer is accustomed to make through his habit of practising with softened piano. Among forty-six curves the note sung was in thirty-six instances too low and in only ten too high.

Experimental Investigation of the Influence of the Pharyngeal Constrictors on the Laryngeal Musculature.—**Dreyfus** (Strasbourg).—The experiments were designed to throw light on the question of how to explain the characteristic laryngoscopic picture observed in certain pharyngeal paralyses, such as bulbar and also post-diphtheritic paralysis. The deficient closure of the glottis during phonation is to be ascribed, not to an adductor paralysis of nervous origin, but to the paralysis of the pharyngeal constrictors. As a result of the latter the muscles of phonation are deprived of the powerful purchase which is necessary for the production of a resonant voice, and which is supplied by the concomitant contraction of the laryngo-pharyngeal muscle, which is attached on either side to the thyroid and cricoid cartilages, and, when it contracts, steadies them. Dreyfus, experimenting on dogs, divided, without injury to nerves, in some cases the middle (*M. hyo-pharyngeus*) and in others the inferior (*M. thyro-crico-pharyngeus*) constrictor, and obtained on division of the middle constrictor marked interference with swallowing, but no interference with the voice, and, on the other hand, on division of the inferior constrictor, no difficulty of swallowing, but considerable disturbance of the voice. The inferior constrictor is therefore, an important laryngeal muscle concerned with the voice. Its action is indispensable for closure of the glottis, but not for swallowing, and all interferences with phonation in bulbar and post-diphtheritic paralysis are to be attributed to its failure.

NADOLECZNY (Munich) warmly recommended Gutzmann's pocket tuning-fork, and regarded as useful also his method of electrification and vibration of the larynx. Most singers have only a relatively perfect sense of pitch, while some very unmusical people have a perfect sense of pitch. He asked Dr. Dreyfus whether his experiments threw any light on the vocal disturbances of acute pharyngeal catarrh. It seemed to him possible that in this condition the functions of pharyngeal muscles might be directly interfered with, or perhaps their contractions were voluntarily restricted.

KÜMMEL (Heidelberg) asked Dr. Gutzmann whether the rhythmical succession of electrical stimuli was in reality more effective than the purely mechanical stimuli due to the continuously sounding tuning-fork. The latter often had a disconcerting effect in phonasthenia.

BOENNIGHAUS (Breslau) asked what was the effect, for example, in bulbar paralysis, of artificial fixation of the larynx. If the opinion of Dr. Dreyfus were correct, the voice should then become normal.

KILLIAN (Freiburg) regarded a tuning-fork apparatus, such as that of Gutzmann, as of the greatest value in hysterical aphonia.

GUTZMANN, in reply, said that the conditions in phonasthenic patients were so extraordinarily diverse that one could never have too many ways of testing them. Especially in hysterical aphonia the electrically driven tuning-fork was more effective than vibration methods.

SOŁOŁOWSKY, in replying, confirmed the remarks of Nadoleczny in reference to the sense of pitch of singers and musicians.

DREYFUS, replying, said that the vocal disturbances in pharyngeal catarrh and acute diseases of the pharynx may certainly be attributed to

voluntary restriction of movement. Artificial compression and fixation of the larynx would prove nothing. They could not replace the innervation of the muscles; and, besides, the inferior constrictor not only compressed the larynx, but also drew it upwards.

Thos. Guthrie (Trans.).

(To be continued.)

PROCEEDINGS OF THE AMERICAN LARYNGOLOGICAL, RHINOLOGICAL, AND OTOLOGICAL SOCIETY.

Seventeenth Annual Meeting, Atlantic City, June 1, 2, and 3, 1911.

Report by DR. L. M. INGRAM.

Thursday, June 1, 1911.

(Continued from vol. xxvi, p. 661.)

The Method of Giving Anæsthesia in Operations upon the Upper Respiratory Tract.—**Dr. James Gwathmey** (New York City) — The surgeon about to operate upon some portion of the upper respiratory tract may select from such a variety of agents and methods for inducing and maintaining anæsthesia that the question of safety and after-effects may be absolutely eliminated. The agents for local anæsthesia are cocaine and its many allies, and morphine, ethyl chloride, and sterile water. Morphine should precede cocaine whenever possible, rendering the latter safer from inhibitory reflexes, improving the anæsthetic, and removing the psychic element. The general anæsthetics are nitrous oxide gas, ether, ethyl chloride, anæsthol, chloroform, morphine, and, in emergency cases, alcohol in the form of whiskey or brandy, combined with morphine. The methods employed were enumerated as follows: Spinal analgesia, rectal anæsthesia, intra-venous anæsthesia, regional analgesia, morphine anæsthesia, combined local and general anæsthesia, hypnotism or mental suggestion combined with some other method, the sequestration method, intra-tracheal anæsthesia, pulmonary anæsthesia by the nasal or oral route, and electrical anæsthesia (one case in human being). The scientific basis for the successful administration of all pulmonary anæsthetics consists, in addition to the usual preparation of the patient, of (1) some preliminary medication; (2) anæsthetic so arranged that any sequence or combination can be quickly made without interfering in the slightest with the operation; (3) all anæsthetics heated to the temperature of the blood; (4) combined with oxygen when indicated; (5) apparatus so constructed as to be able to administer the gases or vapours under normal atmospheric pressure or positive pressure, and with moisture. Dr. Gwathmey emphasised the value of preliminary medication. Given thirty minutes before the operation it quiets a patient, as indicated by the normal heart-sounds; shortens the period of induction, abolishes unnecessary reflexes, and blunts others; diminishes the amount of the anæsthetic one third to one half; renders holding and stopping unnecessary; diminishes the secretion of saliva to a negligible quantity,