Diseases of the nose and throat / by F. de Havilland Hall ... With 2 coloured plates and 59 illustrations.

Contributors

Hall, F. de Havilland 1847-1929.
University of Bristol. Library

Publication/Creation

London : H. K. Lewis, 1894.

Persistent URL

https://wellcomecollection.org/works/sfrh7zqz

Provider

Special Collections of the University of Bristol Library

License and attribution

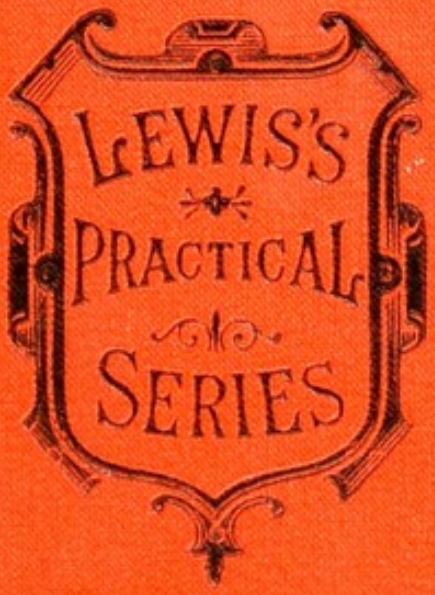
This material has been provided by This material has been provided by University of Bristol Library. The original may be consulted at University of Bristol Library. where the originals may be consulted.
This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.

wellcome collection

Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
https://wellcomecollection.org

DISEASES OF THE NOSE AND THROAT



DE HAVILLAND HALL

I 2

UNIVERSITY OF BRISTOL.

Medical Library.

PRESENTED BY

Mr E. Watson Williams

May 1939.

Stone 578305

SHELF

D.A.

Dr Watson Williams
with the author's Kind Regards
Aug: 1894 –

LEWIS'S PRACTICAL SERIES.

DISEASES

OF THE

NOSE AND THROAT

LEWIS'S PRACTICAL SERIES.

In Crown 8vo Volumes, Illustrated.

DISEASES OF THE NOSE AND THROAT. By F. DE HAVILLAND HALL, M.D., F.R.C.P. Lond., Physician to Out-Patients at the Westminster Hospital.

PUBLIC HEALTH LABORATORY WORK. By HENRY R. KENWOOD, M.B., D.P.H., F.C.S., Instructor in the Hygienic Laboratory, University College, and Assistant to Professor Corfield in the Public Health Department, University College. 10s. 6d.

MEDICAL MICROSCOPY. By FRANK J. WETHERED, M.D., M.R.C.P., Medical Registrar to the Middlesex Hospital. 9s.

MEDICAL ELECTRICITY. By W. E. STEAVENSON, M.D, and H. LEWIS JONES, M.A., M.D., M.R.C.P., Medical Officer in Charge of the Electrical Department in St. Bartholomew's Hospital.

HYGIENE AND PUBLIC HEALTH. By LOUIS C. PARKES, M.D., D.P.H. (Lond. Univ.), Lecturer on Public Health at St. George's Hospital Medical School. Third Edition. 10s. 6d.

A PRACTICAL TEXTBOOK OF THE DISEASES OF WOMEN. By ARTHUR H. N. LEWERS, M.D., M.R.C.P., Obstetric Physician to the London Hospital. Third Edition. 10s. 6d.

ANÆSTHETICS, THEIR USES AND ADMINISTRATION. By DUDLEY W. BUXTON, M.D., B.S., Administrator of Anæsthetics in University College Hospital. Second Edition. 5s.

MANUAL OF OPHTHALMIC PRACTICE. By C. HIGGENS, F.R.C.S., Ophthalmic Surgeon to Guy's Hospital. 6s.

TREATMENT OF DISEASE IN CHILDREN. By ANGEL MONEY, M.D., F.R.C.P., late Assistant Physician to the Hospital for Sick Children. Second Edition. 10s. 6d.

ON FEVERS. By ALEXANDER COLLIE, M.D. (Aberd.), M.R.C.P. (Lond.). With Coloured Plates. 8s. 6d.

HANDBOOK OF DISEASES OF THE EAR. By URBAN PRITCHARD, M.D. (Edin.), F.R.C.S. (Eng.), Professor of Aural Surgery at King's College. Second Edition. 5s.

A PRACTICAL TREATISE ON DISEASES OF THE KIDNEYS AND URINARY DERANGEMENTS. By C. H. RALFE, M.A., M.D., F.R.C.P., Physician to the London Hospital. 10s. 6d.

DENTAL SURGERY FOR GENERAL PRACTITIONERS AND STUDENTS OF MEDICINE. By ASHLEY W. BARRETT, M.D., M.R.C.S., L.D.S., Dental Surgeon to the London Hospital. Second Edition. 3s. 6d.

BODILY DEFORMITIES AND THEIR TREATMENT. By H. A. REEVES, F.R.C.S. (Edin.), Senior Assistant Surgeon to the London Hospital. 8s. 6d.

LONDON: H. K. LEWIS, 136 GOWER STREET, W.C.

DISEASES

OF THE

NOSE AND THROAT

BY

F. DE HAVILLAND HALL, M.D., F.R.C.P. LOND.

PHYSICIAN TO OUTPATIENTS, AND IN CHARGE OF THE THROAT DEPARTMENT
AT THE WESTMINSTER HOSPITAL;
JOINT LECTURER ON THE PRINCIPLES AND PRACTICE OF MEDICINE AT
THE WESTMINSTER HOSPITAL MEDICAL SCHOOL

UNIVERSITY OF BRISTOL LIBRARY

WITH 2 COLOURED PLATES AND 59 ILLUSTRATIONS

LONDON
H. K. LEWIS, 136 GOWER STREET, W.C.
1894

UNIVERSITY OF BRISTOL
MEDICAL
LIBRARY

London:
H. K. Lewis, 136 Gower Street, W.C.

39246

PREFACE.

I FEEL that some apology is due for having added another book to the long list of those dealing with Diseases of the Nose and Throat. The excuse that I offer is that I know of no work of moderate size which gives anything like a complete account of these diseases.

It may be thought that the surgical aspect of the subject has hardly been treated in sufficient detail; it must be remembered, however, that the book is written by a physician and not by a surgeon.

In order to render the book of service to those readers who may wish to study the diseases in question more fully, I have added numerous references to published literature.

I have made free use of the *Centralblatt für Laryngologie und Rhinologie*, so ably edited by my friend, Dr. Felix Semon, to whom I am also indebted for many valuable suggestions.

To Dr. W. A. Wills I owe an especial debt of gratitude for the care with which he has criticised and revised the proof sheets. My best thanks are also due to Dr. Ayres and Mr. de Santi for their kind assistance.

WIMPOLE STREET,
LONDON, W.
April, 1894.

NOTE.—The reference "Centralblatt" in the foot-notes means "Internationales Centralblatt für Laryngologie und Rhinologie."

CONTENTS.

PART I.

DISEASES OF THE NOSE, ACCESSORY SINUSES, AND NASO-PHARYNX.

		PAGE
1.	The Examination of the Nose. Anterior and Posterior Rhinoscopy	1
2.	Acute Rhinitis	8
3.	Purulent Rhinitis	11
4.	Rhinitis due to Specific Infectious Diseases	12
5.	Chronic Hypertrophic Rhinitis	13
6.	Chronic Atrophic Rhinitis	22
7.	Membranous Rhinitis	38
8.	Caseous Rhinitis	41
9.	Nasal Reflexes.	41
10.	Vaso-Motor Rhinitis and Hay Fever	46
11.	Nasal Stenosis	58
12.	Deviations, Spurs, and Crests of the Septum	62
13.	Hæmatoma of Septum	72
14.	Abscess of Septum	73
15.	Perforation of Septum	75
16.	Non-Malignant Growths (Polypi)	79
17.	Malignant Growths	89
18.	Tuberculosis of the Nose	91
19.	Lupus of the Nasal Mucous Membrane	94
20.	Syphilis of the Nose	95
21.	Rhinoscleroma	99
22.	Rhinoliths	101
23.	Foreign Bodies in the Nose	105
24.	Maggots in the Nose	108

PAGE
25. Epistaxis 108
26. Anosmia, Hyperosmia, and Parosmia 124
27. Anatomy of the Sinuses 130
28. Diseases of the Maxillary Sinus 132
29. Diseases of the Frontal Sinus 144
30. Diseases of the Sphenoidal Sinus 147
31. Diseases of the Ethmoidal Cells 147
32. Anatomy of the Pharyngeal Tonsil 149
33. Diseases of the Pharyngeal Tonsil 150
34. Naso-Pharyngeal Catarrh 151
35. Adenoid Vegetations 152
36. Non-Malignant New Growths of the Naso-Pharynx . . 164
37. Malignant New Growths of the Naso-Pharynx . . . 168

PART II.

DISEASES OF THE PHARYNX.

1. Examination of the Pharynx 169
2. Acute Pharyngitis 170
3. Chronic Pharyngitis 174
4. Granular Pharyngitis 179
5. Dilatation of the Pharynx 184
6. Perforations 184
7. Pulsating Arteries 185
8. Retro-pharyngeal Abscess 185
9. Non-malignant Growths of the Pharynx 189
10. Malignant Growths of the Pharynx 191
11. Tuberculosis of the Pharynx and Tonsils 194
12. Lupus of the Pharynx and Larynx 201
13. Syphilis of the Pharynx 207
14. Parasitic Affections of the Pharynx 216
15. Foreign Bodies in the Pharynx 219
16. Neuroses of the Pharynx 223
17. Tonsillitis 226
18. Chronic Enlargement of the Tonsils 235
19. Malignant Growths of the Tonsils 244

PAGE

20. Calculi of the Tonsils 248
21. Hypertrophy of Lingual Tonsil 249
22. Diseases of the Uvula 252
23. Diphtheria 257
24. The Throat Affections of the Specific Infectious Diseases . 281
25. Erysipelas of the Pharynx and Larynx 291
26. Leprosy of the Pharynx, Larynx, and Nose 298
27. Gouty Affections of the Throat 301
28. Herpes, Urticaria, and Pemphigus of the Pharynx . . . 304

PART III.

DISEASES OF THE LARYNX.

1. The Examination of the Larynx 306
2. Acute Laryngitis 313
3. Acute Epiglottitis 321
4. Membranous Laryngitis 322
5. Hæmorrhagic Laryngitis 324
6. Chronic Laryngitis 329
7. Chronic Sub-Glottic Laryngitis 336
8. Chorditis Tuberosa 339
9. Pachydermia Laryngis 340
10. Œdema of the Larynx 344
11. Perichondritis of the Larynx 351
12. Abscess of the Larynx 359
13. Affections of the Crico-Arytenoid Articulation . . . 360
14. Non-Malignant New Growths of the Larynx 366
15. Malignant New Growths of the Larynx 376
16. Tuberculosis of the Larynx 385
17. Syphilis of the Larynx 400
18. Stenosis of the Larynx 412
19. Intubation of the Larynx 419
20. Cicatricial and Congenital Membranes of the Larynx . . 428
21. Prolapse of the Ventricle 428
22. Fractures of the Larynx and Hyoid Bone 431
23. Other Injuries to the Larynx 433
24. Dislocation of the Thyro-Hyoid Articulation 433

PAGE

25. Foreign Bodies in the Larynx 435
26. Laryngeal Changes at Puberty 445
27. The Functions and Innervation of the Larynx . . . 446
28. Neuroses of the Larynx 450
29. Position of Vocal Cords 450
30. Paralysis of the Laryngeal Muscles 451
31. Bilateral Abductor Paralysis 451
32. Unilateral Abductor Paralysis 458
33. Complete Paralysis of the Recurrent Laryngeal Nerves . . 460
34. Bilateral Adductor Paralysis 463
35. Unilateral Adductor Paralysis 466
36. Paralysis of the Arytenoideus 466
37. Paralysis of the Internal Tensors of the Vocal Cords . . 467
38. Paralysis of the External Tensors of the Vocal Cords . . 468
39. Summary of Symptoms and Laryngoscopic Appearances met with in Paralysis of the Nerve Trunks innervating the Larynx 469
40. Laryngeal Spasm 470
41. Spasm of the Adductors of the Vocal Cords 471
42. Infantile Respiratory Spasm 476
43. Nervous Laryngeal Cough 478
44. Spasm of the Tensors of the Vocal Cords 480
45. Diplophonia 481
46. Mogiphonia 482
47. Inspiratory Spasm 483
48. Laryngeal Chorea 483
49. Laryngeal Affections in Tabes 484
50. Laryngeal Affections in Paralysis Agitans, Disseminated Sclerosis, and Labio-Glosso-Laryngeal Paralysis . . 486
51. Altered Conditions of the Sensory Nerves; Anæsthesia, Hyperæsthesia, Paræsthesia, Neuralgia 488
52. Laryngeal Vertigo 491
53. Rheumatic Affections of the Larynx 494

ERRATA.

Page 180, footnote, *for* "section 44," *read* "section 43."
,, 286, line 12 from bottom, *for* "Shelley" *read* "Shelly."

LIST OF ILLUSTRATIONS.

PLATE I.—Larynx during Inspiration* . . . *following page* 312
„ II.—Larynx during Phonation* . . . „ „ „

FIG. PAGE

1. Fraenkel's Nasal Speculum 1
2. Duplay's Nasal Speculum 2
3. Cotton-wool Holder 2
4. Outer Wall of the left Nasal Fossa 3
5. Michel's Rhinoscope 4
6. Fraenkel's Tongue Depressor 5
7. Section through the Head, showing the Posterior Nares, etc. 7
8. Hand-ball Spray Apparatus 16
9. Schech's Galvano-caustic Handles and Burners . . . 17
10. Curved Needle, in Handle, for transfixing Nasal Mucous Membrane 19
11. Jarvis's Snare 19
12. MacDonald's Snare 20
13. Oil Atomisers 36
14. Hunter Mackenzie's Nasal Saw 69
15. One Hook of Jurasz's Nasal Speculum 69
16. Walsham's Forceps and Plugs. 71
17. Hewetson's Nasal Dilator 72
18. Hill's Nasal Dilator 73
19. Polypus Snare 84
20. Woakes' Polypus Snare 85
21. Baber's Hook for seizing Polypus 85
22. Forceps for seizing Polypus 86

* By kind permission of Dr. Dobell.

FIG.		PAGE
23.	Kabierski's Insufflator	86
24.	Instrument for removing Foreign Bodies from the Nose	107
25.	Cooper Rose's Inflating Plug	118
26.	Bellocq's Canula	119
27.	Zwaardemaker's Olfactometer	127
28.	Vertical Transverse Section of the Nasal Fossæ	131
29.	Electric Lamp for Trans-illumination	137
30.	Adenoid Vegetations (after Butlin)	156
31.	Loewenberg's Forceps	159
32.	Mark Hovell's Forceps	159
33.	Hartmann's Curette	161
34.	Gottstein's Curette	162
35.	Meyer's Ring-Knife	162
36.	Dalby's Steel Nail	163
37.	Tuerck's Tongue Depressor	170
38.	Expanding Probang	221
39.	Mackenzie's Tonsillotome	240
40.	Fahnestock's Tonsillotome	241
41.	Method of Making a Laryngoscopic Examination	309
42.	Drawing showing the Relation of Parts in the Mirror (A) and the Larynx (B) [after Schroetter]	311
43.	Laryngeal Brush	334
44.	Mackenzie's Laryngeal Lancet	350
45.	Mackenzie's Laryngeal Forceps	372
46.	Mackenzie's Tube Forceps	372
47.	Schroetter's Laryngeal Forceps	373
48.	Lennox Browne's Laryngeal Snare	373
49.	Krause's Cotton-wool Forceps	397
50.	Heryng's Curette	398
51.	Whistler's Cutting Dilator	417
52.	O'Dwyer's Intubation Instruments	420
53.	Durham's Flexible Forceps	442
54.	Bilateral Abductor. Paralysis. Deep Inspiration	454
55.	Mackenzie's Intra-Laryngeal Electrode and Necklet	458
56.	Complete Paralysis of Left Recurrent. Inspiration	462
57.	Complete Paralysis of Left Recurrent. Phonation	463
58.	Paralysis of Arytenoideus	467
59.	Paralysis of Thyro-Arytenoideus	468

DISEASES OF
THE NOSE AND THROAT.

PART I.

DISEASES OF THE NOSE, ACCESSORY SINUSES, AND NASO-PHARYNX.

1. THE EXAMINATION OF THE NOSE.

Anterior and Posterior Rhinoscopy.

THE examination of the anterior nares is termed anterior rhinoscopy; that of the posterior nares, posterior rhinoscopy; for both kinds of examination, the reflector and light used for illumination of the larynx are employed.

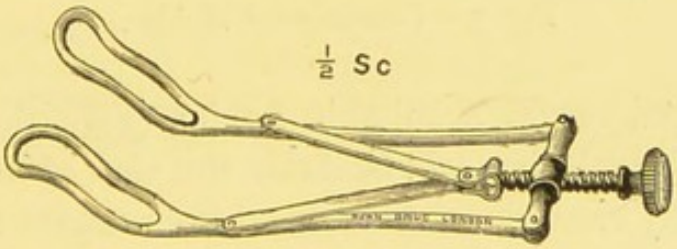


Fig. 1.—Fraenkel's Nasal Speculum.

For **Anterior Rhinoscopy** the specula usually employed are Thudichum's, Fraenkel's fenestrated instrument (Fig. 1)

and Duplay's bivalve speculum (Fig. 2). The spring of Thudichum's speculum is so stiff that patients complain of the pain caused by its introduction; the mucous membrane prolapses through the fenestrations of Fraenkel's, and thereby obscures the view. Duplay's speculum is most suitable for general use, the others being only necessary for

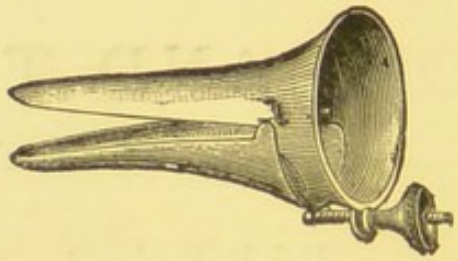


Fig. 2.—Duplay's Nasal Speculum.

exceptional cases. For the examination of children's nostrils, Gruber's oval ear specula will be found most convenient.

After the condition of the front of the nostril and the turbinated bodies has been inspected, the application of a 20 per cent. solution of cocaine by means of cotton wool



Fig. 3.—Cotton-wool Holder.

firmly twisted round a suitable holder (Fig. 3), and saturated with the solution, will facilitate the view of the posterior part, both by causing contraction of the mucous membrane, and thereby increasing the size of the passage, and also by abolishing the sensibility of the membrane, and thus permitting the speculum to be opened wider than could otherwise have been the case (Fig. 4). By anterior rhinoscopy,

the inferior turbinated body, and most of the middle turbinated, can be seen, and occasionally a glimpse of the upper turbinated is obtained. The term "*turbinated body*" is applied to a turbinated bone *plus* its covering of soft tissues. * *Turbinal* is used in the same sense. The condition of the

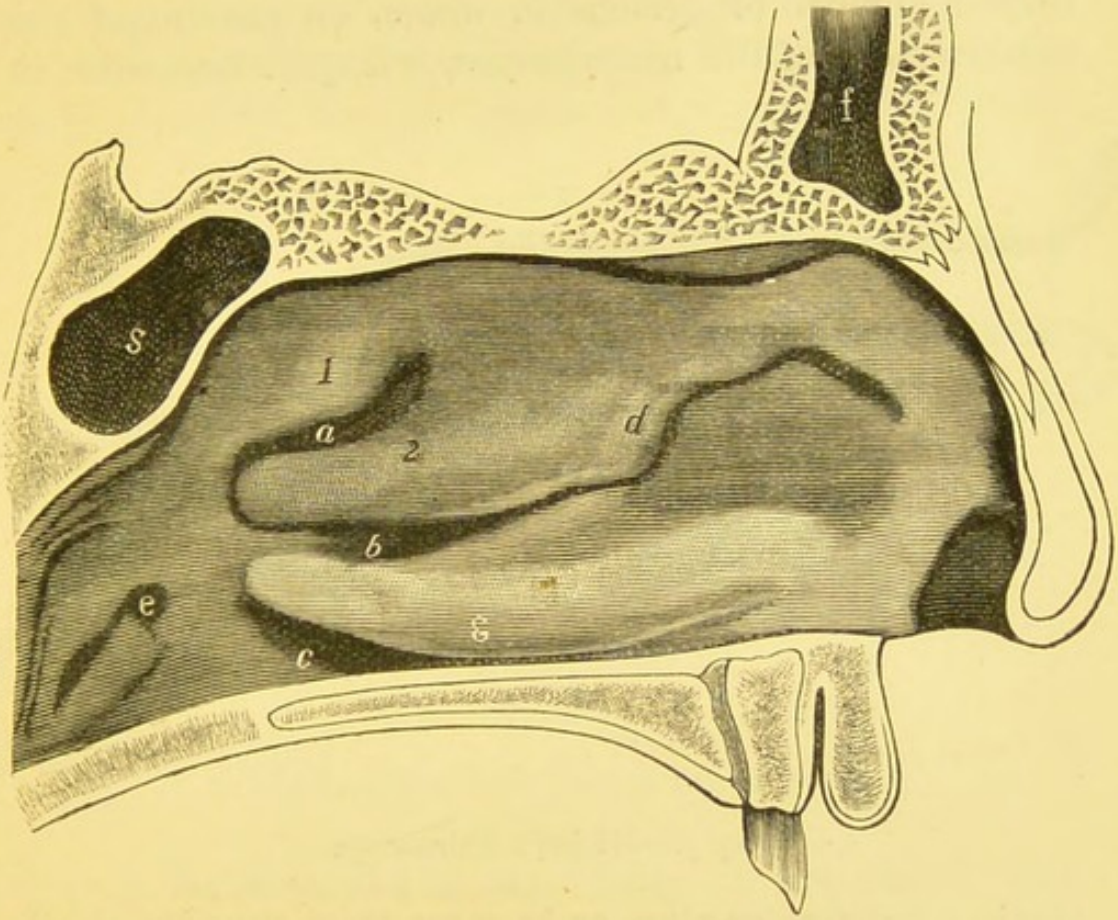


Fig. 4.—Outer Wall of the left Nasal Fossa.

1. Superior turbinated body.
2. Middle turbinated body.
3. Inferior turbinated body.
e. Orifice of Eustachian tube.
f. Frontal sinus.
a. Superior meatus.
b. Middle meatus.
c. Inferior meatus.
d. Anterior end of middle turbinated body.
s. Sphenoidal sinus.

passages and also the state of the septum can be inspected. In order to appreciate what is seen, the observer must habituate himself to the examination of noses both in health

* Baber, *A Guide to the Examination of the Nose*, p. 8.

and disease, as it is only by comparison that it is possible to distinguish the normal from the abnormal, as the arrangement of the turbinated bodies, the direction of the meatuses, and the position of the septum, vary greatly.

Posterior Rhinoscopy is a much more difficult task than making a laryngoscopic examination, as there are a certain number of persons in whom, on account of the conformation of the naso-pharynx, it is quite impossible to

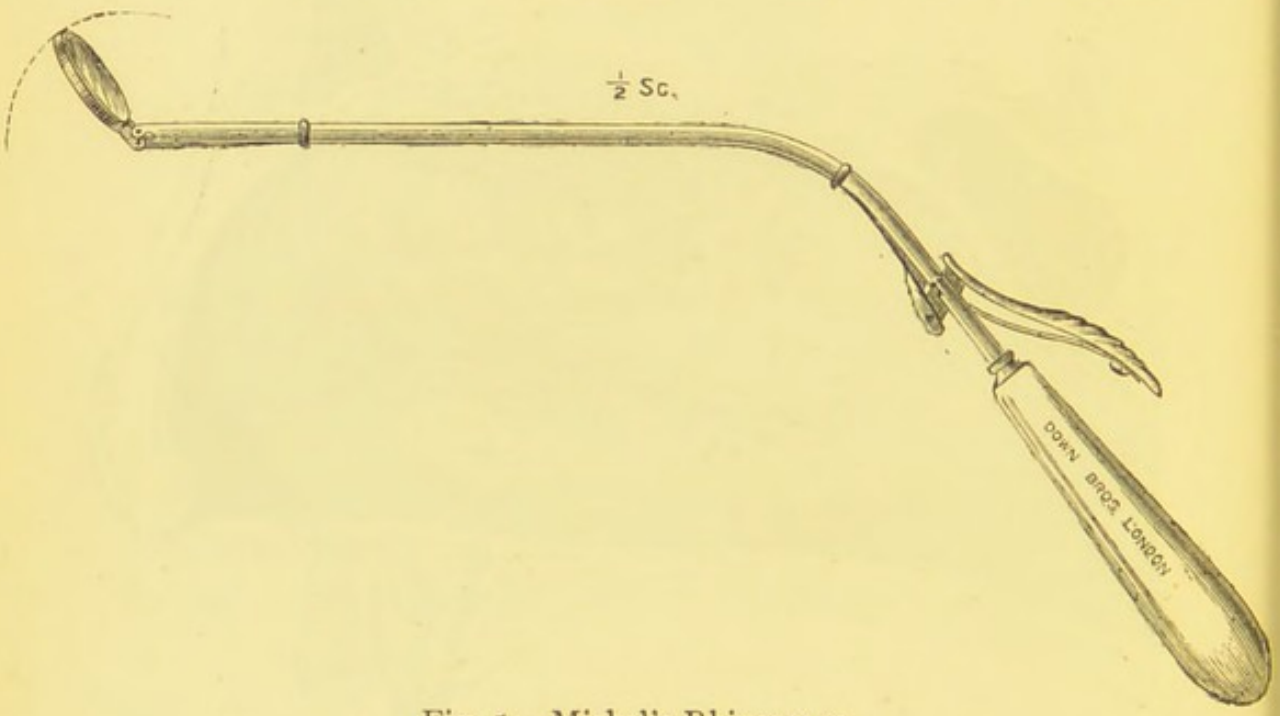


Fig. 5.—Michel's Rhinoscope.

obtain a satisfactory view, or in some cases any view at all, of the posterior nares. Three chief difficulties are met with.* The first, a hard palate, which extends so far back towards the posterior pharyngeal wall that there is no room for the introduction of the mirror. This is fortunately extremely rare, as it offers a complete bar to posterior rhinoscopy. The second difficulty is of frequent occurrence. It consists in a broad and deep soft palate, and a long uvula co-existing with a short distance between them and the posterior

* Lefferts, *Diagnosis and Treatment of Chronic Nasal Catarrh.*

pharyngeal wall. The remaining difficulty is that which is produced by instinctive drawing backwards and upwards of the soft palate, which follows upon the opening of the mouth and introduction of the mirror. The best mirror for posterior rhinoscopy is Michel's (Fig. 5); the mirror is attached to the shank by a hinge, and is so arranged that, by pressing a trigger, the mirror may be placed at any angle with the shank. Before commencing the examination the patient is told to hold the breath, or else to breathe quietly

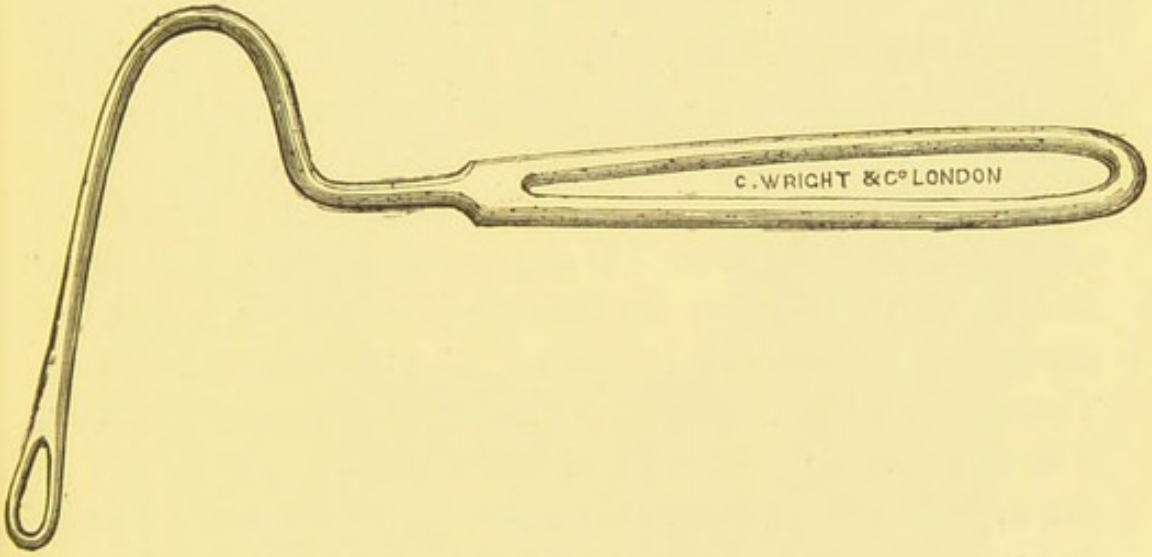


Fig. 6.—Fraenkel's Tongue Depressor.

through the nose, and to say "hang" if requested. The object of this advice is to arrange that the soft palate may hang down in a relaxed condition, and not be drawn up tightly against the pharynx. The tongue is then gently depressed by a suitable spatula (Fig. 6) held in the left hand, and the rhinoscopic mirror, well warmed, is introduced behind the soft palate, on one side or the other of the uvula. When it is in position, the trigger is pressed so as to elevate the mirror, and by this means a view of the posterior nares may be obtained. Should the soft palate be very irritable, both it and the pharynx and tongue may

be sprayed with a 10 per cent. solution of cocaine. This procedure will often enable a satisfactory view to be obtained. Various hooks and snares have been recommended for pulling the soft palate forward; but men of great experience in this method of examination, such as Schech, do not employ them, and say that more is to be done by patience than by instrumental assistance.

It must be borne in mind that, on account of the smallness of the mirror and the anatomical arrangement of the parts, it is impossible to get a complete picture of the posterior nares at the same time; only segments of the picture can be obtained (Fig. 7). In making a rhinoscopic examination, the first things that come into view are the posterior aspect of the uvula and the posterior surface of the velum palati. By gently raising the mirror the septum should be seen. It appears as a pale red, at times almost white, ridge in the middle line, narrow below, but expanding above and becoming of a deeper red colour. Though the lower part of the septum is generally narrow, it is sometimes thickened and bulbous. On either side of the septum are seen the oval nasal fossæ, the spaces being more or less filled by the three turbinated bodies. Of these, the superior is the smallest; the middle is intermediate in size as well as situation, but is seen most distinctly of the three; and the inferior, which is the largest, is partly hidden from sight by the soft palate. The turbinated bodies are usually of a grey or greyish-red colour. If the mirror be now rotated externally, a projection is seen, beyond which is the pale, funnel-like opening of the Eustachian tube; above, and to the outer side, is seen a groove, to which the name of the fossa of Rosenmüller has been applied. If the mirror be directed upwards, the vault of the pharynx can be inspected. The appearances to be seen here vary greatly. If the patient be young and adenoid vegetations

be present, nothing but a red, irregular mass is to be recognised; if, on the other hand, an adult without any

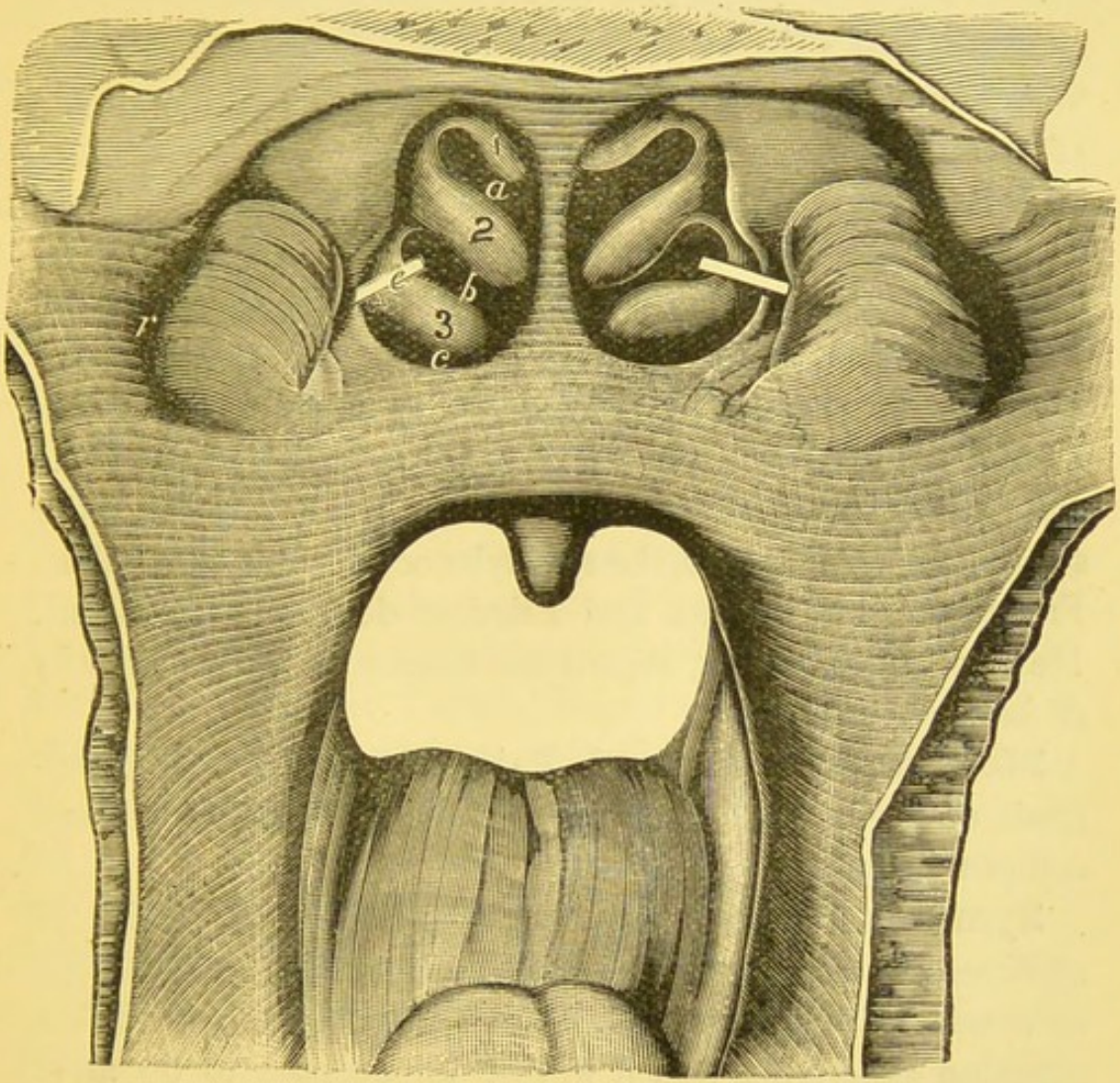


Fig. 7.—Section through the Head, showing the Posterior Nares, etc.

1. Superior turbinated body.
2. Middle turbinated body.
3. Inferior turbinated body.
e. Orifice of Eustachian tube.
a. Superior meatus.
b. Middle meatus.
c. Inferior meatus.
r. Fossa of Rosenmüller.

enlargement of the pharyngeal tonsil be examined, the vaulted appearance of the naso-pharynx can be distinguished.

2. ACUTE RHINITIS.

Acute Nasal Catarrh, Coryza.

Acute catarrhal inflammation of the mucous membrane of the nose; *i.e.*, an ordinary cold in the head.

Ætiology.—There seems to be an hereditary tendency to coryza, and there is also some evidence in favour of its contagiousness. Exposure to cold and damp, especially when the system is debilitated, is the chief exciting cause.

Cardone* points out that acute rhinitis resembles pneumonia, not only as regards its contagiousness, but also in its clinical features. He has found in the nasal secretions the streptococcus pyogenes, the staphylococcus aureus and albus, Fraenkel's diplococcus and Friedlaender's pneumococcus. He does not, however, regard the disease as being primarily of bacterial origin.

Morbid Anatomy and Pathology.—There is hyperæmia of the mucous membrane of the nose, with increased cell-proliferation.

Symptoms.—The chilliness, headache, and feeling of stuffiness in the nose, followed by sneezing and discharge of a watery, irritating fluid from the nostrils, are such a common experience that it will be unnecessary to do more than mention them. After a time the watery fluid becomes muco-purulent, and finally ceases. Accompanying the local manifestation there are usually evidences of constitutional disturbance, such as slight pyrexia, loss of appetite, furred tongue, constipation and high-coloured urine.

In children, especially infants at the breast, acute rhinitis may be quite a serious affection. Owing to the nasal obstruction, cyanosis and other symptoms of impending

* *Annual of Medical Sciences* 1889, vol. iv., D. 1.

suffocation may come on, if the infant is placed on its back or given the breast.

Treatment.—This, to be of any avail, must be undertaken at the very commencement of the attack. The most successful plan is the administration of 10 minims of tincture of opium added to formula No. 11, and given every six hours for four doses, the patient meanwhile being kept at a uniform temperature and on light diet. When the acute symptoms are over, quinine may be given with advantage. The writer can speak from personal experience of the utility of the carbolised smelling salts in warding off a threatened attack of coryza (*see* formula No. 70). Lennox Browne * states that in acute rhinitis he now uses nothing but "menthol inhaled by the nares or applied by spray, brush, or inhaler, or, where the inspiratory power of the nostrils is for the time actually abrogated, by light tampons of menthol-wool." In infantile coryza, Sajous † recommends that a small piece of blotting-paper, rolled up, should be introduced up the nostrils to absorb the secretion. Paroleine containing 2 per cent. of cocaine, applied to the nostrils with a paint-brush every three or four hours, will help to keep the infant comfortable.

Persons, who are particularly liable to attacks of acute rhinitis, ought to regulate their mode of living so as to bring it more in accord with the rules of health. The most fertile cause of nasal catarrh is "coddling." People who shut themselves up in warm rooms, and who wear too much clothing when they go out, render their skins so sensitive to changes of temperature that the slightest draught upsets their heat-regulating centre, and a chill is the result. This is especially likely to be the case, as, owing to their being over-clad, any exertion will cause them to perspire, and, as

* *Diseases of Throat and Nose*, 4th edition, p. 560.

† *Annual of Medical Sciences* 1889, vol. iv., D. 2.

is well known, people who perspire easily are more liable to cold than others. The most potent means of bracing the skin so as to enable it to accommodate itself to changes of temperature is undoubtedly the cold bath. By this I do not mean that young and old, the delicate and the strong, should subject themselves to exactly the same treatment all the year round, but that the morning tub should play an important part in treatment. For children, the aged, and the delicate, it will be necessary to regulate the temperature of the water and the mode of applying it in accordance with their powers of resistance. For such persons, the temperature of the water should never be below 60° Fahr., and it may suffice to sponge the neck and chest with water at this temperature, the patient meanwhile being wrapped in a towel, or standing in a bath of hot water. For the more robust, water at the temperature of the external air may be used, and they may immerse the whole body in it; but even fairly robust people may advantageously add a little warm water to the bath when the thermometer is below 40° Fahr. In whatever way the cold water is applied, the great secret of success is vigorous friction of the skin afterwards, so that "reaction" may be developed. If the person feels cold and languid after his bath, it has done him harm rather than good. To those who can afford the time, the Turkish bath is an excellent plan of accustoming the skin to resist sudden changes of temperature. Clothing should be light, and that worn next the skin should be woollen or silk. Waterproofed and other impervious articles are not to be recommended to those subject to catarrh. Wraps round the neck are to be deprecated. On the other hand, I have seen much benefit result to men from giving up shaving, and allowing the beard and whiskers to grow.

In connection with clothing must be considered the bed and its covering. Fortunately, spring mattresses have nearly

universally superseded the old-fashioned feather bed, much to the advantage of the sleeper. The covering should be warm but light, and air-tight counterpanes discarded.

Diet also has an influence in the production of catarrh. Over-eating predisposes to catching cold, and there are certain articles of food which act injuriously—*i.e.*, pastry, sugar, and sweet things generally. Whether they act by disturbing the digestion, or whether they have any specific action, I do not pretend to say ; but I am sure that I have seen benefit result from regulating the diet.

If the individual is anæmic, iron, arsenic, or cod-liver oil will be of use, the latter being especially serviceable.

Constipation and any other condition of defective health should receive appropriate treatment.

3. PURULENT RHINITIS.

An inflammatory condition of the nasal mucous membrane, attended with a purulent secretion.

Ætiology.—The newly-born occasionally become infected with purulent rhinitis from a gonorrhœal or leucorrhœal discharge in the mother. Adults suffering from gonorrhœa may infect themselves or others. A puriform discharge from the nose may be met with in the exanthemata and glanders. Syphilis, tuberculosis, and the presence of foreign bodies may also give rise to a puriform discharge.

Bosworth * lays great stress on the purulent rhinitis of childhood, as he maintains that it is the precursor of atrophic rhinitis. He regards it as a purely local condition, and not dependent on a constitutional dyscrasia. I have met with many cases, in out-patient practice, of children suffering from purulent nasal catarrh, but in the majority there certainly was underlying this affection the strumous

* *Diseases of the Nose and Throat*, vol. i., p. 155.

diathesis or some other general condition of impaired health.

Morbid Anatomy and Pathology.—There is hyperæmia of the nasal mucous membrane. At first the secretion is mucous, it soon becomes muco-purulent, and from the rapid cell proliferation it becomes puriform, and no longer yields mucin. According to Bosworth, in the final stage there is atrophy of the mucous membrane.

Symptoms.—In infants, as already mentioned (see p. 8), the disease, by leading to nasal stenosis, may give rise to grave symptoms. In children and adults the yellowish purulent discharge is the characteristic symptom.

Diagnosis.—If care be paid in investigating the mode of onset there need be but little difficulty in arriving at a correct diagnosis as to the cause of the discharge. A rhinoscopic examination will enable the observer to exclude such conditions as rhinoliths, foreign bodies, syphilitic necrosis, etc. (For diagnosis from empyema of antrum see p. 136.)

Prognosis.—Purulent rhinitis in children usually runs a chronic course, and requires persevering local treatment to benefit it.

Treatment.—The principles of treatment discussed under the head of atrophic rhinitis are applicable to purulent rhinitis. If, as there is good reason to believe, some of the cases of purulent rhinitis drift into the atrophic form, every endeavour should be made to arrest the disease when it is still in a curable stage.

4. RHINITIS DUE TO SPECIFIC INFECTIOUS DISEASES.

In severe forms of *scarlet fever* the nostrils may be affected by extension from the pharynx. An acrid muco-purulent discharge flows from the nose, and excoriates the

upper lip. In some cases, the mucous membrane may slough in places, and even necrosis of bone or cartilage has occurred.

In *measles*, nasal catarrh is a prominent symptom from the very first, but it rarely gives rise to more than passing trouble.

The eruption of *small pox* occasionally appears on the mucous membrane of the nose.

The nasal variety of *diphtheria* is described in Part II., section 23.

Affection of the nasal mucous membrane is one of the characteristic symptoms of *glanders*. The nose is not necessarily attacked at the commencement, as in some cases the nasal mucous membrane is only involved towards the end of the disease. At first a thin mucus is secreted, this becomes streaked with blood, and later on purulent and very offensive. There is great swelling of the nasal mucous membrane, and a similar condition of the membrane lining the antral and frontal sinuses. The nose may become blocked with crusts, swollen, and very painful. Tubercle-like nodules form, and may lead to ulceration of the mucous membrane and necrosis of the septum.

Treatment.—The essence of local treatment of nasal affections is the thorough cleansing of the passages; hence, in the above-mentioned diseases, if the discharge is offensive, various antiseptic sprays (formulæ Nos. 52 to 55) should be used at frequent intervals for this purpose.

5. CHRONIC HYPERTROPHIC RHINITIS.

A chronic inflammatory condition of the mucous membrane of the nose, attended with hyperplasia.

Ætiology.—The most potent cause of hypertrophic rhinitis is, undoubtedly, the hyperæmia brought about by repeated attacks of acute rhinitis. At first, the mucous

membrane returns to its normal condition after the attack, but as the attacks increase in frequency the mucous membrane becomes permanently swollen. This change is particularly liable to occur if there be already an abnormality of the nose; *i.e.*, deflected septum, spurs, etc., interfering with free nasal respiration. Persons exposed to sudden changes of temperature, or to dust and irritant vapours, frequently suffer from chronic rhinitis. As in the case of enlarged tonsils and adenoid vegetations, so in hypertrophic rhinitis there seems to be an hereditary tendency, and these conditions are not uncommonly found associated.

Morbid Anatomy and Pathology. — There is a proliferation of all the tissues of the mucous membrane. The mucous membrane is swollen and thickened; in places, the hypertrophy is so pronounced that distinct tumours are met with; these are especially liable to occur at the posterior extremities of the inferior turbinals, but they may also be seen on the anterior extremities, though not to the same extent. In the early stages of the disease, the mucous membrane is soft and spongy, but later on, when the fibrous elements begin to preponderate, it becomes firmer.

Symptoms.—The chief complaints are referable to the obstruction of the nose and the increased secretion. The patients complain of a feeling of stuffiness in the nose; they sniffle or frequently blow the nose, and there is a watery or muco-purulent secretion. Owing to the nasal stenosis there is mouth breathing with its attendant evils (see p. 61). The voice has a nasal twang. If the middle turbinal be much swollen, smell and taste may be interfered with. Impairment of hearing is frequently present, due to catarrhal swelling of the Eustachian tube. Sneezing is a very constant symptom, and it is often the one which leads the patient to seek advice. If the

turbinated bodies are so swollen that they touch the septum, various other reflex symptoms may exist. Frontal headache, lassitude, and giddiness, are not infrequently met with in patients suffering from this disease. At night, the symptoms of stenosis are usually aggravated. On whichever side the patient lies, the corresponding nostril becomes completely occluded. This has generally been regarded as being due simply to gravitation of blood. Bresgen,* however, denies this, and states that this condition is due to nervous influence, though he does not explain how it is brought about.

Acne has been noticed occurring in connection with chronic rhinitis, and disappearing when the nasal cavities received appropriate treatment.

Diagnosis.—Chronic hypertrophic rhinitis requires to be differentiated from vaso-motor rhinitis, and from new growths, benign and malignant. Cocaine applied locally rapidly reduces the swelling in cases of vaso-motor rhinitis, and has but comparatively slight effect in the hypertrophic form. New growths are usually more or less pedunculated, and even when this is not the case the growth is generally localised. Cartilaginous and bony tumours can be distinguished by their hardness.

Prognosis.—Under the methods of treatment formerly in vogue, chronic hypertrophic rhinitis was a most intractable disease, but the judicious local employment of the cautery and other caustics usually effects a marked improvement in all the symptoms, and sometimes a cure. Here I would take the opportunity of warning against a too active intra-nasal treatment. As it will be seen under the head of Treatment, the galvano-cautery is not altogether free from risk, and it is sometimes remarkable to notice the great benefit which results from a very slight cauterisation.

* *Annual of Medical Sciences* 1888, vol. iii., p. 251.

Treatment.—The first thing to be done is to carry out the general line of treatment as indicated under the head of Acute Rhinitis.

Locally much good may be effected by the use of medicated sprays (Fig. 8). In simple cases an alkaline spray, such as No. 52, may be employed. Lefferts * objects to the use of sodium chloride, believing that by favouring endosmosis it does more harm than good. Formula No. 53 is a favourite spray of his.

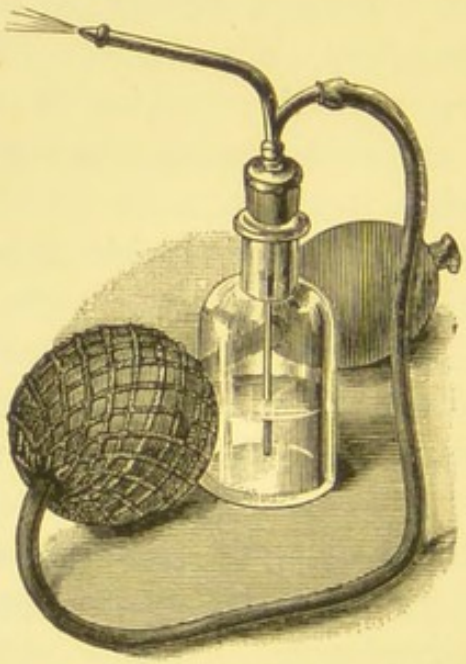


Fig. 8.—Hand-ball Spray Apparatus.

If, after the thick mucus has been removed by the action of these cleansing sprays, it is found that the secretion continues profuse, various mild astringents, such as formulæ Nos. 57, 58, 65, and 66, may be tried. Sajous † recommends a solution of resorcin, five grains to the ounce of distilled water, to be used once daily (formula No. 59).

* *Diagnosis and Treatment of Chronic Nasal Catarrh*, p. 31, St. Louis, 1886.

† *Annual of Medical Sciences* 1888, vol. iii., p. 252.

Powders I have not found of use in hypertrophic rhinitis. Should the mucous membrane be much thickened, and especially if there be outgrowths on the anterior or posterior extremities of the inferior turbinals, more active treatment must be undertaken. Where there is simply a general swelling of the mucous membrane, I have obtained such

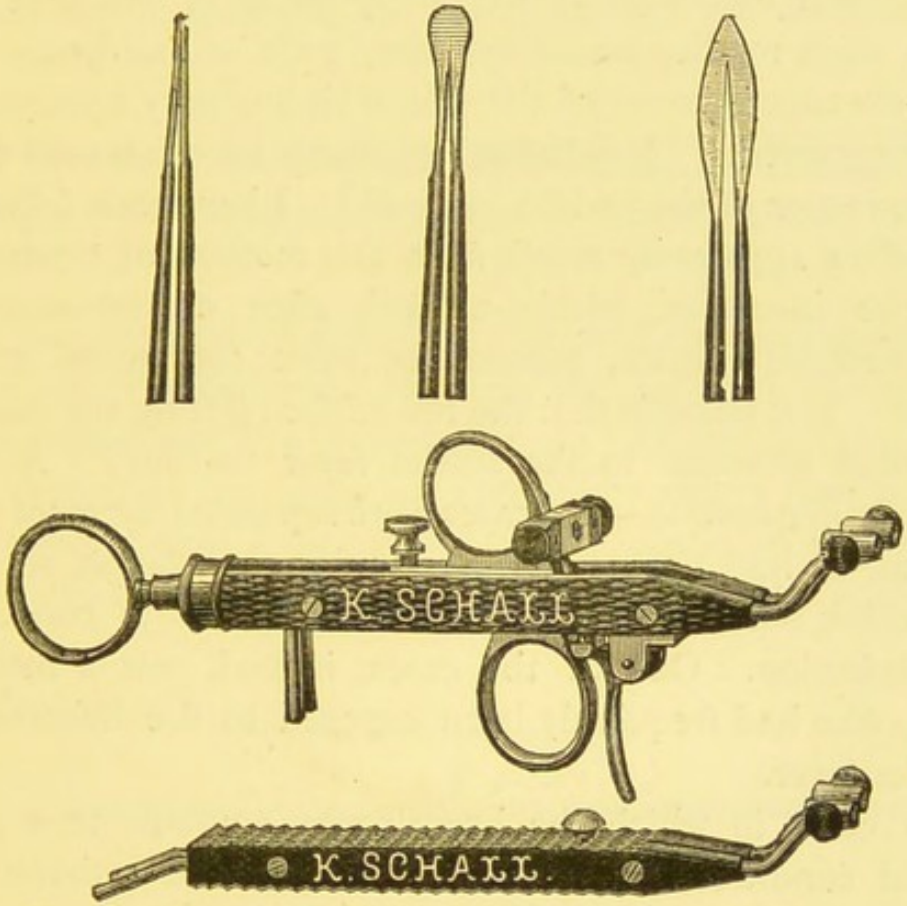


Fig. 9.—Schech's Galvano-caustic Handles and Burners.

excellent results from scoring it with the flat blade of the galvano-cautery (Fig. 9), after the previous application of cocaine, that I have practically given up other plans of treatment. Care should be taken that the instruments are scrupulously clean.

Some operators recommend that the nostrils should be thoroughly washed with some antiseptic fluid before the cautery is used, and they say that by so doing they prevent

the formation of a false membrane due to the presence of the staphylococcus pyogenes aureus.

After the cauterisation it is advisable to insert in the nostril a plug of cotton-wool smeared with some antiseptic ointment (formula No. 29). Cauterisation of the nasal mucous membrane is not entirely free from risk. Cases have been met with in which erysipelas of the nose and face, otitis media, ocular troubles, such as amblyopia and venous engorgement of the eye, with pupillary hyperæmia, have occurred.* Meningitis and death have followed upon cauterisation of the middle turbinal.† I have seen follicular tonsillitis apparently result from this method of treatment. In two instances, within a week after cauterisation for hypertrophic rhinitis, patients of mine contracted scarlet fever. Is it possible that the raw surface left by the cautery afforded entrance to the scarlet fever bacillus? At the periods in question—the cases were separated by more than a year—I had no scarlet fever under observation, so I do not think that I could have been the means of conveying the infection. One of the cases, indeed, was a medical man, who had frequently been exposed to the infection of scarlet fever.

In cases in which the hypertrophy amounts to a polypoidal condition, the surplus tissue must be removed by the loop. Here, again, I am an advocate for the use of the galvano-caustic loop. If the growth is on the anterior extremity of the inferior turbinal, it should be transfixed with a slightly curved needle fixed in a suitable handle (Fig. 10). The loop should then be passed over the handle and point of the needle, and gradually tightened. The electric current can then be turned on, and the tissue slowly burnt through. If the cauterisation is done gradually, the

* *Sajous' Annual* 1888, vol. iii., p. 255.

† *Ibid.*, 1891, vol. iv., D. 5.

current being turned off from time to time for two or three seconds, there will be very little pain (cocaine having been previously applied) and hardly any bleeding. When the growth is from the posterior extremity of the inferior turbinal, the loop will have to be passed backwards until it enters the naso-pharynx; then, by a little manipulation, the mass will be caught in the snare, and can be cut through in



Fig. 10.—Curved Needle, in Handle, for Transfixing Nasal Mucous Membrane.

the manner already described. Should the hæmorrhage be profuse, as occasionally happens, the injection of hot water will generally suffice to check it. In rare instances, anterior or even posterior plugging may be necessary (see p. 117). In dealing with hypertrophy of the posterior part of the inferior turbinal, Bosworth * prefers Jarvis's wire-snare

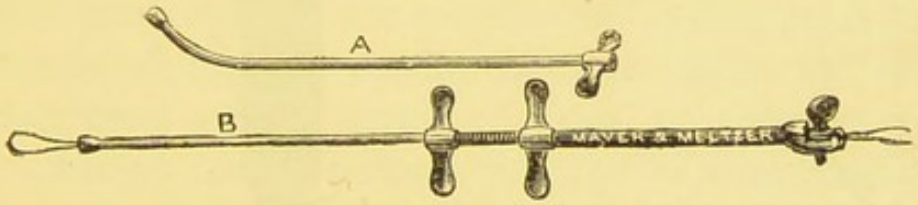


Fig. 11.—Jarvis's Snare.

écraseur.† If the operation is performed slowly, an occasional slight turn being given to the screw, at least an hour being occupied in the process, there is sometimes hardly any hæmorrhage. If severe, a plug of absorbent cotton-wool should be passed back and wedged between the cut surface and the septum, and allowed to remain for twenty-four

* *Diseases of the Nose and Throat*, vol. i., p. 151.
† *Archives of Laryngology*, vol. ii., p. 164.

hours if necessary. Greville MacDonald's* nasal snare (Fig. 12) is a great improvement on Jarvis's, in that it can be firmly held so that the hand is below the field of vision, while it can be worked with the same hand, leaving the other hand free to hold the speculum, or to adjust the snare with the forefinger in the naso-pharynx. Electrolysis † has given good results in two cases, and it

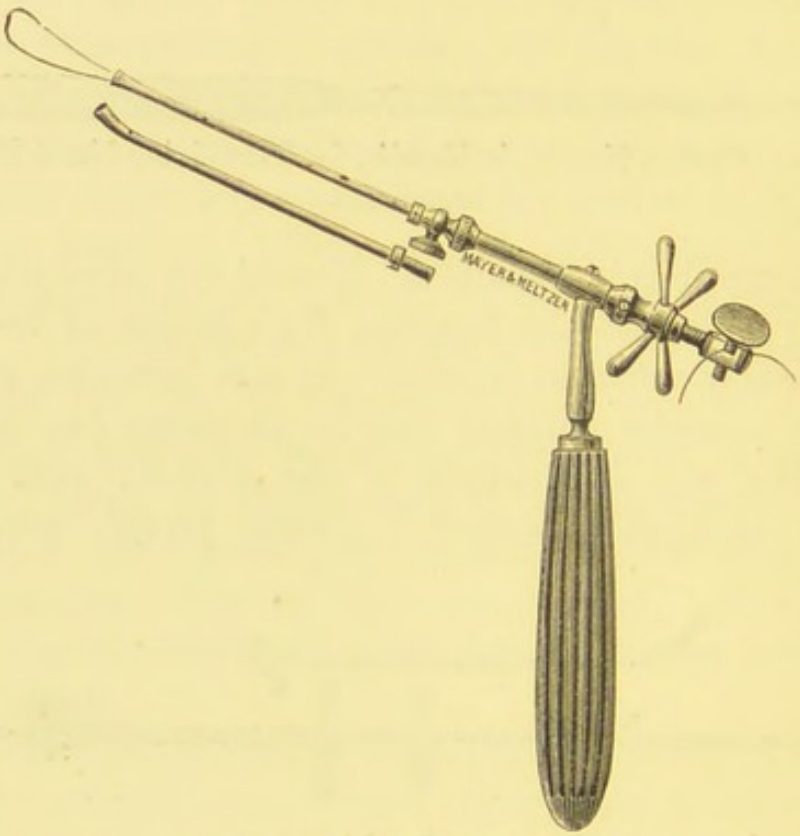


Fig. 12.—MacDonald's Snare.

is a mode of treatment which certainly deserves a trial. A common continuous current battery will suffice for the purpose of generating the electricity. The negative pole should have a broad surface, and is applied to the cheek as near the part to be operated on as possible. A rubber speculum should be introduced up the nostril in order

* *Lancet*, 1890, vol. ii., p. 403.
† *Saious' Annual* 1888, vol. iii., p. 254.

to insure insulation. A platinum needle should be attached to the positive pole, and it should completely traverse the mucous membrane. The circuit should be closed during four or five seconds, and this should be repeated a number of times while the needle is *in situ*. If too strong a current be used, giddiness, together with pain in the upper jaw, will be experienced. Four or five sittings are usually required. Cocaine will diminish the pain, which is sometimes very great. Heryng * advocates the use of chromic acid in preference to the galvano-cautery. He maintains that it is less painful, and has a more immediate as well as a more powerful effect in causing contraction of the swollen mucous membrane. If precautions are taken, the serious consequences following its use, such as severe vomiting, diarrhœa, collapse, and even fatal poisoning of a choleriform type, which have been reported, can be altogether avoided. He recommends that a small crystal of the acid should be gradually and carefully warmed on a suitable silver probe. The acid forms a brownish-red coating to the probe, which adheres firmly and will not crumble off. If too great a heat be employed, the red coating becomes converted into a blackish-grey, porous layer consisting of chromic oxide, which has no caustic properties. The mucous membrane of the nose, previously cocainised, can be lightly touched with the probe thus charged, and, if deep cauterisation be required, pressure can be maintained for a few seconds. It is advisable to cleanse the nose with a spray of warm boric acid solution before the acid is used, and afterwards to spray the part with an alkaline solution (Nos. 52 and 53), so as to neutralise any excess of acid; or the cauterised spot may be swabbed with a pledget of cotton-wool soaked in a solution of bicarbonate of sodium. The nostril operated on should be protected from the cold air

* *Proceedings of International Medical Congress at Copenhagen.*

and dust by a pledget of cotton-wool smeared with an antiseptic ointment (No. 29, or Ung. Iodoformi, B. P.). Bosworth also strongly advocates chromic acid in preference to other caustics, and he very properly points out that the object of using a caustic application is not to destroy a supposed fungous growth, but to pin down the hypertrophied tissue in such a way that its plethoric circulation shall be controlled, and the excessive nutritive processes checked. Lefferts speaks highly of the action of nitric acid in these cases. He applies it by means of cotton-wool wrapped round a suitable probe saturated with nitric acid, and the excess of acid pressed out. This is introduced through a speculum, and the probe is drawn along the thickened mucous membrane, contact being kept up for a few seconds. Glacial acetic acid, which is a less powerful agent, may be employed in the same way. Whatever chemical caustic be employed, the precautions recommended to be used in connection with the application of chromic acid, should be resorted to. Amongst the plans for the treatment of hypertrophic rhinitis, which, if not to be relied upon as directly curative, will be found of assistance in supplementing other methods, may be mentioned the use of hollow vulcanite plugs gradually increasing in size, Goodwillie's nasal intubation tubes (see page 71), laminaria tents or the distension of the nostril with an elastic rubber bag filled with water, similar to that employed in epistaxis.

6. CHRONIC ATROPHIC RHINITIS.

Chronic inflammation, followed by atrophy of the mucous membrane of the nose, and accompanied by the formation of dry crusts and a most offensive odour.

Ætiology.—Chronic atrophic rhinitis is distinctly a disease of early life. Zaufal even regards it as being due

to a congenital defect. The malady, however, seldom appears in subjects under four or five years of age *; towards puberty it increases in severity, and the majority of cases commence before the sixteenth year. Schech † has seen only two cases which developed after the twentieth year, once in a highly chlorotic lady after the removal of numerous polypi which obstructed the nose, and secondly in an elderly married woman much debilitated by a uterine disorder.

Sex seems to exercise considerable influence, as females are more frequently attacked than males, in about the proportion of seven to two.

There is a divergence of opinion about the general health of the subjects of this disorder. Bosworth ‡ says that it occurs as a rule in persons enjoying perfect health. On the other hand, Michel § states emphatically that no one who is quite healthy gets ozæna, and Schech || does not remember a single case of genuine ozæna in which the patient did not exhibit traces of anæmia, chlorosis, scrofula, or tuberculosis. The latter view is certainly in accord with my own experience, as I have seen an undue proportion of cases in phthisical and anæmic patients, and I am inclined to believe that in anæmic young females there is a peculiar vulnerability of mucous membranes generally, their well-known liability to gastric ulcer being an example of this tendency. It has been stated that inherited syphilis may act as a predisposing cause to atrophic rhinitis, but I have no personal experience on

* Trousseau, *Clinical Lectures, Sydenham Society*, vol. iii., p. 62.

† *Diseases of the Mouth, Throat, and Nose* (English Translation), p. 240.

‡ *Archives of Laryngology*, vol. iii., p. 237.

§ *Transactions International Medical Congress* 1881, vol. iii., p. 314.

|| *Loco cit.*

this point. That there is an hereditary tendency to this condition is shown by the fact that atrophic rhinitis is frequently met with in more than one member of the same family.

Pathology.—One of the earliest questions to be settled in the pathology of atrophic rhinitis is whether the disease is usually preceded by a hypertrophic stage. There is very little positive anatomical evidence either one way or the other; but on general pathological grounds it is easier to believe that the disease comes on as a result of a catarrh attended with hypertrophic changes, at the commencement, than to believe that it is *ab initio* of an atrophic character.* Moreover, cases have been recorded, and I have seen at least one myself, in which an atrophic condition was seen on one side and a hypertrophic on the other. Bosworth † is of opinion that atrophic rhinitis develops as the result of a purulent rhinitis occurring in children.

Zaufal ‡ regards the disease as being due to a congenital deficiency in the turbinated bones; another theory is that of an arrest in the development of the turbinated bones. Both these theories are based on the fact that in atrophic rhinitis the nasal passages are much increased in size, and that, as a result of the diminished force of the current of air passing through the dilated passages, mucus tends to be retained and undergo decomposition. To these theories it may be replied that the diminution in the bulk of the turbinated bones is a part of the general atrophy of the structures of the nostrils, which is so characteristic a feature of the disease, though it is met with in an advanced state only when the symptoms have already been well marked

* *Transactions International Medical Congress* 1881, vol. iii., p. 304.

† *Diseases of Nose and Throat*, vol. i., p. 162.

‡ *Transactions International Medical Congress* 1881, vol. iii., p 304.

for some years. In favour of the view that the disease is due to an enlargement of the passages, which allows the mucus to be retained and undergo decomposition, is the fact that a case of ozæna has been recorded as having promptly followed upon the eradication of a nasal sarcoma, which had caused dilatation of the cavity; also Schech's case, already mentioned.

Berliner * regards the apposition of the middle turbinal against the septum as the cause of ozæna. By this means, the flow of the secretion is hindered—it stagnates and decomposes; furthermore, the glands of this part atrophy from pressure.

Michel † has put forward the view that a chronic catarrh of the sphenoidal and ethmoidal sinuses is essential to the existence of ozæna, whereas Robertson ‡ lays great stress on the association of ozæna with antral disease. He has found the natural opening of the antrum closed in almost every case of ozæna. It is possible that the change in the mucous membrane met with in atrophic rhinitis may be due to a trophic neurosis; but, so far, no clear evidence has been adduced in favour of this theory.

Valentin § likens the disease to lupus, and he thinks that it may be connected with tuberculosis.

Spencer Watson ‖ holds a somewhat similar view, being of opinion that chronic rhinitis is allied to lupus erythematosus.

The remaining point to be discussed in the pathology of atrophic rhinitis is the action of micro-organisms. Loewenburg has described a micrococcus which he discovered in the mucous membrane, and which he regards

* *Centralblatt*, vol. vi., p. 503.
† *Transactions International Medical Congress* 1881, vol. iii., p. 304.
‡ *Lancet* 1893, vol. i., p. 984.
§ *Centralblatt*, vol. v., p. 12.
‖ *Transactions Medical Society*, vol. xiv., p. 358.

as the cause of the disease. This view has been supported by many writers, but it is far from being generally accepted; on the contrary, most authorities consider the micro-organisms as being the result, and not the cause, of the disease. Marsano,* for example, has tried inoculations with the micro-organisms, which he regards as the cause of the disease, but did not succeed in producing ozæna. There is, however, no doubt that bacteria play an important part in the production of a fœtid odour. Hajek† has discovered in ozæna a short bacillus occurring in the form of a diplococcus or in chains, which possesses the property of decomposing organic substances with the formation of a penetrating stink. To this organism he has applied the name *Bacillus fœtidus*, and he thinks that it, as well as the other bacteria in ozæna, only causes a part of the disease.

Abel‡ has discovered a bacillus in ozæna with characteristic features. The rods are short, plump, sometimes enclosed in a well-marked capsule, and often arranged in twos or in chains. They resemble Friedlaender's pneumo-bacilli, from which, however, they can be distinguished with certainty. The changes that have been met with on post-mortem examinations show extreme atrophy of the mucous membrane and bony structures. Bosworth§ points out that this is "not due to a connective tissue hypertrophy encroaching on the glandular structures of the membrane, but rather to the transformation of epithelial structures into inflammatory corpuscles, together with an active epithelial desquamation from the surface of the membrane, and from the lining of the acini."

* *Centralblatt*, vol. vii., p. 349.
† *Ibid.*, vol. v., p. 497.
‡ *British Medical Journal* 1893, vol. i., epitome No. 290.
§ *Diseases of Nose and Throat*, vol. i., p. 166.

Krause * lays great stress on the fatty degeneration which he found in the mucous membrane, and in the gland epithelium, and attributes the sickening and rancid smell which is so marked a feature of the disease to the enormous quantity of fat secreted into and beneath the epithelium, which quickly undergoes decomposition, liberating fatty acids. More recently, Habermann † has confirmed part of these observations. From a very exact microscopical examination of two cases he concludes that the nature of ozæna consists of a fatty degeneration of the acinous glands of the nasal mucous membrane, and of Bowman's glands, along with inflammation and infiltration of the mucous membrane. The fibrous degeneration of the neighbouring membrane and the atrophy are caused by this condition, inducing reaction in neighbouring parts.

Symptoms.—From a consideration of the anatomical changes met with in the disease, it will be at once seen that the degenerate mucous membrane is no longer capable of secreting the bland, sero-mucous fluid which it is its function to furnish, but secretes instead a muco-purulent discharge which readily dries and forms the crusts. These are retained in the nasal passages and, undergoing decomposition, give rise to the excessively offensive odour whence the disease derives its synonym of ozæna. The odour is of a peculiar, sickening character, and when once it has been experienced it can readily be recognised again. Fortunately for the patient, the sense of smell is early lost in atrophic rhinitis, so that he is in happy ignorance of the disgusting smell emitted from his nostrils. At the menstrual periods ‡ there is generally a great increase in the severity of the symptoms, and cases which, under treatment,

* *Transactions International Medical Congress* 1881, vol. iii., p. 312.
† *Journal of Laryngology*, vol. i., p. 57.
‡ Trousseau, *Clinical Lectures, Sydenham Society*, vol. iii., p. 62.

have become free for a time from smell, may again be offensive. After twenty, the odour usually lessens, and it may entirely disappear in old age.

In some cases of ozæna it will be found that there is a double source of the fœtor of the breath, *i.e.*, that it proceeds both from the nostrils and also from the trachea.* The tracheal condition is secondary to the rhinitis, but when once it has started it may continue independently. The diagnosis of tracheal ozæna rests on the expectoration of greenish, thick, viscous pellets, having the odour of ozæna, occurring especially in the morning; the persistence of fœtor of the breath after the nostrils have been thoroughly disinfected; and, finally, on the fact that the air exhaled by the mouth is as fœtid as that from the nostrils.

The dry condition of the nose in atrophic rhinitis causes it to be irritable, so that the patient is inclined to pick or scratch the interior, and thus cause excoriation of the mucous membrane and slight hæmorrhage. Indeed, the constant introduction of the finger up the nostrils may give rise to a perforation in the septum, the tissues being already thinned by the disease itself. In consequence of the dilated and dry condition of the nasal passages the inspired air does not get filtered, warmed, and moistened, so that pharyngeal, laryngeal, and bronchial catarrh are frequently met with in patients afflicted with this disease. One of the most troublesome symptoms is the hacking cough produced by the dry condition of the pharynx, and the hawking induced by the patient's attempt to dislodge the dry crusts which adhere to the naso-pharynx.

Ear and eye troubles are frequently met with in cases of atrophic rhinitis. Among the former are to be mentioned acute and chronic catarrh of the middle ear and tinnitus; among the latter, ulcer of the cornea with hypopion and

* Luc, *Journal of Laryngology*, vol. ii., p. 246.

conjunctival catarrh. Many reflex symptoms also occur in the course of the disease, such as paræsthesia of the pharynx and larynx, headache, neuralgia, giddiness, etc. I am inclined to believe that dyspeptic symptoms are sometimes due to ozæna; at all events, I have seen great improvement in the digestive system after methodical treatment of the nose.

From constantly dwelling on the nasal trouble, patients sometimes become depressed in spirits, and melancholia has even been occasionally observed as a consequence of the disease.

Attempts have been made to divide cases of atrophic rhinitis into two classes—the dry and the moist forms;* but I do not think that any advantage is gained by this subdivision. At one time, dry crusts will be found, and at another time there will be a puriform discharge from the nose. The condition of the atmosphere has some effect on the nature of the secretion. The appearance of a patient suffering from atrophic rhinitis is very suggestive, the nose being depressed at the bridge, giving rise to the condition termed saddle-back, and the tip turned up, showing the nostrils, which are unusually dilated.

By anterior rhinoscopy in a typical case the nostrils will be seen filled with dry crusts, consisting of inspissated muco-pus, and stinking abominably. When these have been removed, the cavity of the nose will be found greatly dilated, so that it may even be possible to see the posterior wall of the pharynx. The mucous membrane is usually pale, but sometimes it is slightly reddened. Distinct ulceration is unusual, though the detachment of the crusts may give rise to a little bleeding; there is frequently, however, on the middle turbinated body an excoriated patch.

* Fournié, *Transactions International Medical Congress* 1881, vol. iii., p. 307.

If the cartilages and bones are necrosed, the case can no longer be regarded as one of genuine atrophic rhinitis. The turbinated bones may be so atrophied as hardly to project into the cavity, or the turbinals on one side may be swollen and red, whilst on the other they are atrophied; or the anterior part of the inferior turbinal may be tumefied, and the posterior part atrophied, and *vice versâ*.

By posterior rhinoscopy a similar condition of atrophy can be recognised, and the posterior nares may be found occluded with dry crusts. The pharynx is dry and glistening, or covered with adherent mucus, which in towns is usually black from soot or other impurities in the air, the capacious nostrils having failed to arrest them. A dry, glazed state of the pharynx, or the presence of adherent mucus, should suggest the idea of atrophic rhinitis.

Diagnosis.—The diagnosis of atrophic rhinitis is seldom a matter of any difficulty; the characteristic stench emitted by the patient and the dilated nasal passages, with dry crusts of mucus, are not present in other diseases. Suppuration in the antrum might possibly be mistaken for atrophic rhinitis; but in this condition the discharge is usually confined to one nostril, and, as Christopher Heath* points out, "the offensive smell is perceived only by the patient, and not by his friends, the reverse being the case in ozæna; and, again, the discharge is only occasional, is determined by the position of the head, and is simply purulent, whereas in ozæna the discharge is constant, and mixed with offensive crusts of the nasal cavities." Syphilitic disease of the nasal passages might be mistaken for atrophic rhinitis, but in this case the discharge has not the characteristic smell of the latter disease, and manifestly depends upon ulceration of the mucous membrane and necrosis of the subjacent bone. Moreover, the ready manner in which

* *British Medical Journal* 1887, vol. i., p. 1259.

it usually yields to treatment will assist, if there be any doubt, in the diagnosis.

It is hardly necessary to give a warning against confounding the fœtid discharge due to the presence of a foreign body in the nostril with atrophic rhinitis. I have, however, seen a rhinolith, producing a fœtid discharge, mistaken for ozæna. As it is often impossible to get any history of the introduction of a foreign body, the diagnosis must rest upon a careful rhinoscopic examination.

Prognosis.—Though atrophic rhinitis does not in any way threaten life, it may make it almost unendurable, and prevent the sufferer from being able to gain his livelihood on account of the nuisance he is to all around him. Schech * speaks of the prognosis as being absolutely hopeless, and Fraenkel † avows that a cured ozæna is unknown to him. Others maintain that a cure is possible in children, and Noquet thinks that the atrophic mucous membrane may even be regenerated! I am in the habit of telling patients that, though a complete cure is not to be expected, if they will only take the necessary trouble the disease will be robbed of its worst features. As already mentioned, the smell usually lessens after twenty, and may disappear entirely in old age.

Treatment.—Whatever view be taken as to the origin of chronic atrophic rhinitis, too much stress cannot be laid on the importance of prompt treatment of nasal affections in childhood, so as to prevent, if possible, the onset of the changes which give rise to this disease.

Though local treatment is all-important in atrophic rhinitis, it is well before commencing it to see if there be any underlying general condition of ill-health which needs correction. If anæmia be present, the combination

* *Op. cit.*

† *Transactions International Medical Congress* 1881, vol. iii., p. 316.

of ammonio-citrate of iron with arsenical solution (formula No. 19), given thrice daily, exercises a beneficial effect. If there be any tendency to phthisis, cod-liver oil should be administered. The iodides do not seem to have any good effect in the ozæna due to atrophic rhinitis. The essential point in the local treatment is the thorough cleansing of the nasal cavities. This may be effected in three ways :—(1) by means of the douche ; (2) by the use of the anterior and posterior syringe ; (3) by spraying. At one time, I used the douche almost exclusively, but of late years I have entirely given it up. Several cases of otitis media, due to the fluid passing up the Eustachian tube while the douche was in operation, have been recorded, and though I had had no personal experience of this accident, this was one of the reasons which induced me to discontinue this form of treatment. If the douche is employed, the rules laid down by Dessar * should be carefully observed :—

"1. The handkerchief should not be used for at least ten minutes after douching, inasmuch as, in blowing the nose, any fluid remaining in the nasal passages may, by a Valsalva action, be forced into the Eustachian tube.

"2. After douching, it is advisable for the patient to remain indoors, so as to avoid exposure to the cold air.

"3. During the proceeding, the patient should not be disturbed or excited, as this may give rise to an involuntary attack of sneezing, coughing, or swallowing, and thus render it possible for fluids to enter the middle ear.

"4. Before beginning the douching, a careful examination should be made to see whether both nostrils are free. If one of them is found to be obstructed, the douche should be used on the affected side.

"5. Plain water should never be used for douching, as

* *International Journal of Surgery* May 1892, p. 117.

it loosens the nasal epithelium. The addition of a small amount of sodium chloride prevents this action.

"6. Concentrated solutions should never be used as a douche.

"7. It is not advisable to douche the nose more than three times daily, as a rule; its application morning and evening is sufficient.

"8. The quantity of fluid introduced should not exceed ten ounces, the average amount varying from five to ten ounces.

"9. The fluid should always be *lukewarm*."

Pins' modification of the douche* is free from the objections raised against the ordinary form. It resembles a chemical washing bottle. To the shorter tube, which does not quite reach to the level of the fluid, an india-rubber nozzle is attached, which the patient takes between his lips. The second tube passes down to the bottom of the flask, and at the upper end there is a bulbous termination for introduction into the nostril. A forcible expiration drives the fluid into the nasal passages.

The anterior or posterior syringe answers fairly well in the less severe forms of the disease; but where crusts have collected on the sides and roof of the nasal passages, the only effectual method of washing them away is by means of a spray, emitted with considerable force from the apparatus. Those who prefer the douche or the syringe may use Dobell's solution (formula No. 54). Bayer,† however, states that carbolic acid is not to be recommended locally, because it often completely destroys the power of smelling in those cases in which it has been preserved. Chlorate of potassium, or liquor potassii permanganatis may be substituted for the borax. Great care should be taken that the solution used should be of a suitable temperature.

* *Centralblatt*, vol. vii., p. 424.

† *Transactions International Medical Congress* 1881, vol. iii., p. 314.

I have found "listerine," an American preparation containing thyme, eucalyptus, and other essential oils, together with benzo-boracic acid, a most serviceable and pleasant disinfectant. It may be conveniently employed in Dobell's solution, instead of the glycerine of carbolic acid, in proportion of one or two of listerine to ten of the lotion. As, on account of the chronicity of the disease, the employment of expensive drugs, or any drugs at all for the matter of that, is a question of serious consideration to people of limited means, it is often necessary to use the cheapest preparations. For this purpose, common salt, 2 drachms in half a pint of water, or chlorate of potassium 1 drachm, or liq. potass. perm. 1 drachm in same amount of water, will be found very useful (formula No. 56).

My mode of treatment is first to soften and loosen the crusts as much as possible with a simple saline spray (formula No. 52). If, on rhinoscopic examination, hardened masses still adhere to the mucous membrane, they may be cautiously removed by means of the nasal forceps, or of cotton-wool on a holder, or by the use of the anterior or posterior nasal syringe. The patient should be told to use the spray at least night and morning—sometimes three times a day may be necessary—and to come again in a week's time. If, on the second interview, the nostrils are found to be free from crusts and fairly sweet, the patient is to be directed to continue the same treatment. If crusts are again met with, they should be removed as on the first occasion. The simple saline spray may be continued for some weeks, and if there is no evidence of distinct improvement it will be well to make a change. The addition of listerine to the alkaline spray is useful in diminishing the fœtor from the nose, and acting as a mild stimulant. If a more powerful disinfectant is required, Dobell's solution may be used, and the amount of carbolic acid increased if necessary ; also

weak solutions, 2 to 5 grains of sulphate of zinc, alum, or nitrate of silver, or 5 grains of resorcin in an ounce of water, will at times be found useful. The permanganate of potassium formula or creolin, 1 to 500 up to 1 to 100, is useful as a change. A 10 to 15 per cent. solution of the peroxide of hydrogen has been highly recommended. After thorough cleansing of the nostrils insufflation may be employed. For this purpose I have used iodoform, iodol, or boric acid. Recently, aristol (the iodide of thymol) has been much praised. Loewenstein * makes use of it as an insufflation, or paints on the surface of the mucous membrane a mixture of 1 part of aristol in 10 of flexible collodion.

An oily solution of menthol (10 to 20 per cent.) may be poured into the nostril, and allowed to run into the throat.

Sidlo † has obtained great benefit from daily syringing out the nose with a 2 per cent. solution of chlorate of potassium, with 10 per cent. of glycerine; cotton-wool soaked in a 25 per cent. solution of glycerine in water is introduced once or twice a day, and allowed to remain for an hour.

A spray of thymol in alcohol, glycerine and water (formula No. 43), used two or three times a week, and followed by fluid cosmoline in an atomiser (Fig. 13), has answered well. ‡

Ruault § recommends the following method of treatment:—

The nostrils are to be washed out with a solution of bicarbonate of sodium. They are then to be painted with naphthol-camphor, which consists of 1 part of naphthol to 2 of camphor, with a variable quantity of fluid vaseline, according to the sensitiveness of the patient. The drying

* *Lancet* 1890, vol. ii., p. 38.
† *Ibid* 1889, vol. i., p. 549.
‡ *Sajous' Annual* 1888, vol. iii., p. 258.
§ *Archives de Laryngologie*, December 1887.

of the mucous membrane is prevented by frequently spraying the nostrils with fluid vaseline, with the addition of naphthol-camphor (1 to 10,000 up to 1 to 1000). Later on, to replace washing out by means of inhalation of vapour benzoini.

After thoroughly spraying out the nasal cavities, I have found smearing the interior with oil of eucalyptus and vaseline (formula No. 31) serviceable, as it appears to prevent the mucous membrane becoming dry. The vaseline should be warmed and applied by means of a camel-hair

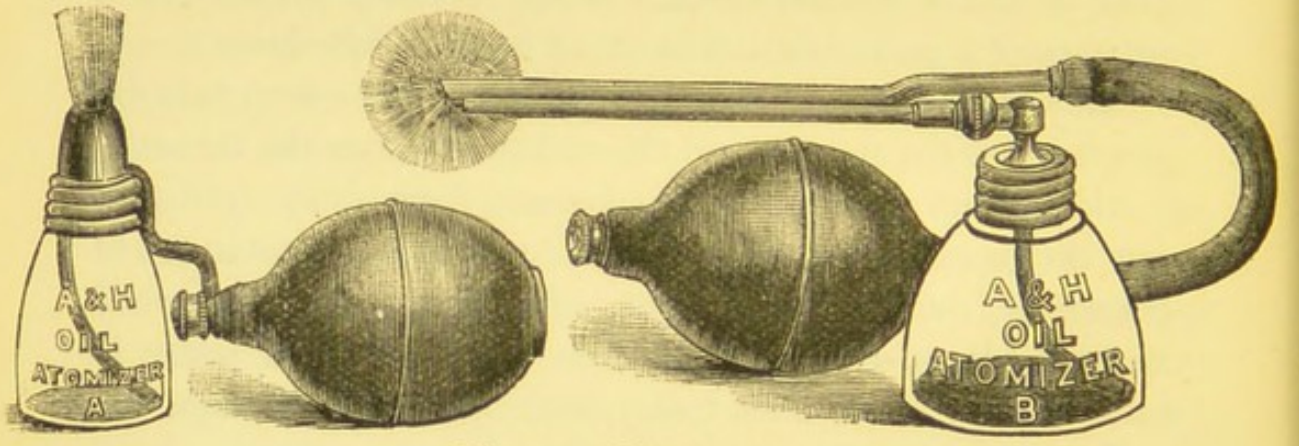


Fig. 13.—Oil Atomisers.
A For Naso-pharyngeal use. B. For Post-nasal use.

brush. Another plan is to spray out the nostrils with one of the liquid paraffins, *e.g.*, paroleine.

In intractable cases, Gottstein's tampon is very useful. To obtain the best effect, the plug of cotton-wool should be in contact with the whole of the interior of the nostril. The plug acts as a stimulant to the mucous membrane, and so keeps up a certain amount of watery discharge, thereby preventing the formation of crusts. The tampons may be soaked in equal parts of balsam of Peru and glycerine, and be left in the nostrils for some hours, and after their removal sozoiodol may be insufflated.*

* *Centralblatt*, vol. vii., p. 48.

But whatever be the medicament applied to the nostril, it must be distinctly understood that it is not so much the particular drug employed, as the thoroughness with which the process is carried out, which conduces to the cure of the disease. Again, it is very desirable to ring the changes on the solutions employed.

Applications in the form of snuffs to promote secretion are of occasional service. They should only be used after thorough cleansing of the passages. Bosworth recommends galanga or sanguinaria (*see* formulæ 48 and 49). If there be any truth in Berliner's view (see p. 25), contact between the middle turbinal and the septum should be prevented. This may be effected either by the introduction of laminaria tents or by removing the projecting part of the turbinal. Robertson * insists on the importance of opening the antrum and douching it regularly until the ostium maxillare is freely patent. As soon as this is effected "the progress towards cure of the ozæna becomes more rapid."

The galvanic cautery at a dull red heat may be cautiously applied to the mucous membrane with beneficial effects in rare cases; but there are no very clear indications for its employment, and it may do great harm. Bryson Delavan,† of New York, recommends the employment of the galvanic current in the following manner:—The positive pole of a constant current battery being applied to the nape of the neck by means of a flat sponge electrode, the negative pole is applied directly to the nasal mucous membrane by means of a piece of common copper wire, around which has been loosely wrapped a pledget of absorbent cotton, saturated with lukewarm water. The strength of the current should range between four and seven milliampères, and the sitting last until the irritation caused by the current has been

* *Lancet* 1893, vol. i., p. 984.

† *Sajous' Annual* 1888, vol. iii., p. 257.

sufficient to provoke a slight watery discharge, usually from five to ten minutes. The list of drugs, and methods of treatment, is a lengthy one; the very number being a proof that there is no specific form of treatment for chronic atrophic rhinitis.

7. MEMBRANOUS RHINITIS.

*Fibrinous or Croupous Rhinitis.**

A form of inflammation of the nasal mucous membrane, accompanied by the formation of a membranous exudation on its surface.

Ætiology.—Two forms of croupous rhinitis occur—one in which the nasal mucous membrane is primarily attacked, and the other in which the nasal affection is secondary to the formation of false membranes on other mucous surfaces. The secondary variety (apart from diphtheritic cases) is extremely rare. Seifert † has recorded a case in which, after an attack of pneumonia, plastic bronchitis developed, and, later on, false membranes formed in the nasal passages. The remarks which follow apply only to the primary variety.

Primary croupous rhinitis is essentially an affection of early life. Of twenty-six cases collected by Raulin, three occurred during adolescence and three in adults, the remaining twenty in infancy and childhood. The disease usually appears without any exciting cause being discoverable. In a case recorded by Hunt, it came on as the result, apparently, of an ordinary cold. The use of the galvano-cautery in the nostrils is occasionally followed by a membranous exudation, which, however, is limited to the cauterised surface.

* See admirable and exhaustive article by Raulin, *Revue de Laryngologie, d'Otologie et de Rhinologie*, May 1890.

† Quoted by Raulin, pp. 295 and 302.

Primary croupous rhinitis is a rare disease; the cases occur sporadically, and it does not appear to be contagious.

Morbid Anatomy and Pathology.—The exudation resembles in many respects that seen in diphtheria. It is of a white colour, more or less firmly adherent to the subjacent mucous membrane, and when removed a bleeding surface is left. Occasionally, however, the membrane is loosely attached, and can consequently be removed without causing bleeding. The exudation is limited to the nasal mucous membrane, and the pharynx does not show any signs of disturbance. In Hunt's case, however, a similar exudation occurred on the tonsils. Microscopically, the membrane is found to consist of fibrin, entangling in its meshes leucocytes, epithelial cells, and a few micro-organisms.

By some authorities, the staphylococcus pyogenes aureus has been deemed the cause of the disease. Lieven * says that, though the coccus resembles the staphylococcus pyogenes aureus, it is distinguished from the latter by its extraordinarily quick growth, and by the duration of its power of infection.

Symptoms.—The attack begins like an ordinary cold, the nostril quickly becomes blocked, and the patients frequently complain of severe frontal headache. The real nature of the attack is only recognised by the expulsion of membranous shreds from the nose or by a rhinoscopic examination. The secretion is more abundant than in acute rhinitis; it becomes muco-purulent and somewhat fœtid, and causes excoriation of the upper lip. The septum and the inferior and middle turbinals are the favourite seat of the membrane, but it may occur on any part of the pituitary membrane. Potter † lays stress on the fact that

* *Centralblatt*, vol. ix., p. 117.

† *Journal of Laryngology*, vol. iii., p. 89.

in these cases cocaine does not exercise its usual power in contracting the tissues.

Diagnosis.—The great difficulty is to distinguish these cases from diphtheria. In the latter, however, the constitutional symptoms are more marked, and they may be of an adynamic character. The exudation is not confined to the nares, but appears also on the soft palate and fauces. The glands of the neck are enlarged, there is usually albumen in the urine, and there may be paralytic sequelæ. All these conditions are absent in the disease in question. Moreover, diphtheria occurs in epidemics, whereas croupous rhinitis is a sporadic affection. Lastly, a bacteriological examination will clinch the diagnosis.

Prognosis.—In the newly-born, membranous rhinitis, by causing nasal stenosis, may prevent suckling, and hence endanger the life of the small patient. Except in very early life, it is an affection free from danger, but somewhat tedious. When the disease exists in combination with a membranous exudation on other parts of the respiratory track—the *secondary form*—the outlook is very grave.

Treatment.—The expulsion of the false membranes should be accelerated by alkaline and antiseptic sprays, Nos. 52 to 55. The membranes should not be forcibly removed by forceps or other instruments. The mucous membrane may be painted with a mixture of papain and lactic acid (formula No. 41), as recommended for diphtheria. Moure advises that the nostrils be swabbed out with a solution composed of two parts of lactic acid, three of carbolic acid, and thirty of glycerine. All caustic applications should be avoided. Tampons of cotton-wool soaked in an oily solution of menthol, and insufflation of iodol or iodoform, have been recommended.

8. CASEOUS RHINITIS.

This affection has also been termed cholesteomatous rhinitis. It is not to be regarded as a distinct disease, but as the result of the necrobiosis of mucous polypi. According to Cozzolino, scrofula is an important etiological factor in the production of this condition. The nasal passages are occupied by a cheesy mass, which, in some cases, has a very unpleasant odour.

Treatment.—Removal of the polypi and persevering use of antiseptic sprays will usually cure the affection. Wagnier * insists on the superiority of insufflations of air in dislodging the caseous masses.

9. NASAL REFLEXES.

It is well known that if the nasal mucous membrane be irritated, be it by cold, dust, or otherwise, an attack of sneezing may result, *i.e.*, irritation of the nerve ends of the trifacial is transmitted along its fibres to the reflex centre for sneezing in the medulla, and thence conveyed to the motor fibres of the expiratory muscles. This is the ordinary physiological nasal reflex, the term reflex being applied to any generation of nerve force which occurs as a consequence of an impression received by a nerve centre.†

According to Hack's original observation, a distended condition of the cavernous tissue of the anterior part of the inferior turbinal may lead to numerous reflex affections; later on, he somewhat modified this view by extending to the central portion of the anterior turbinal and to the middle turbinal the property of setting free the reflex

* *Sajous' Annual* 1891, vol. iv., D. 4.

† Flint. Quoted by Bosworth, *Diseases of Nose and Naso-pharynx*, p. 187.

neurosis. Although Hack erred in attributing to altered conditions of the turbinals too great a *rôle* in the causation of various affections occurring even in remote organs of the body, the result of recent observation has been to show that his investigations afford the clue to the interpretation of some facts which were before involved in obscurity. Among the affections which have been attributed to a reflex nasal neurosis may be mentioned the following*: hay-fever, paroxysmal sneezing, and coryza. The connection between these and an irritable condition of the nasal mucous membrane is obvious. Asthma, nightmare (regarded by Hack as an incomplete attack of asthma), cough, and dyspnœa, exophthalmic goitre,† palpitation and other forms of cardiac neurosis,‡ spasm and paresis of the larynx, spasm of the œsophagus, and vomiting; various affections of the nervous system, *e.g.*, neuralgia, migraine, supra- and infra-orbital headache, vertigo, epilepsy,§ chorea, stammering, and aprosexia (see p. 60). Among eye affections,‖ cases of keratitis, conjunctivitis, imperfect vision, glaucoma, lachrymation, and blepharospasm. Redness of the face and nose, and acne, have been observed.

Cases of cure of the above-mentioned affections by treatment directed exclusively to the nose have been reported by observers worthy of confidence. Kjellman,¶ for example, has collected fifteen cases of epileptiform convulsions, which ceased after the cure of the following pathological conditions of the nasal cavities: polypi, foreign bodies, and swelling of the mucous membrane of

* *Sajous' Annual* 1889, vol. iv., D. 28, gives a detailed account.

† *St. Bartholomew's Hospital Reports*, vol. xxviii., p. 28, and *Clinical Society's Transactions*, vol. xxii., p. 233.

‡ Von Stein, *Journal of Laryngology*, vol. iv., p. 95.

§ Schneider, *Ibid.*, p. 23.

‖ C. H. Moore, *Ibid.*, p. 95.

¶ *British Medical Journal* 18 3, vol. i., epitome No. 489.

the turbinals. From my own personal experience, however, I can only corroborate these statements in so far as they refer to hay-fever, paroxysmal sneezing, and asthma.

According to Hack, the swelling of the cavernous tissue of the inferior turbinals is a necessary link in the chain of the reflex process for numerous diseases, and if it be annihilated the reflex can no longer occur. If this were indeed the case, the nose would have to take the place so long occupied by the uterus, and the diagnosis and treatment of disease would be much facilitated. However, it is clear that Hack erred in two directions. In the first place, the cavernous tissue of the turbinals only represents a part of the exciting cause of the reflex. Other observers have pointed out that changes in the mucous membrane of any part of the nose, and even atrophic rhinitis or polypi, may be the starting-point of the reflex. Secondly, he attributed too important a *rôle* to the nose; and the tendency at the present time, amongst thoughtful practitioners, is to restrict within somewhat narrow limits their views as to the action of nasal affections in producing diseases of remote organs. Thus, while recognising the nose as the possible starting-point of a reflex, giving rise to pathological manifestations in some part of the body, either near or distant, it should not be considered a probable cause; only after other more likely causes have been carefully excluded should it be decided that the nose may be the seat of origin. Moreover, as Gottstein * has pointed out, we frequently find enlargement of the turbinals in persons who have no nasal symptoms, and it follows as a natural consequence that in persons who have some neurotic affection, a similar enlargement may exist without being of pathological importance. In this respect I fully agree with the

* *Transactions of International Medical Congress at Copenhagen.*

following remarks:* "It is not necessary to conclude that the neurasthenic owes his nervous symptoms to the presence of intra-nasal 'spurs,' 'deflections,' 'hypertrophies,' and the like, or that they have necessarily anything at all to do with his condition. It seems to us that to draw the attention of such a patient off general treatment, and to concentrate it upon one organ, even if that be only the nose, is to put him in a worse condition than when we started." With regard to the pains in the head occurring in diseases of the nose and naso-pharynx, it is hardly necessary to invoke the aid of the reflex theory to explain them, as they may be regarded simply as a radiation of the pains originating in the cavities just mentioned.

Bosworth, while believing in the existence of reflex nasal neuroses, is of opinion that the theory has been carried too far, and that many of the so-called reflex neuroses are really due to a disturbance of the normal physiological relation which exists between the nasal cavity and the lower air passages. Hopmann,† also, is of the opinion that the majority of the ocular affections accompanying intra-nasal disease are not exclusively of the nature of reflex neuroses, but that direct propagation of inflammatory nasal processes is a factor in their production. Moreover, Bresgen ‡ and others have ascribed the changes in the skin of the face met with in some cases of nasal disease, to venous congestion caused by the obstruction in the nose. The so-called nasal cough, instead of being of reflex origin, may in some instances be due to secretion falling into the larynx from the posterior nares.§

As regards the lesions met with in the nose, which may

* *Journal of Laryngology*, vol. iv., p. 234.

† Quoted by Semon, *Clinical Society's Transactions*, vol. xxii., p. 233.

‡ McBride, *British Medical Journal* 1887, vol. i., p. 205.

§ *Ibid.*

serve as the starting-point of a reflex neurosis, the most common is certainly a puffy condition of the inferior turbinals, especially if the swollen turbinal touches the septum; but hypertrophy of any part may act in the same way. Atrophic rhinitis, in rare cases, is the only lesion found to explain the occurrence of a reflex neurosis. As has been already mentioned, the presence of polypi may produce asthma, and may also give rise to other neuroses.

Spurs, deviations of septum, adenoid vegetations—in fact, almost any abnormal condition of the nose—may stand in the relation of cause to the reflex.

Voltolini * has pointed out that in cases in which asthma has existed sufficiently long to give rise to emphysema, the removal of the polypi will not cure the asthma.

Treatment.—The more I have seen of treatment directed against the nasal condition supposed to be at the bottom of certain neuroses, the more convinced am I that it is impossible to predicate, in any given case, whether the line of treatment suggested will benefit the patient. This being the case, it is manifestly our duty, as Semon pointed out in the discussion on this subject at the Copenhagen Congress, to lay before the patient, at the commencement of the treatment, the position of affairs, so that he may clearly understand that the procedure is more or less of the nature of an experiment. At the same time, he may be assured that the risk of doing any damage is very small, and that cocaine practically abolishes pain.

Occasionally, however, intra-nasal treatment has had an undesirable effect. Semon,† for instance, has recorded a case of "unilateral, incomplete Graves's Disease," which came on in a patient from whose nostrils he had removed

* *Journal of Laryngology*, vol. iv., p. 102.

† *Clinical Society Transactions*, vol. xxii., p. 233.

polypi. Laurent * has reported the case of a man in whom slight hypertrophy of the turbinals had given rise to a certain degree of oppression. The swelling was removed by eight applications of the thermo-cautery and chromic acid. As the oppression increased instead of lessening, Laurent was of opinion that cicatrices produced by the cauterisations irritated the terminal filaments of the tri-geminal. Cases of otitis media, meningitis, and death, have followed the use of the galvano-cautery (see p. 18). If, after the matter has been placed clearly before him, the patient is anxious that surgical measures should be taken, then any abnormal conditions of the nose, such as hypertrophic rhinitis, deflection and spurs of the septum, polypi, etc., should receive appropriate treatment. While, however, the local condition is being attended to, the general health of the patient should not be neglected, and it is in this respect that the risk of a too exclusive specialism comes into play.

10. VASO-MOTOR RHINITIS AND HAY-FEVER.

By the term vaso-motor rhinitis is meant the sudden swelling of the nasal mucous membrane, brought about by vaso-motor paralysis, due to psychical, mechanical, or other causes. Accompanying this condition are found sneezing and profuse watery discharge.

Under this head are included cases of hay-fever, due to the irritation of the pollen of grasses, cases of paroxysmal sneezing and coryza, due to the action of other irritants, and cases of psychical origin, *i.e.*, the result of some mental influence, and quite independent of any mechanical irritation of the nasal mucous membrane. As hay-fever is the chief representative of the class, it will be convenient to

* *Revue de Laryngologie, d'Otologie, et de Rhinologie*, December 1890, p. 774.

point out its principal features, adding a few remarks on the other varieties.

The result of the attention that has been paid to the pathology of hay-fever in recent years is to clearly establish that persons of a neurotic constitution, in whom there exists some abnormality in the nasal mucous membrane, or even in the conjunctiva, may, as the result of exposure to certain irritant particles, (which vary according to the idiosyncrasy of the individual,) show all the symptoms which are usually included under the designation of hay-fever. The combination of these three factors being required explains the fact that, though thousands are exposed to sources of irritation, such as the pollen of certain grasses, only an exceedingly small number suffer any inconvenience. Bosworth * has pointed out that hay-fever and asthma are intimately connected; for it is well known that a large number of hay-fever patients suffer from asthma, following soon after the onset of their nasal symptoms. He therefore divides cases of asthma into hay asthma and perennial asthma; the latter occurring without reference to seasons, and without the coryza of hay-fever. He advocates the view that, like hay-fever, asthma is also dependent on three conditions—(1) a general neurotic condition; (2) a diseased condition of the nasal mucous membrane; (3) some obscure condition of the atmosphere exciting the paroxysms. In his opinion, the connection between nasal diseases and asthma is of so intimate a nature, that a sufficient cause for the asthmatic attack may be found in the nose in every single instance; and he states that in few instances has he failed to give marked relief by treatment entirely confined to the nasal passages.† Schmiegelow's ‡ statistics show that

* *Diseases of Nose and Naso-pharynx*, p. 237.

† *New York Medical Journal*, April 24th and May 1st, 1886.

‡ *Asthma considered Especially in Relation to Nasal Disease*, p. 60.

amongst 514 patients treated for chronic rhinitis, 40 had asthmatic attacks (about 8 per cent.), and amongst 139 cases of nasal polypi, 31 had asthma (about 22 per cent.). These figures are sufficient to lead to the nose being carefully examined in all cases of asthma.

Ætiology.—In every case of hay-fever, at least three factors are concerned in the production of an attack—(1) a general nervous constitution of the individual; (2) a local irritability of the conjunctival or nasal mucous membrane; and (3) some direct exciting cause. As regards the first, it is to be noted that the greatest sufferers from hay-fever are the English-speaking peoples*; but it is also met with in other races, though much more rarely. An instance of it occurring in a negro has been recorded. As a rule, the victims are persons belonging to the educated classes,† whereas labourers almost entirely escape. Again, inhabitants of towns are more prone to be attacked than country folk. Men are much more subject to the disease than women; and heredity exercises a powerful influence.

As Bosworth justly remarks, we are indebted to Daly, of Pittsburgh, for the greatest step in advance in the knowledge of the disease, since he was the first to recognise the second factor concerned in the causation of hay-fever, viz., a local irritability of the nasal mucous membrane. Though this irritability of the mucous membrane is most marked in the nose, there are cases in which the conjunctiva seems to be the starting-point of the attack; hence, it is only fair to assume that the conjunctival, as well as the pituitary mucous membrane, may be concerned in the onset of hay-fever. The remaining factor is the direct exciting cause. Careful and prolonged investigation has shown that, in this country at all events, the pollen of certain grasses, more particularly

* Morell Mackenzie, *Hay Fever*, p. 16.

† Blackley, *Hay Fever*, p. 189.

the *Anthoxanthum odoratum*, is the most powerful exciting cause of hay-fever. Blackley * estimated the number of pollen grains present in the air during a stated period by exposing slips of glass, and allowing any solid matter the air may contain to deposit on the glass. "Each slip of glass had a cell formed upon it with black varnish, so as to enclose a space one centimètre square. This square was coated with a thin layer of fluid prepared for the purpose. After being exposed for twenty-four hours, each slip was placed under the microscope, and any deposit it contained was carefully examined, and the number of pollen grains counted." He found, from personal experience, that the presence of the greatest amount of pollen "corresponded tolerably well with the period of the greatest intensity of the disease." † In the United States, the pollen of ragweed is especially active in producing attacks. It is now, however, well known that other sources of irritation, such as dust, or even the perfume from some plants, or the odour of certain animals, are capable of starting an attack in those predisposed to it. Exposure to a bright light may also start it off. Heat aggravates the symptoms of hay-fever. "Just as the hands and feet swell in warm weather, so does the mucous membrane of the nose become congested, and the state of fulness of its vessels powerfully aids the action of all irritants." ‡ Rain, on the other hand, washes the atmosphere, and carries away the irritant particles. In hot, dry weather, such as was prevalent in the summer of 1893, hay-fever is particularly troublesome. Berkhart maintains that the disposition to the "so-called hay-fever" is much greater than is usually admitted, and argues, very ingeniously, that if only a small

* *Hay Fever*, p. 150.
† *Ibid.*, p. 165.
‡ Berkart, *Lancet* 1890, vol. ii., p. 13.

number of those subject to the affection come under notice it is because the disease is rather annoying than distressing. He also points out that the symptoms, being supposed to be due to "cold," are patiently borne as inevitable, and that it is only those whose sense of logic revolts at such a diagnosis, especially if they be acquainted with a certain kind of literature, who substitute for it the theory of hay-fever.*

Morbid Anatomy and Pathology.—The subject of reflex nasal neuroses has already been discussed. It will therefore be sufficient to say that changes in the nasal mucous membrane play a prominent *rôle* in the production of hay-fever; and it has been shown that preternatural irritation of the Schneiderian membrane, from any disease whatever, will render it liable to respond to the effect of influences which would be entirely innocuous if applied to a healthy tissue.

The changes met with in the nose in cases of hay-fever are usually of a hypertrophic character, and constitute the condition known as hypertrophic rhinitis; the whole nasal cavity may be affected, or there may be only a puffy swelling of the inferior or middle turbinated bodies, or a patch of erosion on the mucous membrane. Polypi, deflections of the septum and spurs, have been observed in some cases. In a case of prolonged duration under the care of the writer, all symptoms ceased as soon as a perforation in the septum had taken place, apparently proving that the irritable zone from which the reflex stimulus started was situated on the septum. It will thus be seen that there is no one special form of nasal disease associated with hay-fever, but that it may occur in connection with almost any variety. In some instances it is quite impossible to say that the nasal mucous membrane exhibits any pathological change, and in these cases it seems as if there existed

* *Lancet* 1890, vol. ii., p. 13.

a state of hyperæsthesia, the *hyperæsthetic rhinitis* of Sajous. On touching the interior of the nose with a probe, certain parts of the mucous membrane will be found to be hyperæsthetic, and it may be possible to start an attack of sneezing in this way. Whatever the persisting local changes may be, a paroxysm of hay-fever is invariably accompanied by swelling and engorgement of the cavernous tissue, which forms so important an element of the inferior turbinated body, but which is also present in other parts of the nasal mucous membrane. This swelling is brought about by vaso-motor paralysis. As a consequence of this, there is a rapid exudation of serum into the tissues of the part and upon the surface, giving rise to the profuse watery discharge which is so prominent a feature of hay-fever. The swelling of the membrane leads to nasal obstruction and pressure on the septum, as well as the irritation and pain which are thereby caused.

Symptoms.—The attack may commence with irritation of the conjunctivæ, lachrymation, and an increased secretion from the Meibomian glands; some amount of chemosis is frequently present. There is a feeling of fulness and oppression in the head, pain across the frontal sinuses, and intolerance of light. After an interval of time varying from a few hours to some days, the nasal mucous membrane becomes affected; or, as more generally happens, it is primarily attacked, the affection of the eyes being secondary. In any case, the patient, sooner or later, complains of intense irritation and stuffiness in the nose, and the mucous membrane may swell to such an extent as to render breathing through the nose very difficult, or even impossible. There is also a profuse watery discharge from the nose, with incessant sneezing. In some patients, the sneezing occurs in regular volleys until the patient becomes quite exhausted; or the attacks may follow so rapidly that the patient becomes

cyanosed and even collapsed. The catarrhal condition may also extend up the Eustachian tubes, giving rise to deafness. In some cases, the disease extends down the throat, causing a feeling of dryness and itching in the fauces; and if the bronchial mucous membrane be attacked, there will be cough and a sense of constriction across the chest. Well-marked asthma may accompany an attack such as above described, or it may constitute its chief feature, the symptoms of coryza being less marked.

As regards general symptoms, there may be a slight amount of pyrexia, but it is frequently altogether absent; the pulse is usually somewhat accelerated. The attacks have a depressing influence on the patient generally, and there may be evidences of gastric disturbance. Urticaria is sometimes associated with hay-fever, and herpetic vesicles occasionally occur on the lips.

True hay-fever usually begins at the end of May or the commencement of June, and lasts about five or six weeks, or even longer in severe cases.

Diagnosis.—The catarrhal symptoms which mark the onset of the attack, and the occurrence of violent sneezing after exposure to a source of irritation, (in typical cases the pollen of various grasses,) usually suffice to render the diagnosis easy. The only cases which present any difficulty are those in which symptoms of asthma appear without a previous catarrhal stage; but these may usually be distinguished from ordinary asthma by the fact that the attack occurs by day, and that it can be traced to the inhalation of some irritant or odour.

Prognosis.—The result of the great attention, which has been directed to treatment of the local conditions existing in the nose, has been to remove hay-fever from the list of incurable diseases. In the majority of cases, great relief can be afforded by appropriate local treatment, and in a

certain number a complete cure may even be obtained. The more marked the local mischief, *i.e.*, the greater the amount of swelling of the turbinals present, and the less the neurotic tendency of the individual, so much the greater is the probability of success. The indications pointing to the probability of success in any given case are, however, too uncertain to allow of a definite opinion being expressed as to the ultimate result of the treatment. It is well therefore to explain to every patient, before commencing local treatment, that this must of necessity be looked upon as more or less of the nature of an experiment.

Treatment.—Bearing in mind the three factors concerned in the production of the disease, it will be desirable, in the first place, to improve the general health of the individual as far as possible; but constitutional treatment, though often very helpful, will not by itself suffice to effect a cure. The severity of many cases is aggravated by the injudicious use of stimulants. Doubtless, the depression produced by the disease would seem to suggest the administration of alcohol in some form or another; but when its action in dilating the arterioles is considered, it will be seen that locally its effect is far from beneficial, to say nothing of the more remote evils that may result from its use. Morell Mackenzie speaks highly of valerianate of zinc in combination with compound asafœtida pill (formula No. 46) given two or three times a day. Tincture of opium in 5- to 10-minim doses, either alone or in combination with the same quantity of the tincture of belladonna, has been highly praised. One medical man reports that $\frac{1}{10}$ of a grain of morphine with $\frac{1}{200}$ of a grain of atropine, administered subcutaneously three times a day, robbed the hay season of its misery so far as he was concerned; but the objections to recommending subcutaneous injections of morphine in chronic illness are so

weighty, that they should only be resorted to as a last resource. Another medical man speaks enthusiastically of his personal experience of succus belladonnæ, ½ drachm being added to 3 ounces of water, and a teaspoonful taken every hour until the symptoms are relieved; the same solution may be used as a lotion for the eyes.

In a case of spasmodic sneezing, under my care, attended with the most profuse flow of watery fluid from the nostrils, the patient is generally able to cut short an attack by putting his feet into mustard and hot water, and taking 5 minims of the liquor morphinæ hydrochloratis with 1 minim of the liquor atropinæ sulphatis every four hours for three or four doses.

Antipyrin in daily doses of 10 to 30 grains, or antifebrin in doses of 4 to 10 grains daily, may be employed, and they will often give great relief. Bromide of potassium in combination with Fowler's solution (formula No. 22) is useful in allaying the nervous erethism met with in hay-fever, while at the same time the arsenic has a tonic effect.

The second point to be considered is the removal of the patient from the exciting cause of the paroxysm, or, if this cannot be done, an endeavour should be made to protect him from it as far as possible. Many persons who suffer severely in the country are almost free at the seaside, and a sea voyage has a still better effect. But if the individual cannot escape from the country, he should be instructed to wear out-of-doors "goggles" with pale-blue glasses, and a blue silk veil of double thickness over the face. He should take things as quietly as possible, and exertion in the sun should especially be avoided. On the least suspicion of the complaint commencing, he should bathe the conjunctivæ with a solution of corrosive sublimate 1 in 3000, and the same solution may be

cautiously sprayed up the nostrils. Plugging the nostrils with tampons of cotton-wool soaked in glycerine is very useful in some cases.

Lastly, the greatest care should be taken to examine the nasal passages with the view of discovering any departures from the normal condition which may exist in them. If a puffy swelling of the turbinated bodies exist, or the mucous membrane be hypertrophied, the use of the galvano-cautery can be highly recommended. The surface is first rendered anæsthetic by dabbing it with a 20 per cent. solution of cocaine. After an interval of five minutes, the cocaine may, if necessary, be applied a second time. The galvano-caustic blade should then be drawn along the mucous membrane so as to score it freely, or the fine point may be passed into the tissue in several places. Whichever plan be adopted, as healing occurs contraction takes place, and the undue sensitiveness of the surface is thereby destroyed.

Should the inferior turbinal be much enlarged, or should there be a spur on, or deviation of, the septum, unless great care is taken an adhesion may form between the septum and the outer wall of the nose, which would greatly aggravate the symptoms. More prominent hypertrophied tissue or polypi may be removed by the galvano-caustic loop. Instead of the galvano-cautery, chromic acid may be employed as described at page 21.

Sajous * has obtained excellent results from applying glacial acetic acid freely over the surface of the turbinated bodies, with one or two light applications of nitric acid. The use of cocaine will cause the treatment to be almost painless. If there be marked deviation of, or spurs on, the septum, and especially if the outer wall is in contact with it, the rectification of these abnormalities by

* *Sajous' Annual* 1888, vol. iii., p. 269.

surgical procedure is absolutely necessary for the cure of the case.

As regards the use of cocaine locally, the expectations which were formed of its efficacy in hay-fever, when the drug was first introduced, have not been realised. Though the immediate effect of the application of a weak solution of cocaine to the nasal mucous membrane is to produce an alleviation of the most distressing symptoms of the disease, the effect soon passes off, and the application has to be renewed. As a result of the dilatation of the blood-vessels, which is the secondary effect of cocaine, the mucous membrane increases in thickness, so that eventually cocaine aggravates the evil it was meant to cure. Moreover, the seductive effect of the drug and the risk of starting the cocaine habit should not be forgotten. A 10 or 20 per cent. solution of menthol dissolved in almond or olive oil, or paroleine, and applied to the nasal mucous membrane, has yielded good results, and has none of the drawbacks of cocaine. Sir Andrew Clark has proposed a plan of treatment by which the irritability of the nasal mucous membrane is exhausted. An ounce of glycerine of carbolic acid, 1 drachm of hydrochlorate of quinine, and a two-thousandth part of perchloride of mercury are made into a solution by the aid of heat, and the interior of the nostrils is freely swabbed out with the mixture. He claims a fair measure of success for this plan—*i.e.*, about half of those whose cases he was able to follow were cured for the season, and four persons were cured "for good." If a more radical treatment be out of question, or be objected to by the patient, anointing the interior of the nose with an ointment consisting of vaseline and oil of eucalyptus, with or without solution of atropine (formula No. 30), as suggested by Lennox Browne, will be found useful. Among

minor remedies which have been found of use in alleviating some of the symptoms of hay-fever may be mentioned carbolized smelling-salts (formula No. 70), the inhalation of benzoin, and a spray of a 25 per cent. solution of rectified spirit.

Morell Mackenzie* has found a solution of acetate of lead the most soothing application to the eyes (formula No. 9). To prevent the excoriation which so frequently occurs, the nostrils and upper lip may be smeared over with ung. zinci or ung. acidi borici.

As it is now generally admitted that asthma may depend upon nasal disease, the importance of examining the nose in all cases of asthma must be borne in mind. It is not desirable to commence with intra-nasal treatment at the outset. The condition of the heart, lungs, kidneys, and other important organs, must be carefully investigated, and the patient's general health improved, as far as possible. If, in spite of these measures, the attacks of asthma persist, and if there exist some definite lesion in the nose, then this should receive appropriate treatment. The exact nature of the rhino-chirurgical treatment employed will, of course, depend upon the nature of the disease; but it must be remembered that persistent and persevering treatment may be required to effect a cure. The more recent the asthma is, and the more marked the nasal affection is, the greater is the prospect of success. In all cases of asthma, however, nasal treatment is an experiment; in cases of long standing, the asthma usually persists in spite of the most vigorous treatment of the nasal lesion, the habit apparently being too strong to be eradicated. Unless there is some distinct morbid change in the nose, treatment directed to this organ almost invariably fails, and it should only be undertaken at the earnest

* *Hay Fever*, p. 46.

request of the patient, when all other methods have failed to give relief.

Should asthmatic attacks occur in the course of hay-fever, the patient may try iodide of potassium (formula No. 26) or citrate of caffeine (formula No. 13); the addition of bromide of potassium diminishes the tendency to insomnia which is produced by caffeine. For the asthmatic paroxysm, I have obtained the best results from nitro-glycerine (formula No. 16), which may be taken every hour for three doses, or the inhalation of the compound lobelia powder (formula No. 50).

11. NASAL STENOSIS.

Under the head of nasal stenosis are included all those conditions of the nose in which there is obstruction, more or less complete, to nasal respiration.

Ætiology.—The causes of the various conditions producing nasal stenosis will be found in the chapters devoted to the individual affections.

Morbid Anatomy and Pathology.—Nasal stenosis may be brought about by alterations in the framework of the nose, bony and cartilaginous, by changes in the mucous membrane, by the presence of new growths, or of rhinoliths and foreign bodies, and, lastly, by affections of the naso-pharyngeal cavity and of the tonsils. The alterations in the bony and cartilaginous framework of the nose producing stenosis, are deflections of the septum and the presence of spurs and crests on the septum; in vaso-motor rhinitis we have to do with a temporary condition of stenosis, whereas in chronic hypertrophic rhinitis the obstruction is more or less permanent; but, even in cases of this disease, vaso-motor action influences the degree of stenosis. All the different varieties of new growths, non-

malignant and malignant, have nasal stenosis for a prominent symptom. In both of the cases of rhinoscleroma reported by Robertson there was complete occlusion of the nares (see p. 99). Sometimes, as the result of operative treatment, adhesion between the inferior turbinal and the septum may occur, and give rise to stenosis. Lastly, the various affections of the naso-pharynx, *i.e.*, enlargement of the pharyngeal tonsil, adenoid vegetations, fibromas, etc., may all cause a marked degree of stenosis. In addition to the causes already mentioned, cases of congenital atresia, which may be unilateral or bilateral, have been recorded. Congenital occlusion of the anterior nares is an extremely rare condition. Jarvis * reports two cases, and states that he has only been able to find one case in the literature of the subject. Occlusion of the posterior nares is much more common. Hubbell,† for example, has found sixteen cases recorded in literature. In some of the cases the occluding wall was comparatively thin, thus rendering operative interference fairly easy. In five of the cases, hearing was perfect. Bony occlusion is occasionally met with,‡ and in a case shown by Cresswell Baber, at a meeting of the Laryngological Society in November 1893, the occlusion was partly bony, partly membranous.

Symptoms.—As the symptoms directly dependent on nasal stenosis are alike, no matter what be the nature of the lesion giving rise to the obstruction, I have deemed it desirable to devote a section to the consideration of this condition, so as to spare the necessity for repetition.

The first thing that strikes the observant physician in looking at a series of young people suffering from nasal stenosis, is their defective development. This is more

* *Annual of Medical Sciences*, 1888, vol. iii., p. 264.
† *Ibid.*, p. 266.
‡ *Centralblatt*, vol. ix., p. 370.

especially the case in a condition which, like adenoid vegetations, dates from early life. The immediate increase in height and weight which follows upon the removal of these growths, is generally very remarkable, and is a striking proof of the deleterious influence exerted on the physical development of the body by defective nasal respiration. Hardly less remarkable is the effect on the patient's mental state. Guye * was one of the first to direct attention to the deficiency of brain-power exhibited by children suffering from adenoid vegetations, and he especially pointed out that there is an inability in these children to concentrate their attention on any given subject. For this condition he has proposed the term *aprosexia* (inability to attend). As a consequence of this, the acquisition of learning is a slow and painful process, and doubtless many a child in the past has been regarded as being of defective intellect, whereas the cause was simply the condition just referred to. Patients suffering from nasal stenosis have frequently a pale appearance. Curtis † has made spectroscopic examinations of the blood, in reference to the amount of oxyhæmoglobin contained before and after operations undertaken for the relief of the stenosis. He has found that after the operation there is a constant increase in the percentage of oxyhæmoglobin contained in the blood, and he is of opinion that this increase is directly proportional to the improvement of the nasal respiration.

If nasal stenosis occur early in life, and if the patient be at the same time rickety, there will be characteristic alterations in the shape of the chest, the so-called pigeon-breast being the result.

Freundenthal ‡ has investigated the relation between

* *Deutsche Med. Wochenschr.*, 1887, No. 43.

† *International Journal of Surgery*, February 1890, p. 26.

‡ *Annual of Medical Sciences* 1889, vol. iv., D. 4.

chronic nasal obstruction and hernia. Out of five hundred patients suffering from hernia, he found that one hundred and forty-three had marked nasal obstruction. He considers that the constant hawking, coughing, etc., increase the abdominal pressure, and thereby tend to produce hernia. Nocturnal enuresis is said to occur more frequently in children with nasal obstruction than in others. Sleep is frequently disturbed and unrefreshing, and nightmare is of common occurrence. Snoring is an almost invariable symptom, and mouth-breathing, with its consequences of granular pharyngitis and laryngeal catarrh, occurs of necessity if the obstruction is at all complete. The nasal twang of the voice is very characteristic, and Matheson * has drawn attention to the occurrence of stammering and stuttering. Scanes Spicer † suggests that nasal stenosis and the consequent mouth-breathing have "some influence, in intensifying many of the proximate factors at work in the production of caries of the teeth." The shape of the face and character of the palate are described in the section on adenoid vegetations. As a result of the retention of the secretions in the antrum, frontal and other sinuses, headache, especially in the frontal region, is frequently complained of, as is also a feeling of weight and stuffiness in the head. Restlessness, twitching, or even convulsions, may occur in children affected with nasal stenosis,‡ and in adults melancholia and hypochondriasis have been noted.

The senses of smell and taste are generally much interfered with. Owing to extension of catarrhal processes to the Eustachian tubes, ear-ache, tinnitus aurium, deafness,

* *British Medical Journal* 1888, vol. ii., p. 487.

† Reprint from *The Transactions of the Odontological Society of Great Britain*, January 1890, p. 31.

‡ Scanes Spicer, *Throat and Nose Affections in Children.*

and otitis media sometimes accompany nasal stenosis. Curiously enough, as I have already pointed out, cases of complete congenital occlusion of the posterior nares have been recorded in which hearing was unimpaired. In a certain number of cases, disease of the lachrymal apparatus has been traced to nasal stenosis.

If one nostril be stenosed and the other dilated, owing to the feeble current of air through the dilated nostril, the secretions tend to be retained, and, undergoing decomposition, give rise to an unpleasant discharge.

Cough, a sense of suffocation, and asthmatic paroxysms, are not unfrequently associated with nasal stenosis.

In the section devoted to adenoid vegetations will be found some other symptoms due to interference with nasal respiration.

Treatment.—The methods of treating the various forms of nasal stenosis are described under the heads of the different diseases giving rise to it.

In cases of congenital occlusion, if the membrane be thin it may be divided by the galvano-cautery. Should it be of dense fibrous tissue or of a bony nature, drills driven by an electro-motor or a dental engine may be employed. When a fair-sized opening has been obtained, it will require to be kept patent by the introduction of hollow rubber bougies, which may have to remain *in situ* for weeks, or even two or three months, as there is a great tendency to contraction.

12. DEVIATIONS, SPURS, AND CRESTS OF THE SEPTUM.

By the term deviation or deflection of the septum is understood the condition in which the septum, instead of being centrally placed and dividing the nose into two main cavities of equal size, inclines to one side or the other,

so as to increase the size of one cavity at the expense of the other. By a spur is meant a rounded or pointed outgrowth, and by a crest is meant an outgrowth extending along the whole or a part of the septum, generally more or less parallel to the inferior turbinal.

Ætiology.—Cases of congenital deviation of the septum have been described; they are, however, quite exceptional, and it is, as a rule, only after the seventh year of age that asymmetry of the nose begins.* Males are more affected than females. Some deviation or other irregularity of the septum is so constantly met with in adult life that even those observers who take a comparatively broad view of the question say that deviations occur in 50 per cent. † of the cases, and some writers state that they occur in 99 per cent. ! ‡ These figures refer to European races. In the lower races, this deformity is much less frequently met with. Thus, according to Zuckerkandl, in 103 non-European crania it was present in only 23.3 per cent.§ Many conditions, and some of them extremely fanciful, have had the credit of producing deflections of the septum. Thus, Mayo Collier, ‖ in an able paper on the subject, enumerates fifteen causes, but points out that only a small minority of this long list has anything to do with the production of this deformity.

Delavan ¶ lays great stress on the fact that the general development of the nasal fossæ is delayed until about the seventh year. Then occurs a period of active growth, when the septum, wedged in between the ethmoid above and the

* Zuckerkandl, *Journal of Laryngology*, vol. v., p. 86.
† Heymann, *Ibid.*, vol. ii., p. 78.
‡ Delavan, *Ibid.*, p. 113.
§ Mackenzie's *Diseases of Throat and Nose*, vol. ii., p. 433.
‖ *Journal of Laryngology*, vol. v., p. 501.
¶ *Annual of Medical Sciences* 1888, vol. iii., p. 272.

hard palate below, bends in the direction of least resistance, thus producing the irregularities so frequently met with. This is especially liable to be the case if there is a diminution in the vertical diameter of the nose, due to a high palate (see p. 154), so that the septum has not sufficient room for its normal growth. Walsham is of opinion that, in the non-traumatic cases, the deviation is the result of defective development of the bones of the face. Rickets has probably some influence in the production of this condition. Enlargement of the turbinals, polypi, and other tumours of the nasal cavities, if of sufficient size to exercise direct pressure on the septum, may cause it to become deflected; but by a long way the most potent cause is traumatism. This is especially the case as regards injuries inflicted in early life, when the parts are soft and pliable. According, however, to Collier, obstruction of one nostril, or obstruction in general, is "the grand, all-efficient, all-powerful, ever-present cause of deflections of the nasal septum." He explains this result by the rarefaction of the air which takes place in the blocked nostril during inspiration. As a consequence of this rarefaction, there must be pressure on the walls of that nostril in direct proportion to the amount of rarefaction. Hence it comes to pass that with each inspiratory act there is pressure of variable amount on the septum, which consequently yields at its weakest point. "The lowered barometric pressure behind the seat of a temporary or permanent stenosis, inevitably present during nasal inspiration, leads, perforce, to overfilling of the blood-vessels, and thus to hyper-nutrition." This explanation of MacDonald's * accounts for the increase in thickness of the structures of the septum.

Morbid Anatomy and Pathology.—Deviations of the septum are practically confined to the anterior two-thirds,

* *Diseases of the Nose*, p. 187.

the posterior third being almost invariably placed centrally. The cartilaginous portion is that which is generally affected.

Malformations of the septum may be arranged in the following groups * :—

1. Simple deviation. With or without thickening, or spurs.
2. Sigmoid deviation in vertical or antero-posterior direction. With or without thickening, or spurs.
3. Zigzag, or irregular deviation.
4. Spurs or crests, without deviation of septum.

In the simple deviation there will be bulging on one side and concavity on the other, the bulging being sometimes increased by the presence of inflammatory thickening. Spurs are more often seen on the concave surface. If there be sigmoid deviation, there will be obstruction in one nostril anteriorly, and in the other posteriorly. In the zigzag variety, the perpendicular plates of the ethmoid and vomer, instead of making a smooth surface with the cartilage, join at different places, giving rise to irregularities.

Bosworth † points out that prominent ridges may occur along sutural lines, viz., the line of junction between the vomer and the palatal process of the superior maxillary bone; the junction of the cartilage of the septum and vomer, ending abruptly at the junction of the upper border of the septal cartilage and vertical plate of ethmoid; or along the whole anterior edge of the vomer, including its union with the cartilage of the septum and the vertical plate of the ethmoid. Walsham ‡ suggests that these ridges are formed in a similar manner to the enlargement of the epiphyses in rickets, and that they may possibly be a manifestation of this diathesis. The spurs are probably

* "Modification of Rosenthal's Classification," *Journal of Laryngology*, vol. iii., p. 104.

† *Journal of Laryngology*, vol. i., p. 189.

‡ *St. Bartholomew's Hospital Reports*, vol. xxiii., p. 126.

the result of a local perichondritis or periostitis. Many of the so-called exostoses are merely cartilaginous excrescences.

Symptoms.—The symptoms produced by deviations and spurs of the septum are those due to obstructed nasal respiration; and, as they are fully described under the head of Nasal Stenosis (p. 59), any further description is unnecessary.

Diagnosis.—Before much attention had been directed to the interior of the nose, spurs and deviations of the septum were commonly regarded as exostoses. More careful examination has shown that the latter are very uncommon. Deviation, with bulging, of the septum, might be mistaken for a growth in the nostril. If ordinary care be taken in making the examination with a suitable mirror and good light, this mistake should not be possible.

Prognosis.—The result of judiciously planned and skilfully executed operations for the relief of deviations and other deformities of the septum is most satisfactory, and patients usually experience great relief as soon as the obstruction is removed.

Treatment.—The discovery of the existence of deviations, spurs, and crests of the septum has led, in many instances, to quite uncalled-for treatment. In no other part of the body have so many attempts been made to improve upon Nature as in the nose. Judging from the writings of some rhinologists, it would seem that in the nose we have the key to the most complex processes, and that the rectification of septal abnormalities would suffice to cure symptoms referred to the most distant organs. Now, however, that the first burst of enthusiasm is over, there is every reason to believe that the opinion of the moderate men will prevail, and that deformities of the septum will not be interfered with unless there are clear grounds for

supposing that surgical interference is absolutely necessary. The indications for operation are formulated by Sedziak* in his able paper as follows: 1. Respiratory troubles; 2. Reflex symptoms; 3. Aural troubles, and consequent difficulty in catheterisation; 4. Interference with the removal of polypi.

The test of sufficiently large nasal passages is ability to sleep at night with the mouth closed. If the patient is unable to do so, and there are respiratory troubles, *i.e.*, tendency to laryngeal and bronchial catarrh, cough, asthmatic attacks, etc., an operation to remove the obstruction is certainly justifiable, and will often yield admirable results. The indications from reflex symptoms are very far from being as clear as those just mentioned. They are certainly more problematical, and an operation should only be undertaken after it has been distinctly put to the patient that the chances of success are, from the nature of the case, somewhat doubtful.

The presence of ear trouble, especially if recent or increasing in severity, would justify an operation; and the same can be said of cases in which abnormalities of the septum interfere with the passage of the Eustachian catheter, or prevent the removal of nasal polypi. In public speakers, barristers, actors, etc., whose living more or less depends upon the condition of the vocal organs, the removal of spurs, etc., may be necessary.

In slight cases of deviation of, or growth from, the septum, it may be possible to improve nasal breathing by treating the hypertrophic rhinitis which frequently accompanies these cases.

It will be convenient to discuss the treatment of spurs and crests before that of deviation of the septum. The methods employed may be arranged under the following

* *Journal of Laryngology*, vol. v., p. 140.

heads: 1. A cutting process, whether by knife, chisel, or gouge; 2. The use of the saw; 3. The use of the trephine; 4. The use of electricity, either in the form of the galvano-cautery or electrolysis.

In all surgical procedures in the nostrils, it is important that they should be thoroughly disinfected before the operation. This may be effected by first spraying them out with an alkaline solution (formula No. 52), and then swabbing them out with a solution of corrosive sublimate, 1 in 2000.

For small outgrowths, cocaine anæsthesia will usually suffice. A 20 per cent. solution should be applied over the surface, and 4 or 5 minims of the solution injected with a Pravaz syringe into the mucous membrane over the spot to be operated on. One of two methods may be employed: either the projecting part of the cartilage may be shaved off, together with the mucous membrane, or a flap of mucous membrane may be raised, and then the outgrowth may be shaved off. Iodoform should be insufflated, and the nose carefully plugged with iodoform gauze, and left untouched for three or four days. Should the hæmorrhage, as is frequently the case, be profuse, the nostril should be syringed out with water at a temperature of 110° Fahr. (See p. 120.) Should the outgrowth be hard, or large enough to require the use of the gouge or chisel, general anæsthesia will be necessary.

Bosworth * is a great advocate of the saw, and he recommends cutting away the projecting spurs "as one would saw a board from a log." A very convenient nasal saw (Fig. 14) has been invented by Hunter Mackenzie; it is so contrived that, by altering the blade in the handle, it will cut upwards or downwards.

The trephine may be attached to an ordinary dental

* *Diseases of Nose and Throat*, vol. i., p. 303.

engine or to an electro-motor. Bronner* recommends that the external wall of the nostril should be drawn outwards with a Jurasz (Fig. 15) or modified Loewenberg

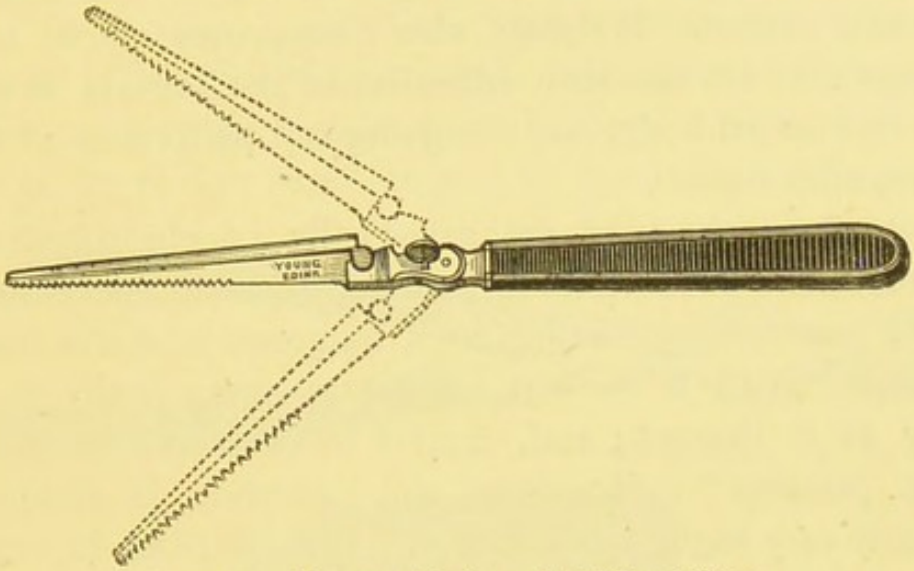


Fig. 14.—Hunter Mackenzie's Nasal Saw.

speculum. The trephine is placed on the spur, then set in motion, and pressed gently backwards parallel with the septum. The trephine usually cuts through the spur very readily, and is not so painful as the saw or knife. Should

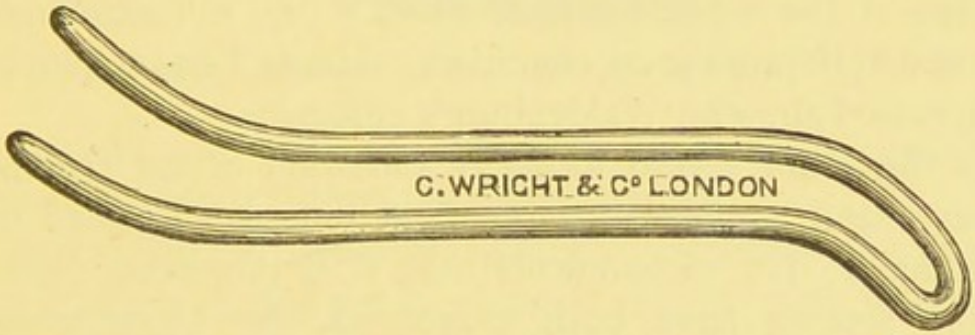


Fig. 15.—One Hook of Jurasz's Nasal Speculum (reduced in length).

the outgrowth be of a bony nature, a trephine with a saw-edge should be used. The after-treatment is the same as that described in the cutting operation.

* *Lancet*, July 26th, 1891.

The galvano-caustic loop has been employed in the removal of spurs; but I quite agree with Bronner when he points out that, though any thickened mucous membrane can be removed by the loop, a spur, in the strict sense of the term, cannot. Walsham also disapproves of its use, and says that he has seen adhesion of the septum to the lower turbinated body, and sloughing and perforation of the septum, after its use.

Moure* speaks very enthusiastically of electrolysis in the treatment of deviations (with or without thickening), and of osseous or cartilaginous outgrowths of the nasal septum. "With it we can operate as energetically or as lightly as is desired; and, thanks to cocaine, it is made almost painless." Moreover, the operation is attended with only very slight hæmorrhage. He describes in detail the electrical *technique* of the operation.

In slight cases of deviation of the septum, attempts may be made to straighten it by wearing some kind of nasal plug or other instrument for dilatation, such as ivory or celluloid bougies, laminaria tents, tampons of cotton-wool, etc. Digital pressure, applied by the patient to the convex surface of the septum several times a day, will sometimes succeed in improving the condition. Massei† has employed compressed air, with Waldenburg's apparatus.

In the more severe forms of deviation of the septum, I have seen excellent results from the plan adopted by Walsham.‡ He recommends that, after projecting pieces of the septum have been shaved off, the straightening should be accomplished by forcible rectification with the forceps (Fig. 16) he has designed for this purpose, or with

* *Journal of Laryngology*, vol. iv., p. 494.
† *Ibid.*, vol. i., p. 148.
‡ *St. Bartholomew's Hospital Reports*, vol. xxiii., p. 123.

the forceps contrived by Thomas Smith. To keep the septum in its new position, some form of retentive apparatus must be worn for a week or ten days, in order to prevent the parts resuming their faulty position. Hollow vulcanite or celluloid plugs, Goodwillie's * nasal intubation tubes, or a piece of stout rubber drainage tube, answer effectually. A small rubber-bag mounted on a central canula, after the plan of the rubber nasal tampon for epistaxis, will keep the

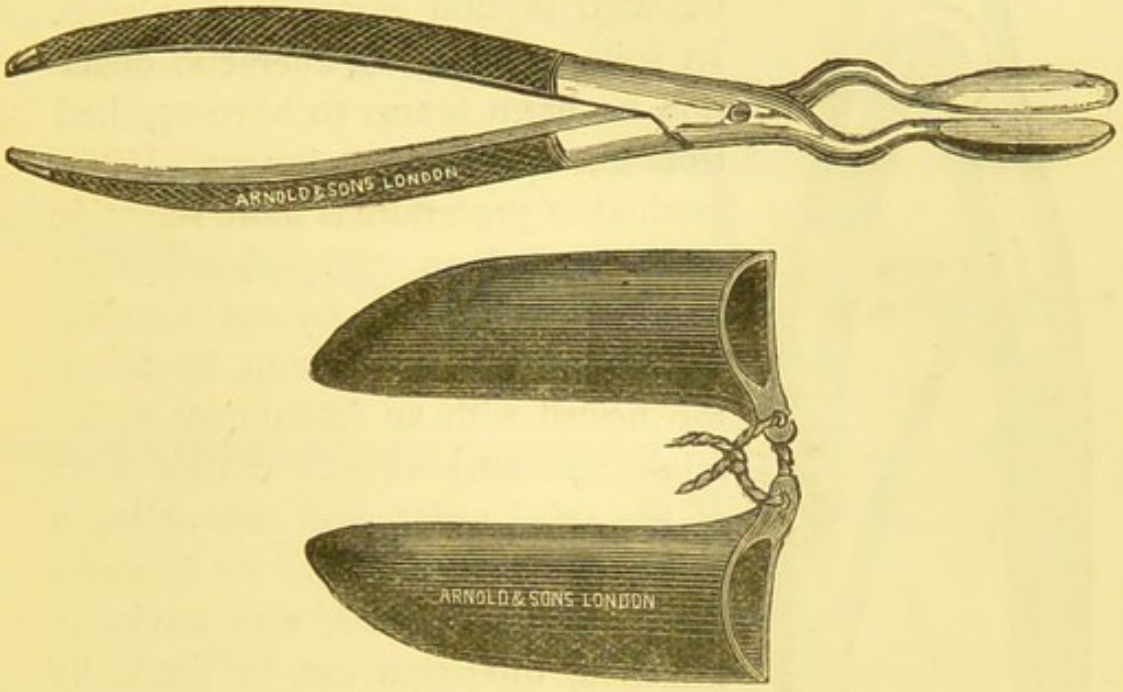


Fig. 16.—Walsham's Forceps and Plugs.

septum *in situ*, and, by exercising an equable pressure, cause less irritation than the harder plugs.†

Perforating the cartilaginous septum by means of a punch was formerly carried out in cases of such extreme deviation of the septum, as to more or less completely occlude one nostril. The operation is based on erroneous principles, and the results are anything but satisfactory; its performance is, therefore, not to be advised.

* *New York Medical Journal*, vol. li., p. 540.
† J. N. Mackenzie.

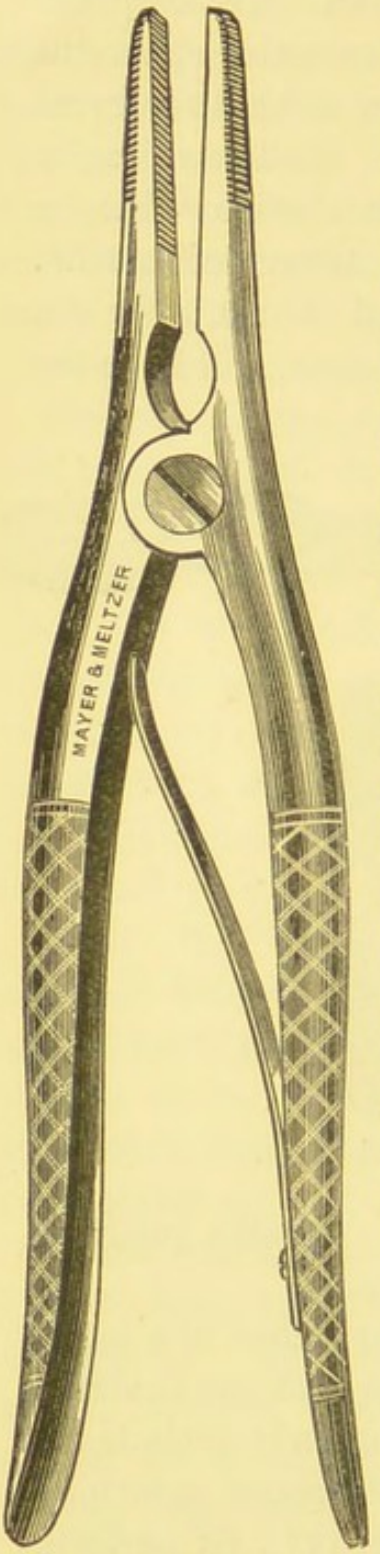


Fig. 17.—Hewetson's Nasal Dilator.

The method of forcible dilatation is especially serviceable in anterior nasal stenosis. For this purpose, Hewetson* has devised an instrument resembling a glove-stretcher (Fig. 17). With this, he rapidly dilates the stenosed nostril; the turbinals are crushed, and in some instances a deviated septum is forcibly displaced. In spite of the most energetic dilatation no harm seems to have resulted from this method of treatment. Hill's† method of procedure is more scientific and less violent. After first treating any turbinal hypertrophy and removing outgrowth from the septum, he dilates the nostril with an instrument which might be described as a double lever of the third order, and resembling a rectal dilator (Fig. 18). As it works by means of a screw, with an index attached, dilatation can be gradually accomplished, and the amount estimated with precision.

13. HÆMATOMA OF SEPTUM.

By the term hæmatoma of the septum is meant a collection of blood beneath the mucous membrane of the septum. This condition is almost invariably the result of traumatism.

* *British Medical Journal* 1890, vol. ii., p. 620.

† *Ibid.*

On rhinoscopic examination a tumour will be seen either in one or both nostrils; it is of a red colour and smooth. At first, fluctuation may be made out from side to side; later on, this may disappear, but if the hæmatoma break down and form an abscess, fluctuation may again be perceptible.

If the effusion of blood be large, there may be interference with nasal respiration, diminished sense of smell, and alteration in the voice.*

Hæmatoma is to be differentiated from abscess of the

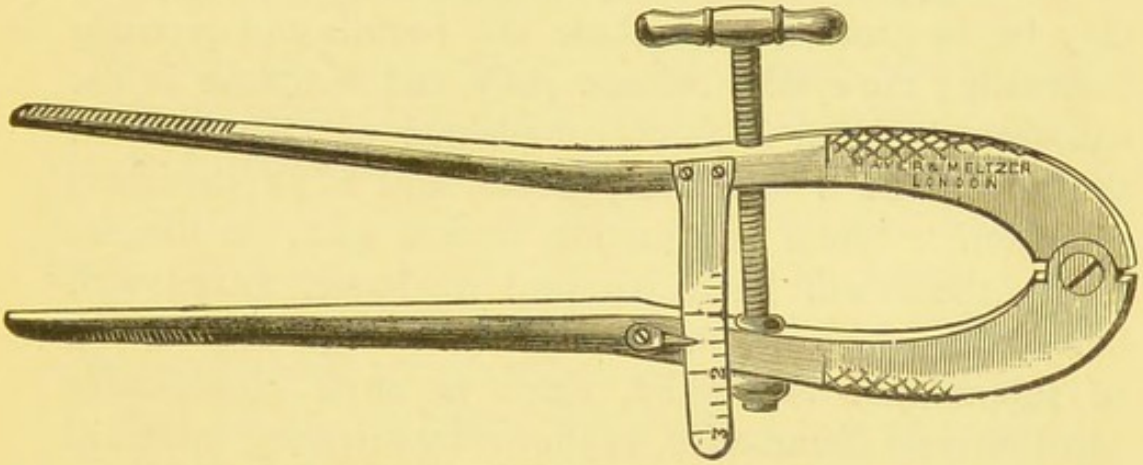


Fig. 18.—Hill's Nasal Dilator.

septum by the less amount of pain and tenderness, and by the absence of febrile disturbance.

The patient should be kept quiet, and an evaporating lotion (formula No. 10), or an ice poultice, should be applied externally. Surgical interference is, as a rule, unadvisable, unless the effusion be very large.

14. ABSCESS OF SEPTUM.

Ætiology.—Traumatism is the usual cause of abscess of the septum. As the result of an extravasation of blood

* *Centralblatt*, vol. i., p. 207.

taking place under the perichondrium, a coagulum is formed which breaks down and becomes purulent. Exposure to a cold draught of air has caused septal abscess. In a few cases of so-called acute idiopathic perichondritis * nothing more serious than a simple acute coryza has preceded the attack.

Abscess of the septum may be a complication of syphilitic or tubercular disease of the nose.

Symptoms.—In acute cases, the symptoms resemble those of facial erysipelas; the swelling of the mucous membrane of the septum is, however, more marked, and may be so great as to occlude the nostrils and protrude externally; the eyelids become puffy, and headache in the naso-frontal region is much complained of. The pain in the nose itself is often very acute, and of a throbbing character. When suppuration occurs, and the abscess bursts, there will be a puriform discharge, mixed with blood, from one or both nostrils. Though the amount of suppuration is limited, there is often considerable constitutional disturbance, as shown by shivering, increased frequency of pulse, and rise of temperature.

Prognosis.—The danger to life mostly arises from the possibility of the supervention of erysipelas, septicæmia, or meningitis.

As MacDonald † points out, there need be no fear of deformity so long as the cartilaginous septum only (as is usually the case) is involved.

Treatment.—As soon as there is any evidence of suppuration, a free incision should be made on the side of the septum on which the bulging is most marked; in some cases, it will be necessary to incise both sides. A small tenotomy knife answers very well for this purpose.

* *Archives of Laryngology*, vol. i., p. 59, and vol. iv., p. 133.

† *Diseases of the Nose*, p. 202.

The previous application of cocaine will facilitate this procedure. The nostrils should be syringed out with carbolic acid lotion (1 in 40), and if the nostril tends to close, a small piece of india-rubber drainage-tube may be left in. Externally, lint saturated with lead and opium lotion (formula No. 8) may be kept applied.

Quinine is useful internally, and opium or morphine may be required to relieve the acute pain and procure sleep.

15. PERFORATION OF THE SEPTUM.

The opinion was held, even quite recently, that perforations in the septum were almost invariably of syphilitic origin. Jonathan Hutchinson * opposed this view and supported his contention by twelve carefully examined and described cases. In young persons there sometimes appear to be reasons for associating it with lupus, but in middle-aged or more advanced life it appears to come on idiopathically, *i.e.*, there are no conditions of ill-health apparent to which it could be assigned. In addition to syphilis and these cases of so-called idiopathic perforation, ulceration of the septum, followed by perforation, is met with in leprosy, tuberculosis, diphtheria and typhoid fever, as a result of traumatism, and in connection with abscess and perichondritis of the septum. My own experience is quite in accord with Bosworth's. He writes: † "The most common cause of this form of perforation is to be found in the existence of a projection of the cartilage into one or the other passage, whereby its prominent portion becomes subjected to the current of inspired air, laden as it is with dust and other impurities, whereby a process of erosion is established,

* *Medical Times* 1884, vol. ii., p. 6.

† *Diseases of the Nose and Throat*, vol. i., p. 308.

under which the cartilage is gradually worn away until an opening occurs." This theory is confirmed by the frequency of perforation of the septum among workers in cement factories.* In order to get rid of the dust, the finger is frequently introduced into the nose, and in course of time that part of the septum which is abraded by the finger-nail becomes perforated by the constant repetition of the process. The results of inhalation of bichromate of potassium are much more serious. The men usually become affected after they have worked for about a week. They complain of a bitter, nauseous taste in the mouth, great irritation of the nasal mucous membrane, with incessant sneezing and conjunctivitis. If they continue at the work, ulceration and perforation of the septum may result. J. N. Mackenzie† describes the ulceration as occurring also on the turbinals and in the naso-pharynx. Occasionally there is otitis media, with perforation of tympanum and otorrhœa. Perforation of the septum also occurs in workers engaged in the manufacture of copper-arsenic green.‡ As regards the frequency of the occurrence of perforation of the septum, it may be mentioned that Zuckerkandl § found it present in eight out of one hundred and eighty necropsies; these figures hardly correspond to the result of clinical experience, as perforations are not so frequently met with in practice.

Morbid Anatomy and Pathology.—Hajek‖ has described the pathological changes in perforating ulcer of the nasal septum, which occurs independently of syphilis or tubercle. His observations are based on the examination

* Foulerton, *Lancet* 1889, vol. ii., p. 314.
† *Centralblatt*, vol. i., p. 377.
‡ *Journal of Laryngology*, vol. iv., p. 479.
§ *British Medical Journal*, 1886, vol. v., p. 540.
‖ *Lancet* 1891, vol. ii., p. 1295.

of thirty-three cases. The first change to be noticed in the mucous membrane is a greyish-white discolouration of the superficial layers. This is seen microscopically to be due to swelling of the epithelial cells, together with the infiltration of a fibrinous substance between them. Necrosis occurs, and a small ulcer with a sharp outline is formed. The process continues, and the ulcer gradually gets larger and deeper, until finally the cartilage is affected. The edge of the perforation becomes smooth and scar-like. According to Hajek, this kind of perforation is found almost entirely in individuals suffering from tuberculosis in other organs, especially the lungs. Micrococci (staphylococcus pyogenes aureus and streptococcus pyogenes) are found in the necrotic portion, and on account of their number, and confinement to the diseased spot, they may probably be regarded as the cause of the disease.

The changes above described are usually very chronic, months or even years elapsing before perforation is complete. As a rule, the ulceration commences on one side. Fraenkel* points out that the perforation generally corresponds to the "site of predilection" of epistaxis, and the orifice of Jacobson's organ, *i.e.*, about half an inch from the edge of the columna. The anastomotic network of capillaries at this spot readily tends to the formation of varicose dilatation of the vessels and the formation of thrombi, and the cutting off of the blood supply leads to ulceration. Rosenfeld† regards idiopathic perforation of the septum as being of neurotic origin, similar to the tropho-neurotic, gangrenous processes which occur in the hands and feet. In connection with this point, it is interesting to note that Barrs‡ has recorded a case of "slow,

* *Centralblatt*, vol. vi., p. 370.
† *Ibid.*
‡ *British Medical Journal*, 1892, vol. i., p. 768.

quiet destruction of the septum nasi and hard palate of tabetic origin."

In chronic atrophic rhinitis, as a result of the thinning of the mucous membrane and tissues of the nose, there is a tendency to perforation of the septum, which is increased by the irritation of the crusts in the nostril leading to the finger being introduced.

Symptoms.—In some cases, the perforation has caused so little inconvenience that it is only accidentally discovered on making a rhinoscopic examination. Usually, however, the patient complains of irritation and discomfort in the nose, which leads him to scratch the interior. When perforation has occurred, the patient is sometimes annoyed by a whistling sound on inspiration. A curious case is recorded of a man who had suffered for years from hay-fever, but who lost all the symptoms as soon as a perforation occurred in the septum.

As the syphilitic cases usually run a more rapid course and are attended with inflammation, there is more pain than occurs in the non-syphilitic variety, and there is also more discharge. On making a rhinoscopic examination, the so-called idiopathic perforation has thin edges; it is clean cut, and looks as if it had been punched out. It is round or oval in shape, but always regular, and the surrounding mucous membrane is not affected.

Diagnosis.—The chief point in the diagnosis is to distinguish between syphilitic and other perforations of the septum. In syphilis, as Hutchinson well points out, the ulceration usually begins further back, and involves the vomer itself; it is generally much more extensive, and runs a more rapid course.

When due to lupus, there are usually signs of existing lupus on the face, or the characteristic scars left by this disease, and the edges of the perforation are thick and irregular.

Prognosis.—When once perforation has occurred, there is not much chance of the opening closing again; all that can be hoped for is to arrest any further destruction.

Treatment.—If of syphilitic origin, the usual constitutional treatment for this disease should be employed; the nostrils should be kept free from crusts by carefully spraying them out with a warm alkaline or antiseptic solution (formulæ Nos. 52, 53, 54), and ung. hydr. nit. dil. (1 to 7) should be applied to the margin of the ulceration. Should this not suffice to arrest the ulceration, the surface should be painted with a 20 per cent. solution of cocaine, and the edges should be cauterised with the solution of the acid nitrate of mercury.

In the idiopathic form, especially when accompanying atrophic rhinitis, no active measures are desirable. The usual treatment for the rhinitis should be pursued, and the ulcerated surface should be anointed with ointment (formulæ Nos. 29, 31, 32). Hutchinson* has obtained good results from the repeated careful application of the acid nitrate of mercury and the use of the yellow oxide ointment.

Cement workers, or those engaged in the manufacture of bichromate of potassium, should wear plugs of cotton-wool in the nose while at work, and should be instructed to wash out the nostrils daily with tepid water, and to abstain from picking the nose.

16. NON-MALIGNANT GROWTHS (POLYPI).

Nasal polypi are tumours usually of a soft, jelly-like character growing in the nasal passages.

Ætiology.—Nothing very definite can at present be

* *Medical Times* 1884, vol. ii., p. 43.

stated as to the causes which lead to the formation of nasal polypi; but, as will be seen later on, there is an intimate connection between them and suppuration in the accessory cavities of the nose.

Polypi are comparatively rare under the age of fifteen; a case of congenital polypi has, however, been recorded.* They usually occur in adults, and are met with in men more frequently than in women.

Morbid Anatomy and Pathology.—The so-called mucous polypi are either soft fibromata or myxomata, or the two may co-exist, forming a fibro-myxoma. The myxomata consist of a loose form of connective tissue, the meshes of which are filled with stellate cells and with a mucin-yielding substance. In some cases, the growth begins as an adenoma of the nasal mucous glands; secondary changes occur in the cells, and finally only areolar tissue, infiltrated with mucous fluid, is left.†

Polypi are usually pear-shaped, but they may be of any form, from the pressure they exercise on one another, or from coming in contact with the nasal walls. They are generally of a pale, yellowish colour and of soft consistence. They vary very much in size; if they grow into the naso-pharynx, they may attain the size of a plum, and be upwards of three inches in length and one to two inches in circumference, and may weigh as much as half an ounce. They almost invariably take their origin from the middle or superior turbinals, or from the outer wall in the middle meatus; their favourite seat is around the hiatus semilunaris; occasionally they grow from the inferior turbinal, but hardly ever from the septum. They are nearly always multiple, and frequently occur on both sides. A polypoidal mass, more or less sessile, is occasionally seen

* *Sajous' Annual* 1892, vol. iv., D. 12.

† Johnston, *Sajous' Annual* 1889, vol. iv., D. 10.

springing from the inferior turbinals; this is of a reddish colour, and though unlike the ordinary nasal polypi to the naked eye, microscopically its structure is much the same. On removal, the growth bleeds much more freely than the other variety. It has been confounded with papilloma. The point in the pathology of nasal polypi which engages most attention at the present time, is their relationship to suppuration in the accessory cavities. Gruenwald* has carefully examined 33 cases of nasal polypi, with the result that in all but 4 he found signs of suppuration. In 3 patients there existed empyema of the antrum, in 9 empyema of the ethmoid cells, in 4 caries of the ethmoid bone, in 1 empyema of the sphenoidal sinus, in 11 combined empyema of several cavities, and in 1 granulations within the ethmoidal cells. He emphasizes the fact that in bilateral suppuration there were polypi in both nostrils, whereas if the suppuration was unilateral the polypi were confined to the same side. He further goes on to state that out of seventy patients with disease of the accessory cavities, nearly half were affected with polypi. These figures have led him to the conclusion that the growth of polypi is brought about by chronic suppuration.

The results of Gruenwald's observations go to prove that there is more truth in Woakes' views than has hitherto been conceded to them. The latter writer, in a paper read before the Medical Society of London in 1885, stated that "polypus of the nose is not a disease *per se*, but that it is only a prominent symptom of necrosing inflammation of certain special osseous structures of the nose, and which is initiated in the muco-periosteal environment of these textures."† This condition he has designated by the term "necrosing ethmoiditis." In a recent com-

* *Die Lehre von den Naseneiterungen*, p. 54.

† *Medical Society's Proceedings*, vol. viii., p. 263.

munication,* he gives a description of the pathological changes met with in the diseased tissues.

Symptoms.—These may be divided into local and general. A sense of fulness and stuffiness in the nostrils, with difficulty in breathing through the nose, in some cases passing on to complete obstruction, a constant secretion from the nostrils, partial or complete loss of the sense of smell, and frequently more or less deafness, are the chief local symptoms. Exuberant and long-continued growth of polypi sometimes causes broadening and flattening of the nose. As in all cases where there is nasal stenosis, the voice has a "dead," muffled sound. Among the general or remote symptoms must first of all be enumerated asthma, which, as Voltolini was the first to point out, may owe its origin to the existence of nasal polypi. Even when not directly due to polypi, asthma is always aggravated by their presence. Cough, hay-fever, epilepsy, giddiness, night-mare, etc., have been met with in patients suffering from polypi, and have disappeared after the removal of these growths (*see* REFLEX NASAL NEUROSES).

Polypi may frequently be recognised without instrumental aid, and they sometimes even protrude from the nostrils.

On anterior rhinoscopy, the nasal passages will be seen to be occupied by glistening bodies of a yellowish or pinkish colour, which are easily indented by the probe. In exceptional cases they can only be recognised with the rhinoscope.

Diagnosis.—Hypertrophy of the inferior turbinated body is sometimes mistaken for a polypus; the situation, firm consistence, and red colour, should suffice to prevent the mistake. Erectile swelling of the anterior end of this body may also be confounded with a polypus. The effect

* *British Medical Journal* 1892, vol. i., p. 546; *Ibid.*, 1893, vol. i., pp. 91, 147, 1216.

of cocaine in causing a disappearance of this swelling will suffice for the diagnosis. A deviated septum might also give occasion to error. Malignant growths in the nose are generally more firmly attached than polypi, are harder, more painful, and bleed freely.

Prognosis.—Polypi, though not dangerous to life, are exceedingly troublesome to eradicate. In a case under my care, there is a history of polypi for nearly forty years. The mucous membrane has become of a myxomatous character throughout, so that the patient is only kept in comfort by removing the exuberant growth of polypi three or four times a year.

Semon's * case of unilateral, incomplete Graves' disease, following the removal of nasal polypi, is most instructive as pointing to a danger which had previously not been contemplated as a result of intra-nasal treatment.

The possibility of a polypus becoming malignant should be borne in mind, as cases of transformation into sarcoma and carcinoma have been recorded. It must also be remembered that malignant and benign neoplasms may co-exist in the same individual.

Treatment.—The rough-and-ready method of removal of polypi by means of forceps is now becoming a thing of the past, and the dispute at present is as to the employment of the galvano-caustic loop, as opposed to the cold snare. To a large extent this is determined by individual custom; the cold snare requires less apparatus, but the tug which is requisite to remove the polypi makes it a more painful procedure than the galvano-caustic loop, and it is usually attended with more bleeding. I have, from the first, employed the latter method, and I have been so satisfied with it that I have not been tempted to try the

* *Clinical Society's Transactions*, vol. xxii., p. 233, and *Laryngological Society's Proceedings* 1893.

cold snare. At the Glasgow meeting of the British Medical Association in 1888,* the subject of the removal of nasal polypi was thoroughly discussed, and the majority of those present were in favour of the cold snare.

Whichever plan is adopted, it is essential for the operator to reflect a bright cone of light into the nostril, and to employ a speculum. Duplay's (Fig. 2, p. 2) is the one I use. The interior of the nose should be swabbed or sprayed out with a 20 per cent. solution of cocaine (formula No. 51). After waiting two or three minutes, a second application may be made. After a similar interval, the nasal mucous membrane

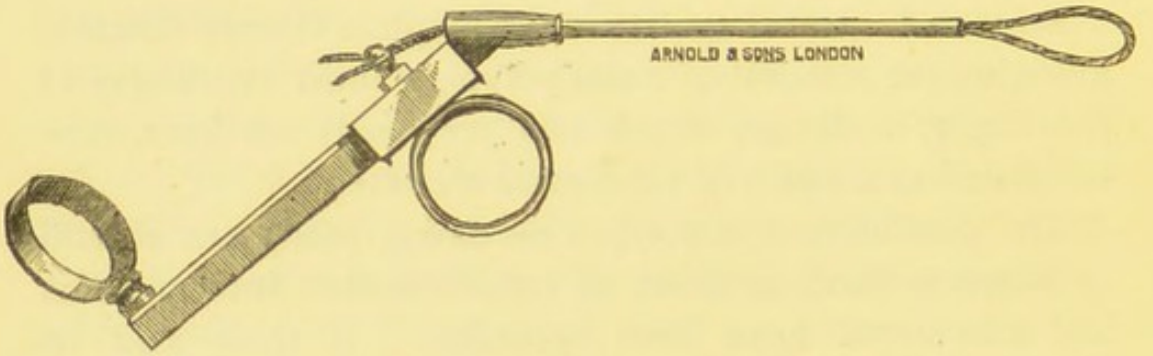


Fig. 19.—Polypus Snare.

is usually sufficiently anæsthetised, to allow of the wire loop being introduced up the nostril without pain. Schech's galvano-caustic apparatus is the most convenient form (*see* Fig. 9, p. 17). It will be found as a rule that for the right nostril the tubes for the wire should be arranged horizontally, and for the left nostril, one above the other. No. 6 or 7 piano wire answers admirably; it is very cheap, and it possesses just the requisite resiliency. If the cold snare is employed, a simple instrument, such as Fig. 19, or a more powerful one, such as Woakes' (Fig. 20), can be recommended. In introducing the loop, it is important to get it well round the

* *British Medical Journal* 1888, vol. ii., p. 603.

base of the polypus; if the polypus be sessile, the loop should be passed as near the base as possible; then the current should be turned on, and the red-hot wire will form a furrow in the growth, which enables the operator to obtain

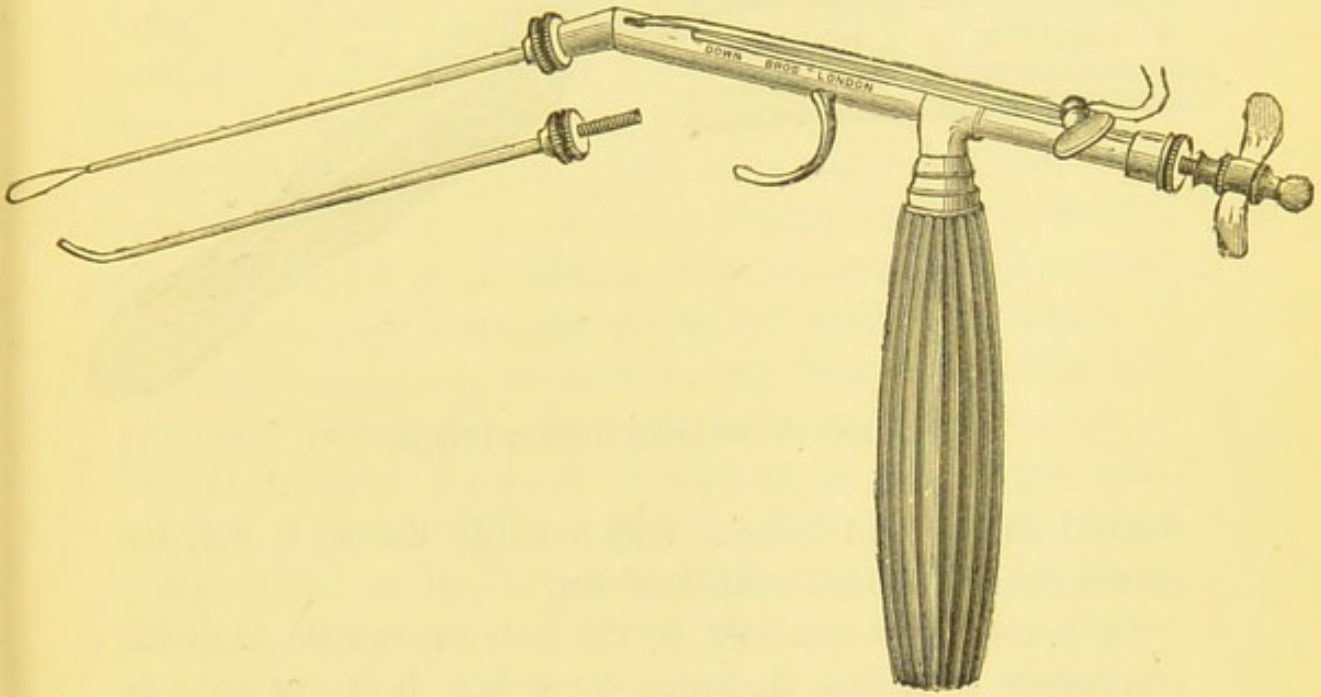


Fig. 20.—Woakes's Polypus Snare.

a firm grip. With the galvano-caustic loop, one trusts to burning through the pedicle, whereas if the cold snare is employed, after the loop has been tightened as much as possible the polypus must be detached by a twisting movement with a tug at the end. In some cases, it will be found

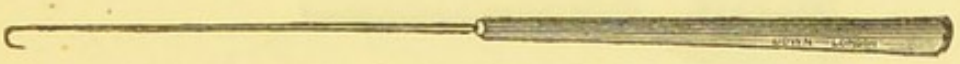


Fig. 21.—Baber's Hook for Seizing Polypus.

convenient to exert traction on the polypus before passing the loop around it; this can be done by Baber's hook (Fig. 21), or with the forceps I usually employ (Fig. 22). In cases in which a large polypus, attached to the posterior

extremity of the middle turbinal, hangs down in the naso-pharynx, it may be necessary to guide the loop round the polypus by the finger introduced behind the soft palate.

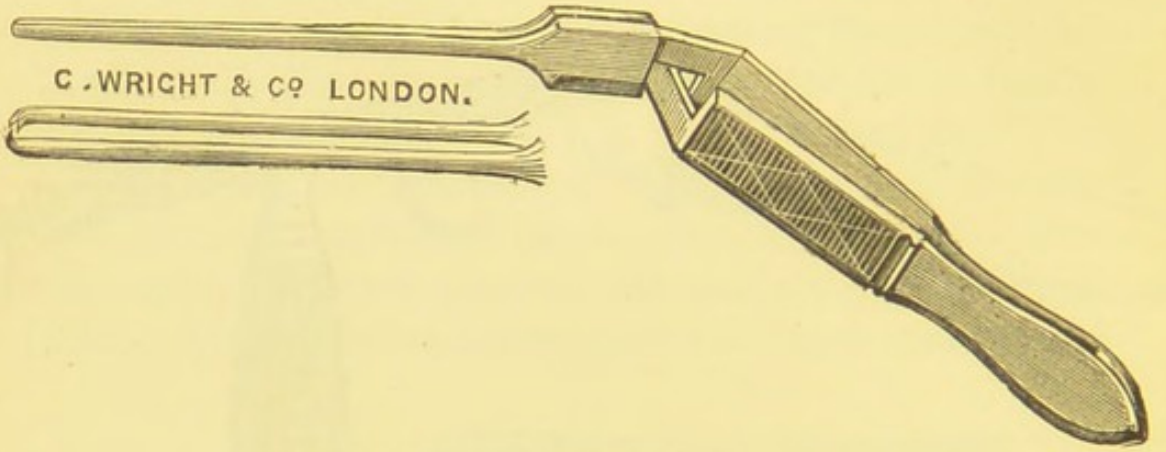


Fig. 22.—Forceps for Seizing Polypus.

Should the patient have a very irritable throat, it may be expedient to administer chloroform.

In operating, especially if the galvano-caustic loop be employed, it is not desirable to attack both nostrils at

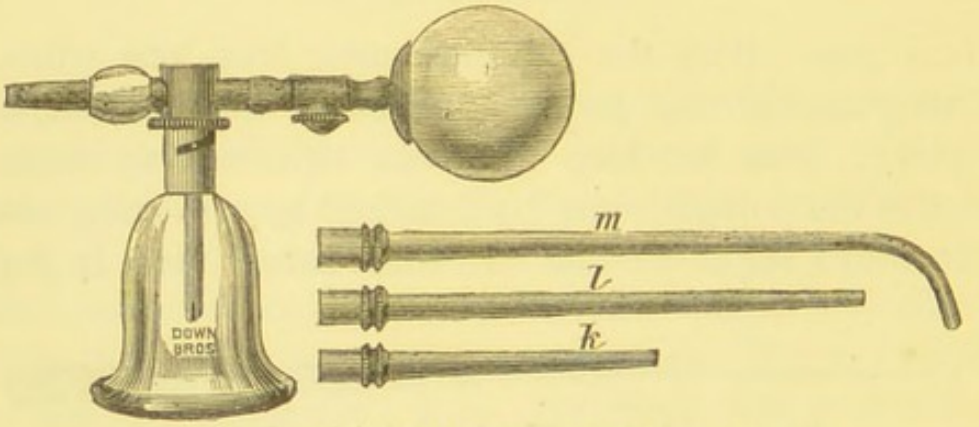


Fig. 23.—Kabierski's Insufflator.

the same sitting, unless the patient has shown himself very tolerant of similar measures at previous sittings. There is always the possibility of starting an otitis media, with all its deplorable sequelæ. If there be much hæmorrhage

after the removal of polypi, iodoform should be insufflated (Kabierski's insufflator (Fig. 23) is the best apparatus for the purpose), and the nostril carefully plugged anteriorly with iodoform gauze, which may be left undisturbed for twenty-four hours. Where there is little or no bleeding, iodoform should be insufflated, and a pledget of carbolised cotton-wool introduced as a protection against cold. I have not found it necessary to spray or syringe out the nostril after the operation. But when the polypi have been removed, whatever process be employed, there still remains the difficult task of preventing their recurrence. The most convenient plan is to burn down the pedicle by means of the galvano-cautery, cocaine having been previously employed to render the part anæsthetic, or caustics, such as chromic acid in the form of crystals, or the 90 per cent. solution of carbolic acid, may be applied to the base of the polypus; but in the case of multiple sessile polypi the tendency to recurrence is so great that the greatest patience and perseverance will be required in order to attain the desired end. A spray of 25 to 50 per cent. of alcohol in water, used once or twice a day, seems to exert some influence in checking the exuberant growth of polypi; it requires, however, to be used for many months. It has been stated that the use of alcoholic sprays tends to destroy the sense of smell; but from personal experience I cannot say that this is the case, though I have ordered it occasionally. Robertson* states "that in the case of inveterate recurring nasal polypi, the antrum may with certainty be inferred to be implicated, and that opening and draining of this cavity offer the only prospect of a radical cure"; and he adduces some cases in proof of this statement. If Gruenwald's assertion, that the growth of polypi is dependent on suppuration, be found to be correct, not only

* *Lancet* 1893, vol. i., p. 984.

must the antrum be drained, but all the other possible sources of suppuration within the nasal passages must receive appropriate treatment.

Among the rarer non-malignant growths met with in the nasal fossæ may be mentioned papilloma, hard fibroma, angioma, osteoma, enchondroma, and cysts.

Papillomata almost invariably spring from the inferior turbinal. They are usually sessile, and resemble a blackberry in shape. On removal they bleed more freely than the ordinary polypi. The fibromata may sometimes grow to an enormous size, and destroy by pressure all tissues with which they come in contact. Electrolysis has been found of use in reducing the bulk of these tumours.*

Osteomata and enchondromata require to be differentiated from displacement of, and from spurs and ridges on, the septum. They may be removed in the same way as spurs (see p. 67).

The prominent symptoms of an angioma are bleeding, often repeated and copious, and gradually increasing obstruction of the nasal passage. The growth is usually situated in the upper part of the nose, and has a broad base. It is rounded, more or less irregular on its surface, elastic to the touch, and has a red or bluish colour. Pulsation has been noticed.

Angiomata are liable to be confounded with malignant disease of the nose.

The cold wire loop is said to be safer, simpler, and more reliable than the galvano-caustic loop. If the loop is tightened very gradually, one to three hours being necessary, the danger of hæmorrhage is almost excluded.†

Cystic tumours‡ are sometimes met with. They are

* *Sajous' Annual* 1889, vol. iv., D. 11.

† Jarvis, *Sajous' Annual* 1889, vol. iv., D. 13.

‡ *Ibid.*, 1891, vol. iv., D. 9.

liable to be mistaken for the softer forms of mucous polypus.

17. MALIGNANT GROWTHS.

Malignant disease of the nasal cavities is rare, but cases of epithelioma and sarcoma have been recorded. According to Newman,* two-thirds of the carcinomatous tumours are epitheliomata, while the majority of the remaining third are adeno-carcinomata. If the tumour be pedunculated, it is generally the result of the epitheliomatous degeneration of a neoplasm originally benign. Sarcomata may, however, assume this form from the first.

Symptoms.—The symptom, which is generally the first to attract attention, is the obstruction which the presence of the new growth causes to nasal respiration, and the consequent alteration of the voice, and impairment of the sense of smell. In consequence of the more rapid growth of malignant neoplasms, the obstruction is developed early in the case, and there are often signs of centrifugal pressure—as, for example, broadening of the nose, and pressing upwards of the orbital plate. Pain is usually complained of, and this is increased as the tumour grows and exercises more and more pressure on the neighbouring parts. There may be a discharge of a greenish character from the nose, and this is, at times, fœtid. Epistaxis is so frequent a symptom that its mere existence in the case of a neoplasm in the nose should suggest the suspicion of malignant disease. These neoplasms vary very much in size; Mackenzie † says "from a pea to an orange." Though, as already stated, a sarcoma may be pedunculated, it is usually sessile, of a

* *Malignant Disease of the Throat and Nose*, p. 136.
† *Diseases of the Throat and Nose*, vol. ii., p. 394.

reddish colour, and very vascular. Epithelioma generally commences as a warty growth.

Diagnosis.—Rapid growth, acute pain, frequent hæmorrhages, fungating appearance, and friable consistence of the growth, are certain signs of malignancy. Some of these signs, however, may be absent. The point of origin is of assistance, as polypi springing from the septum must be regarded with very grave suspicion.* The occurrence of swollen submaxillary glands is an important symptom of cancer of the nose. Epithelioma of the nose is usually met with in persons of fifty years and upwards. Sarcoma, on the other hand, is most frequent between ten and twenty, and again between forty and fifty, when the greatest number of cases occur.†

Osteomata, deviations and perichondritis of the septum, abscess, rhinoliths, and foreign bodies, have all in their turn simulated malignant tumours. In these cases, a careful rhinoscopic examination, and watching the patient, will usually suffice to clear up the diagnosis. A gumma which has broken down will, at times, so closely resemble an epithelioma that it will require the effect of treatment to settle the difficulty. The possibility of the existence of a primary syphilitic sore in the nostril should also be borne in mind. Tubercular lesions are met with as ulcers and granulations. In these cases, there may be pulmonary complications. Lupus, if primary, is difficult to distinguish at first; but its very chronic course will finally establish the diagnosis. The same remark holds good of rhinoscleroma.

In doubtful cases, a microscopic examination of a portion of the growth will almost invariably settle the diagnosis.

Prognosis.—This is, in all instances, bad; but some

* Plicque, *Journal of Laryngology*, vol. iv., p. 194.

† Newman, *Malignant Disease of the Throat and Nose*, p. 142.

recent cases * which have been operated on go to show that sarcoma of the nose is not so malignant as is generally believed. The average duration of cases of epithelioma of the nose is two years, and death comes on, at latest, three years from the commencement of the disease, and is brought about by meningitis or cachexy.

Treatment.—If the tumour be pedunculated, it should be removed by an external incision, so as to get at the pedicle. The incision may be made in the naso-genial furrow or along the dorsum of the nose. Attempts at removal by evulsion, without an external incision, are both incomplete and dangerous. Sessile tumours, with limited base of implantation, offer a fair chance of removal; but if the tumour spreads widely or deeply, the question as to whether any operative procedure is advisable requires the gravest consideration, as a partial removal of the growth would only aggravate the evil. If the tumour be inoperable, the best plan of arresting repeated hæmorrhages is the use of the galvano-cautery or electrolysis. If the latter be employed, the positive pole should always be intra-nasal.‡

18. TUBERCULOSIS OF THE NOSE.

Though tubercular disease of the pituitary mucous membrane, in comparison with the similar affection of the oro-pharyngeal cavity, is a rare disease, it is found to occur more frequently than was, at one time, believed to be the case.

Ætiology.—The disease almost invariably occurs in

* *Annual of Universal Medical Sciences* 1888, vol. iii., p. 264.

† Barcilay, *Centralblatt*, vol. ii., p. 433.

‡ For much of the above I am indebted to Plicque's admirable article on "Malignant Tumours of the Nasal Fossæ," in the *Journal of Laryngology*, vol. iv., p. 194.

patients suffering from pulmonary or general tuberculosis, but exceptional cases have been described, in which no pulmonary or other tubercular lesion was recognised.*

Morbid Anatomy and Pathology.—Chronic catarrh and repeated irritation of the nasal mucous membrane, by causing abrasions of the epithelium, may afford entrance to the tubercle bacilli, which will multiply and give rise to the characteristic lesion if the soil be suitable. Tuberculosis occurs in the nose, either in the form of ulceration or as a growth. The usual site of the ulcer is the septum, about half an inch from the anterior border, but the ala nasi and floor of the nostril are also attacked. The ulcer has sometimes thickened, everted edges, but at other times is clean cut. The surface of the ulceration, which is of a greyish-red colour, is covered by a muco-purulent secretion, or by crusts. Around the ulcer may sometimes be seen small yellow specks, indicating the deposition of miliary tubercle; these spots soften, break down, and, by coalescing, increase the size of the original ulcer. Tubercle bacilli can be found in the secretion. If a growth occurs, it is generally seen on one of the turbinals, and it resembles a papillomatous growth, but is smaller, more flattened, of a more regular outline, and of a reddish-grey colour.† MacDonald ‡ has described a case in which both nasal fossæ were filled with "a dusky red, coarsely and irregularly lobulated mass." The growth sprung from the margin of a perforation in the cartilaginous septum.

Symptoms.—The nose is usually swollen and painful. The secretion from the nostrils is sometimes offensive, and it may contain blood. Volkmann § describes a

* Bosworth, *Diseases of Nose and Throat*, vol. i., p. 373.

† *Ibid.*, p. 374.

‡ *Diseases of the Nose*, p. 340.

§ *Journal of Laryngology*, vol. i., p. 90.

condition which he terms tubercular ozæna. Tubercular disease of the nose represents a much more chronic affection than a similar condition of the tongue or larynx, inasmuch as the nose is not subjected to the constant movement and other sources of irritation to which the latter are exposed.

Diagnosis.—There is considerable difficulty in making a differential diagnosis between lupus and tuberculosis of the nasal mucous membrane; some authorities, indeed, regard them as manifestations of the same condition. Clutton's * case of ulceration of palate, pharynx, ears, and nose, is a good illustration of this difficulty. It was brought forward as a tubercular affection, but the occurrence of a condition of the cheek resembling lupus, the chronicity of the disease, together with its tendency to improve and then relapse again, are all points in favour of the diagnosis of lupus as against tuberculosis.

As regards the diagnosis of tuberculosis from syphilis, the non-occurrence of tubercle bacilli should lead to the employment of an anti-syphilitic treatment; and only if this fails should the question of tuberculosis be considered.

Prognosis.—If the ulceration is limited in extent, and is not running a rapid course, it may be in the power of treatment to arrest the disease, and especially if there be no active pulmonary tuberculosis.

Treatment.—For small ulcers, Cartaz † recommends the galvano-cautery under cocaine anæsthesia. For more extensive ulceration, lactic acid, with or without previous scraping, should be employed. If operative treatment is contra-indicated, the surface of the ulcer should be cleansed with an alkaline spray, iodoform should then be insufflated, and a pledget of cotton-wool introduced into the nostril,

* *Clinical Society's Transactions*, vol. xix., p. 197.

† *Sajous' Annual of Medical Sciences* 1888, vol. iii., p. 261.

or a 5 per cent. solution of menthol in olive oil applied. The usual treatment, hygienic and medical, appropriate to tuberculosis, should be carried out at the same time.

19. LUPUS OF THE NASAL MUCOUS MEMBRANE.

Ætiology.—Lupus of the interior of the nose usually results from extension of the disease from the face.

Cozzolino * has, however, described five cases of primary lupus of the nose occurring in patients from twenty-two to fifty-five years of age. A history of tuberculosis, either in the individual or his family, is usually to be elicited in cases of nasal lupus.

Morbid Anatomy and Pathology.—Lupus of the nose may occur in the form of ulceration, which often leads to perforation of the septum, or as tumours. Ulceration usually begins just within the nostril, and soon leads to perforation of the septum. The ulcer may heal, or it may extend up to the edge of the vomer.† The lateral cartilages for the most part remain free; the turbinals, however, are usually attacked. The nodules seen in the nostrils resemble those met with on other mucous surfaces.

Symptoms.—The chief symptom of which the patient complains is the discomfort produced by the blocking of the nose, which is aggravated by the tendency there is in these cases to the formation of crusts. There is but little discharge, and this is usually free from odour.

Diagnosis.—The perforating lupoid ulcer of the septum is often mistaken for a syphilitic affection. The latter usually spreads to the bony septum, but lupus generally spares bones. The absence of response to anti-syphilitic treatment will assist in excluding syphilis. Lupoid tumours

* *Centralblatt*, vol. iii., p. 206.

† Hutchinson, *British Medical Journal* 1888, vol. i., p. 62.

of the nose are to be distinguished from mucous polypi by their granular, irregular surface, and by their opaque, white colour, as opposed to the translucency of polypi. From fibromata they can be readily distinguished by the ease with which they are torn. The diagnosis of nasal lupus is sometimes confirmed by the appearance of lupus nodules on the skin. The microscopic examination of a portion of the growth will often be required, in order to determine the nature of the case.

Prognosis.—Lupus of the nose generally runs a very chronic course. A case has been recorded in which the septum was destroyed and the sphenoid was laid bare and eroded, death taking place from basic meningitis.

Treatment.—Any outgrowths may be removed by the cold or galvano-caustic loop, or with the sharp spoon and subsequent use of the galvano-cautery. Some operators have obtained good results with the lactic acid treatment (*see* p. 93). Bearing in mind the fact that bacilli are destroyed by unfavourable conditions in their environment, cold has been successfully employed in the treatment of nasal lupus, an ice-bag being placed on the nose for three hours night and morning. A cure was obtained in the course of a few weeks.* Cod-liver oil, syrup of the iodide of iron, and arsenic, should be given internally.

20. SYPHILIS OF THE NOSE.

All stages of syphilis are met with in the nasal cavities, *i.e.*, primary, secondary, tertiary, and inherited syphilis. Primary syphilitic affection of the nostril is very rare; nevertheless, twenty-seven cases have been recorded.† As

* *Centralblatt*, vol. vi., p. 300.
† *Ibid.*, vol. x., p. 329.

a rule the virus is accidentally conveyed to the nose by the finger, but cases of direct transference by the genital organ have been noted.

Spencer Watson * had an example of the former under his care. The patient was a monthly nurse, whose nostril became infected during her attendance on a lady, in her confinement, who was suffering from syphilis. Moure has recorded another case.† In the absence of history, the diagnosis of the nature of the disease would be attended with great difficulty until the supervention of secondary symptoms should clear up its nature. It is most likely to be confounded with sarcoma, as this is the commonest malignant growth in the nose; but from this it may be distinguished by its tendency to bleed, the small amount of swelling compared with the ulceration, and the early enlargement of the sub-maxillary glands. In comparison with the extreme frequency, one might almost say the constant presence, of mucous patches in the cavity of the mouth, secondary syphilitic manifestations are very rarely met with; when they do occur they are chiefly seen at the orifice. A catarrhal, erythematous, papular, or pustular condition of the mucous membrane is met with under these circumstances. Tertiary syphilitic affections of the nose are of frequent occurrence. They may take the forms of gumma, of ulceration, and of necrosis of bone and cartilage.

Gummata are usually situated on the septum; they occur as rounded tumours of a purplish colour, and may be sufficiently large to block the nasal cavity. If softening takes place, and the gumma breaks down, ulceration may result, which may penetrate to the deeper tissues, giving rise to necrosis of bone or cartilage.

* *Diseases of the Nose*, 2nd edition, p. 120.

† *Sajous' Annual* 1888, vol. iii., p. 259.

According to Michelson,* ulcers occurring in longitudinal furrows on the septum are characteristic of syphilis. The "saddle-back" nose is due to the cicatricial contraction of the connective tissue which binds the cutaneous and cartilaginous structures to the nasal bones. A similar result may occur as a consequence of a phlegmonous inflammation of the nose, without the existence of any defect in the septum, and on the other hand, the septum may be extensively destroyed without producing any alteration in the external appearance of the nose.

Statistics show that the danger of the nose and naso-pharynx becoming attacked is greatest during the period of one to three years after infection.†

One of the earliest manifestations of inherited syphilis is "snuffles," a term applied to the nasal catarrh which is so characteristic a symptom of this form of the disease. As this symptom usually occurs in combination with others, such as rash, condylomata, and ulceration at the angles of the mouth, the diagnosis is, as a rule, easily made. Later in life, especially at or after the period of puberty, the question of inherited syphilis may again crop up, in connection with the changes that have taken place in the nostrils, leading to the falling in of the bridge of the nose. As the result of inherited syphilis, gummata, deep ulceration, perforation of the septum, and necrosis of the bone and cartilage may occur.

Prognosis.—Though the primary sore in the nose causes great swelling and disfigurement at the time, the process is entirely removed by treatment, and but slight scarring remains.‡ Under suitable treatment secondary affections cause but little trouble. If tertiary disease occur in

* *Centralblatt*, vol. v., p. 501.
† *Ibid.*, vol. vii., p. 51.
‡ Burnett's *System*, vol. ii., p. 188.

debilitated subjects, especially if it be neglected, necrosis of the bones may take place, leading to collapse of the nose.

Treatment.—Primary syphilis of the nostril requires exactly the same treatment as when it occurs elsewhere.

In the syphilitic rhinitis of the second stage, in addition to the ordinary constitutional treatment it will be advisable to spray out the nostrils with a simple cleansing or antiseptic solution (formulæ Nos. 52, 53, 54), and afterwards apply dilute citrine ointment (formula No. 32), or insufflate iodoform or iodol. In tertiary syphilitic affection of the nose, taking the form of gumma, iodide of potassium must be pushed in full doses, and should the swelling not begin to decrease pretty speedily, the inunction of blue ointment in the axillæ may be added. If this plan of treatment be carried out energetically, there will be no necessity for the removal of gummata by surgical measures. If the gummata have softened, and ulceration has led to necrosis, it will be necessary to remove the necrosed portions of bone if they are not thrown off spontaneously. This may be safely done if the sequestra are situated below the middle meatus. Above this region great caution must be exercised, and no force should be employed to detach the dead bone. The nostrils should be kept scrupulously clean by the use of sprays, etc., as recommended for the treatment of secondary syphilis of the nose. In cases of obstinate ulceration, Mackenzie * endorses Schuster's recommendation of the free use of Volkmann's sharp spoon. Care in its use is requisite, as death has resulted from hæmorrhage whilst the surgeon was scraping out the nasal fossæ of a patient suffering from syphilitic necrosis.

In infants suffering from the rhinitis of inherited syphilis, it may be necessary to feed the patient by the spoon, on account of the inability to suck, if the nostrils are blocked.

* *Diseases of the Throat and Nose*, vol. ii., p. 405.

The nostrils should be sprayed out with an antiseptic solution, and afterwards anointed with dilute citrine ointment (formula No. 32).

21. RHINOSCLEROMA.

This is an exceedingly rare disease. The majority of cases have occurred in the eastern parts of Austria and the south-western provinces of Russia. It has also been met with in Central America, Egypt, and India. The first case described in this country was that of a Guatemalan, aged eighteen, who was exhibited at the Pathological Society by Payne and Semon, on October 21st, 1884.* At the meeting of the British Medical Association, at Leeds, in 1889, W. Robertson† showed two sisters, aged thirty-three and thirty respectively, as suffering from rhinoscleroma. Some doubts, however, were expressed at the meeting as to the correctness of the diagnosis.

Wolkowitsch of Kieff‡ states that, out of 85 cases he has collected, the mucous membrane of the nares was attacked in 81, the cutaneous coverings of the nose in 74, the pharynx in 57, the larynx in 19, the trachea in 5, the upper lip in 46, the upper jaw in 16, the hard palate in 17, the tongue in 4, the lower lip in 2, the lachrymal tract in 5. The ear was affected in one case only. Young adults are chiefly attacked.

Morbid Anatomy and Pathology.—The disease may be regarded as an infectious chronic granuloma, and it consists of an infiltration of spindle and round cells, smaller than granulation cells. Together with these, there are some larger cells of a different form. The infiltration takes place

* *British Medical Journal* 1885, vol. i., p. 485.
† *Ibid.*, 1889, vol. ii., p. 597.
‡ *The Satellite* 1890, p. 65; and *Lancet* 1890, vol. ii., p. 86.

into the skin and upper part of the mucous membrane, and gives rise to a cartilaginous hardness. The "creeping" tendency of the new growth is very striking. Characteristic micro-organisms have been found in the larger cells, the lymphatics, and blood-vessels of the patches. Wolkowitsch states that these micro-organisms cannot be distinguished, morphologically, from Friedlaender's pneumococcus. They can be stained by Gram's method. Inoculation experiments have been hitherto unsuccessful.

Symptoms.—As the disease appears purely a local one, the symptoms are limited to the organ affected. When it attacks the nose, it may go on to produce complete obstruction. On making an examination, the neoplasm is seen to occur in slightly elevated plates, red in colour, smooth on the surface, of firm consistence, and as hard as cartilage. There may be some discharge, and even hæmorrhage, from the nose ; but there is an absence of anything like œdema or inflammation, and there is no tendency to ulceration or softening. Though there is usually some tenderness on pressure, the affection is practically a painless one. If the disease attacks other parts, changes similar to those met with in the nose are seen. If the pharynx or larynx is much affected, there may be marked dyspnœa.

Diagnosis.—The diseases from which rhinoscleroma requires to be differentiated are syphilis, lupus, tuberculosis, malignant disease, and keloid.

From all these, except keloid, rhinoscleroma is to be distinguished by its slow progress, the absence of ulceration and offensive discharge. As against syphilis, the diagnosis will be confirmed by the want of response to energetic anti-syphilitic treatment. Relapses, which are so common in lupus, do not occur in rhinoscleroma Moreover, in the former disease, there is usually some cutaneous complication. The pain, rapid growth, and foul discharge accompanying

malignant disease of the nose, will suffice to exclude it. Time will be necessary to distinguish keloid from rhinoscleroma.

Prognosis.—The course of the disease is exceedingly chronic, and cases are recorded as having lasted upwards of twenty years. Unless it extends down the larynx, there is no danger to life. It seems probable that some of the cases described as chorditis vocalis inferior hypertrophica were in reality examples of rhinoscleroma attacking the larynx. As a result of the infiltration of the laryngeal mucous membrane, a kind of cicatricial contraction may take place, which requires either mechanical dilatation or tracheotomy.

Treatment.—All that should be attempted in cases of rhinoscleroma is to maintain the patency of the nose and larynx, should this be threatened. In the nose, the galvanocautery has been employed with partial success, and the like result has attended extirpation with the knife. A true cure has not yet been obtained.

22. RHINOLITHS.

Nasal Calculi.

Ætiology.—Two kinds of rhinoliths have been described, viz., one in which there is a spontaneous stone formation, and the other in which a deposit of salts takes place around a foreign body. The latter is the more common form. Out of 110 cases collected by Max Seeligmann,* in 57 a foreign body was found as the nucleus, and in 3 cases small coagula of blood or mucus; in 10 cases no nucleus nor even a cavity could be distinguished; in the remaining 40 cases, details as to the presence or absence of a nucleus are wanting. The foreign body which serves as the nucleus

* *Ueber Nasensteine*, Inaugural Dissertation. Karlsruhe, 1892.

may be introduced through the anterior nasal opening, as by children at play, or it may be inspired; in some cases, it enters the nostril through the choana in the act of vomiting or sneezing. Two conditions seem to promote the formation of these concretions: (1) An alteration in the secretions, such as takes place in chronic inflammation of the nasal mucous membrane and lachrymal gland, and (2) Conditions leading to retention of the secretions, such as occur in cases where there is contraction of the nasal passages. How the concretion is brought about when no nucleus is present for the salts to be precipitated on is difficult to explain; some authorities, indeed, go so far as to deny the occurrence of rhinoliths without a nucleus.

A curious feature in the ætiology of nasal calculi is the greater liability of females to the affection than males. Out of Seeligmann's 110 cases, 62 were females, 29 were men, and in 19 the sex was not specified. He suggests, as possible causes, differences in the structure of the nasal cavities or in the composition of the lachrymal and nasal secretions, and, lastly, retention of secretion due to the nose being blown less frequently by females than by males. Rhinoliths usually occupy the inferior meatus, but they may be met with in any part of the nasal passages.

They are almost invariably single. One or two examples have, however, been recorded in which two or more stones have been found, but there is no reliable case of both nostrils being affected. In weight they average from 7 to 90 grains. In the list of cases already referred to there are two stones, each weighing over 190 grains, one stone which weighed 337 grains, and another which attained the extraordinary weight of 720 grains. In colour, they vary from a dirty white to grey, brown, or black. In a case* under my care, the stone had a distinct greenish tinge. In

* *Clinical Society's Transactions*, vol. xxi., p. 60.

consistence they may be soft and crumbling, or as hard as ivory. Chemically, rhinoliths are usually composed chiefly of phosphates and carbonates of calcium and magnesium with traces of chloride and carbonate of sodium, and a certain proportion of organic matter. Traces of iron have been detected in some cases, probably due to the nucleus being composed of that metal.

Symptoms.—The existence of a unilateral discharge, and a feeling of obstruction in the nose, are the most common symptoms denoting the presence of a rhinolith. The discharge is usually muco-purulent, but it may be fœtid. In exceptional cases, where the septum has become perforated, there may be a discharge from both nostrils. In some cases, pain radiating from the nostril has been a marked feature. In consequence of the irritation produced by the presence of the stone, there is generally more or less swelling of the part, and in Hendley's case* the ala nasi was perforated by the pressure of the huge stone, weighing 720 grains. There is often sympathetic disturbance of the eye and ear, as shown by increased secretion of tears, earache, tinnitus, etc. There may be a nasal twang to the voice; and attacks of sneezing, giddiness, and a tendency to vomiting have been described. Unilateral hyperidrosis of the face has been noted.

Diagnosis.—"They may be mistaken for a nasal polypus or tumour on account of the dilatation of the nostril and obstruction to respiration; or, from the deformity and accompanying suppuration, for necrosis or some primary disease of the bones."† They have also been mistaken for malignant disease, and my case was sent to me with the idea that the patient was suffering from ozæna. If once a suspicion is aroused as to the true state of affairs, spraying

* *British Medical Journal* 1886, vol. ii., p. 1161.

† J. O. Roe, *Archives of Laryngology*, vol. i., p. 153.

out the nostril with an alkaline lotion (formula No. 52), and the application of a 10 per cent. solution of cocaine, followed by a careful rhinoscopic examination and the use of the probe, together with attention to the history of the case, will almost invariably enable a diagnosis to be made.

Prognosis.—A favourable opinion can be given in these cases, as when once the stone has been removed the symptoms speedily disappear.

Treatment.—The method of removal of rhinoliths depends chiefly on their size. If they are small, they can usually be readily extracted by suitable forceps. In making attempts to seize the stone, great care should be exercised so as not to push it backwards, on account of the risk of its passing into the larynx. Should it be impossible, on account of the position of the stone, or the configuration of the nose, to extract it anteriorly, it may be necessary to push it backwards; but in this event, the finger should be passed back to the pharynx so as to prevent the stone entering the larynx. In some cases, forceps, made with blades that can be introduced separately like midwifery forceps, will enable the calculus to be seized, or, as in my case, the mass may be extracted by passing a wire loop over it, and then exercising traction. If the calculus be very large, it may be necessary to crush it before attempts are made to remove it, and the administration of a general anæsthetic may be necessary. Should the calculus be unusually large and hard, it may be impossible to remove it without separating the nose from its attachment to the cheek: this had to be done in Hendley's case.

The introduction of cocaine has much facilitated the removal of rhinoliths, as painting a 20 per cent. solution of this drug over the mucous membrane not only renders the part anæsthetic, but also dilates the passage by its constringent action on the mucous surfaces. The after-treatment

consists in spraying out the nostril with some mild antiseptic solution, such as formulæ Nos. 53 and 54.

23. FOREIGN BODIES IN THE NOSE.

All kinds of foreign bodies have been met with in the nose. Among the most common are fruit stones, beans, buttons, beads, pieces of slate pencil, or of wood, shells, pebbles, etc. In the vast majority of the cases, the foreign body has been introduced up the nose by the patient, and then forgotten; but it must be remembered that in some cases the foreign body has passed into the posterior nares in the act of vomiting, or has been driven up behind the soft palate during a fit of choking. As a rule, the foreign body becomes impacted in the inferior meatus between the turbinated body and the septum; if it becomes fixed higher up, its detection is more difficult, and still more so if it has been forced into the posterior nares during the act of vomiting. After a time, the nose becomes tolerant of a foreign body; and there are numerous cases on record in which foreign bodies have been retained in the nostrils for many (in one case twenty-five) years, without exciting a suspicion of their presence.

Symptoms.—These have been fully discussed in the last section dealing with rhinoliths.

Diagnosis.—Inasmuch as a rhinolith is a foreign body, what has been said of the diagnosis of rhinoliths will equally apply to that of foreign bodies in general. The eruption of a supernumerary tooth into the nasal cavity is not a very uncommon event, and the possibility of its occurrence should always be borne in mind.*

Treatment.—An attempt should be made, in the first

* See case reported by Author, *Medical Society's Proceedings*, vol. vii., p. 29.

instance, to drive out the foreign body by one of the pneumatic methods. Slaton * describes his plan as follows :— "The operator places a thin cloth over the child's mouth, applies his finger to the nostril not containing the substance, pressing sufficiently to close the lumen, and then puts his mouth to the child's, and gives two or three strong puffs. The substance will fly out nine times out of ten." For Dodd's plan,† "all that is needed is a simple, soft rubber tube, say one or two feet long, with a hard rubber or wooden tip at one end, but large enough to fill the nostril. This olive-shaped tip is applied to the nostril next to that in which the foreign body lies. The other end of the rubber tube is applied to the lips of the surgeon, and a sudden hard blow is made, when (the soft palate having been closed either by the child's crying, or by a swallow of water in the case of an older person) the foreign body will fly out. If it does not come with one or two ordinary blows, the other nostril can also be held by the hand of the surgeon, and, during the blow, the hand suddenly withdrawn ; this sudden relief of the compressed air will act with greater force, and will be sure to drive out the foreign body." Instead of blowing, Politzer's bag may be used.

For these procedures, and indeed in all operations for the removal of foreign bodies, a 20 per cent. solution of cocaine is exceedingly useful ; it can be applied either by cotton-wool on a suitable holder, or in the form of spray. If the patient be a child, and a general anæsthetic be not given, the child should be taken on the nurse's lap, with a shawl fastened round the body so as to secure the arms and legs ; a good light should then be thrown by the reflector on to the nostril, and a careful examination made in order to detect the exact situation of the foreign body. Various

* *New York Medical Record* 1891, vol. xxxix., p. 93.

† *Lancet* 1888, vol. ii., p. 899.

kinds of forceps, duck-bill and others, have been used. One of the simplest instruments is a probe with a curve at the distal extremity; the probe should be passed up along the septum, and attempts made to lever out the foreign body. A small scoop may be used for the same purpose. A modification of Leroy d'Etiolle's instrument, used in aural cases, may also be employed to remove foreign bodies from the nose (Fig. 24). A strabismus hook has been found useful. The instrument recommended by Gross is highly approved of by Durham *; he says that it is much superior to a bent probe, fine forceps, or loop of wire. I employed a wire loop in a case of rhinolith, and succeeded in noosing, and thus removing, the foreign body. Sajous † recommends

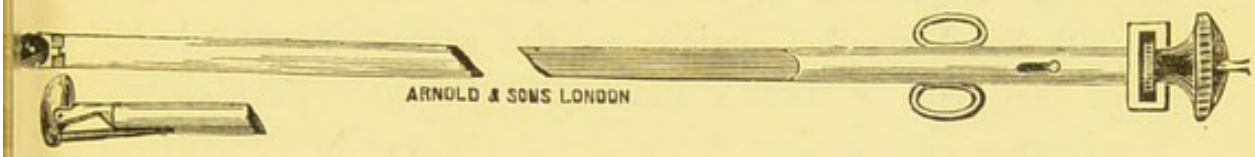


Fig. 24.—Instrument for Removing Foreign Bodies from the Nose.

a more elaborate plan. He passes one fine wire loop beneath the foreign body into the pharynx, and another above it. Then he draws both loops forward into the mouth, and fastens a piece of bandage to each. The bandage is then drawn into the nostril, and the foreign body is removed like a cork from a bottle.

Lastly, I come to a method of treatment which I only mention in order most emphatically to condemn. This is the plan of passing a stream of water into the unobstructed nostril, so that it may flow round the posterior nares into the other nostril, and thus drive the foreign body before it. The risk of water entering the Eustachian tube and setting up otitis media is so great, that this method,

* Holmes's *System of Surgery*, 3rd edition, p. 718.
† *Centralblatt*, vol. iii., p. 166.

though it has met with approval in the past, should never be employed. (See also the treatment of Rhinoliths.)

24. MAGGOTS IN THE NOSE.

Inasmuch as I do not know of any case occurring in the British Isles in which maggots have been found in the nostrils, it suffices to say that myasis is seldom met with outside the tropics.

As regards treatment, inhalation of chloroform will sometimes effect a cure; if not, the patient should be rendered anæsthetic with this drug, and equal parts of chloroform and water, or even pure chloroform, may be injected up the nostrils. Injections of kerosene have been found useful. Morell Mackenzie's * article on the subject is one of the most complete of those contained in his admirable treatise. For further information, the reader is referred to this article.

25. EPISTAXIS.

By epistaxis is understood bleeding from the nose.

Ætiology.—Epistaxis is met with in the various forms of rhinitis. In acute rhinitis, there is rarely any great amount of bleeding, seldom more than is sufficient to tinge the secretion; the same may be said of chronic hypertrophic rhinitis; in chronic atrophic rhinitis, on the other hand, it is sometimes profuse, especially when the irritation caused by the presence of the hardened crusts leads to their forcible removal. In vaso-motor rhinitis, the engorgement of the erectile tissue is usually relieved by a serous exudation; occasionally this is sanguinolent, and in rare cases, pure blood may escape. In diseases of the

* *Diseases of Nose and Throat*, vol. ii., p. 448.

nose attended by ulceration, such as syphilis and tuberculosis, the discharges are frequently bloodstained, but it is unusual for much hæmorrhage to occur. Polypi and papillomata only cause hæmorrhage in exceptional cases, but epistaxis is a frequent symptom of malignant new formations. Angiomata readily bleed, and may be the source of serious loss of blood. Worms, maggots, and centipedes may, by causing irritation, set up slight bleeding. Leeches sometimes give rise to severe hæmorrhage. Mechanical violence is the most common of all causes of epistaxis.

Of the constitutional causes of epistaxis, alteration of the lateral pressure in the blood-vessels plays an important part. The increased arterial tension and hypertrophy of the left ventricle met with in the granular contracted kidney, explain the frequency of the occurrence of epistaxis in this disease. In aortic insufficiency there is also a great tendency to hæmorrhage from the nose. In all diseases in which there is any interference in the return of blood from the head, epistaxis is a frequent symptom. Hence it is met with in diseases of the heart, especially mitral stenosis and in pulmonary affections, such as bronchitis and emphysema. In pneumonia epistaxis is sometimes observed; here it may be an early symptom, or one of the critical phenomena. In whooping-cough epistaxis frequently occurs during the paroxysm. Cirrhosis of the liver has long been regarded as a cause of nose-bleeding. In a middle-aged man the occurrence of epistaxis is almost as suggestive of cirrhosis of the liver as the presence of bleeding piles. Harkin * and Verneuil † consider that the liver plays a very important *rôle* in the origination of epistaxis. The former regards the hæmorrhagic diathesis

* *Nature and Treatment of Epistaxis*, p. 3.

† *Bulletin Général de Thérapeutique*, July 30th, 1888.

as a secondary affection, chiefly due to chronic hepatic derangement, and Verneuil maintains that latent affections of the liver may provoke, or keep up, obstinate epistaxis. Direct pressure upon the veins of the neck, as in cases of bronchocele and other tumours of the neck, may cause epistaxis.

Rarefied air, as in mountaineering and ballooning, extremes of heat and cold, or sudden change from one to the other, will produce epistaxis.

In diseases attended with alterations in the composition of the blood, epistaxis is a prominent symptom. It is met with in hæmophilia, it is the most common form of mucous hæmorrhage in purpura, and it also occurs in scurvy, chlorosis, anæmia, and pernicious anæmia. In leukæmia, Mosler* found epistaxis in thirty-five out of sixty-four cases. Epistaxis is met with in ague, "sometimes even recurring periodically as the sole symptom and effect of malarial poisoning, until stopped by the administration of quinine." †

Certain drugs, such as phosphorus, the salicyl compounds, chloralamide, etc., have been known to cause epistaxis. This symptom is met with in all the acute infective diseases, notably in enteric fever. It may occur in the prodromal stage of measles, varicella, typhus fever, erysipelas, and less frequently in scarlet fever; but epistaxis occurring at the end of scarlet fever is to be referred rather to the kidney affection than to the fever. It is very frequently met with in diphtheria, even when the diphtheritic process is not localised in the nose. In the recent epidemic of influenza, the onset of epistaxis was generally due to the catarrh, but in some cases a special hæmorrhagic tendency seems to have developed during the

* Baumgarten, *Die Epistaxis*, Wien, 1886, p. 21.

† Fagge's *Medicine*, vol. ii., p. 96.

course of the disease. In relapsing fever, according to the observations of Semon,* epistaxis was a critical symptom in more than 30 per cent. of the cases. Epistaxis may be one of the earliest signs of leprosy.

Epistaxis is rare in the newly-born and infants, but from the second year of life up to the period of puberty it is more and more frequently observed. In adult life it becomes rare, but the tendency may again manifest itself in old age.

Males are more prone to it than females. Joal's † observations show the influence of masturbation and the importance of the sexual factor in the coming on of epistaxis in young people.

That epistaxis may replace the catamenial flow is, I think, proved by sufficient clinical evidence. Obermeier's case, quoted by Fagge,‡ seems to put the question beyond doubt, in this instance at least. Baumgarten § records three cases of epistaxis vicarious to menstruation, and points out that cases of vicarious nasal hæmorrhage occur almost exclusively at the period of puberty, at the menopause, and, in rare instances, during pregnancy.

As regards the immediate exciting cause, it is found that attacks of epistaxis, occurring in persons prone to it, are usually brought on by sneezing, blowing the nose, or slight mechanical injuries to the nose, such as result from the introduction of the forefinger into the nostril; and the itching sensation experienced in the nose, in some of these cases, leads to the use of the finger. The attacks may, however, come on spontaneously, and even occur during sleep.

* Morell Mackenzie's *Diseases of Throat and Nose*, vol. ii., p. 341.
† *Centralblatt*, vol. v., p. 458.
‡ *Principles and Practice of Medicine*, vol. ii., p. 96.
§ *Die Epistaxis*, Wien, 1886.

Morbid Anatomy and Pathology.—It has been found, as the result of careful examination, that in a large number of cases of epistaxis the blood can be seen to issue from a spot on the anterior part of the septum, and, from the frequency with which this connexion exists, this spot has come to be designated the "*site of predilection*" for nasal hæmorrhage. This spot is usually at the distance of about half an inch from the anterior end of the cartilaginous septum, and corresponds to the situation of the organ of Jacobson. Kiesselbach * reports that out of thirty-five cases of epistaxis in adults, in thirty-three the source of the hæmorrhage was found on the septum, and, in the great majority of the cases, on the anterior lower part of it, in one on the inferior turbinal, and in one on the inferior turbinal and the septum. Bandler † states that out of fifty-four cases of epistaxis, the bleeding spot could not be found in seventeen cases. In the remaining thirty-seven cases, the hæmorrhage took place from the anterior part of the septum, in a few on a level with the floor of the nasal cavity, and only in one case at the level of the middle turbinal. The appearances presented by the "site of predilection" vary considerably. In some cases a varicose or aneurysmal condition of the vessels on the septum may be distinctly recognised; in others, a small patch of erosion or ulceration, the size of a poppy- or hempseed to a lentil, may be seen. Sometimes the mucous membrane is soft, spongy, and slightly elevated; at others, the spot looks pale and atrophied; occasionally, the only change to be distinguished is a slight alteration in polish and colour. Whatever may be the local condition, a characteristic symptom is, that on gently rubbing the part with a smooth probe, it bleeds. As the result of a previous hæmorrhage, the spot is usually covered with a brown or black crust.

* *Centralblatt*, vol. i., p. 204. † *Ibid.*, vol. iv., p. 205.

Chiari,* from his observations, concludes that the superficial vessels of the septum rupture, as the result of slight injuries, and bleed until the opening is closed by a clot. If complete thrombosis occur, bleeding ceases, and spontaneous healing ensues; but if only a lateral thrombus be formed, this is easily removed by engorgement of blood in the nose during sneezing, blowing the nose, etc., or by slight mechanical injuries, and the epistaxis begins anew. The close connection of the mucous membrane with the septum will probably tend to keep the vessels gaping.

Symptoms.—The mode in which the hæmorrhage occurs varies very greatly. In some cases, it may come on daily for a number of weeks; the bleeding then ceases entirely for a considerable time. In another series of cases, there may be frequent, even daily, attacks of slight hæmorrhage, this condition lasting for years; or the attacks may occur at infrequent intervals, but then generally very severely. The flow of blood usually lasts only a few minutes, but it may sometimes continue with more or less intensity for hours. The quantity of blood lost varies very greatly, from a few drops up to twelve pounds in sixty hours. Epistaxis is sometimes preceded by headache; in other cases, especially when the flow has been excessive, headache may follow the attack. In some rare cases, an attack of migraine is cut short by the onset of epistaxis.

Mahomed† has drawn attention to the fact that even when the patient is much blanched through the loss of blood, the pressure in the arteries may still remain excessive, as, for example, in cases of Bright's disease.

Diagnosis.—Epistaxis has to be distinguished from cases in which the blood does not come from the nasal mucous membrane, but from some other organ, the nose represent-

* *Allgem-Weiner Mediz. Zeitung*, 1883, No. 24.

† Fagge's *Medicine*, vol. ii., p. 451.

ing merely the passive part of a conduit. Under this category are comprised bleeding from pharynx, naso-pharynx, the accessory cavities of the nose, larynx, lungs, and stomach, and cases of fractured base of the skull. In all these instances, blood will come from both nostrils, unless there is any narrowing or occlusion of one nostril, with the exception of cases in which the hæmorrhage results from a cavity directly communicating with one nostril, and then, of course, the bleeding will be on the affected side only. On the other hand, it must be remembered that in cases of true epistaxis the blood may trickle down the throat and be swallowed, finally to be vomited up, simulating hæmatemesis. Epistaxis may also be mistaken for hæmoptysis, as in a case * where a varicose ulcer of the posterior lower part of the septum and of the corresponding surface of the right nostril led to repeated hæmorrhages, and, the blood being coughed up, gave rise to the fear that it came from the lungs. Anterior and posterior rhinoscopy, carefully carried out, will almost invariably suffice to clear up the diagnosis; in exceptional cases in which this aid fails, there are usually some collateral symptoms which will prevent a mistake being made.

Prognosis.—It may be stated that, as a general rule, the tendency of epistaxis is to cease spontaneously. In nasal diseases, with the exception of malignant new formations, a good prognosis may be given. Where the hæmorrhage is due to congestion, the combination of local and general treatment will almost invariably effect a cure. When, however, we have to deal with degenerative changes in the vessels, or with diathetic diseases, the prognosis is bad, and death may be directly due to the loss of blood.

In cases of granular contracted kidney and hypertrophy of the heart, the occurrence of epistaxis should warn the

* *Centralblatt*, vol. iii., p. 372.

physician of the possible supervention of cerebral hæmorrhage or uræmic convulsions. Epistaxis in old people with degenerative vessels also requires a guarded prognosis. If the flow of blood from the nose be too promptly arrested, one of the cerebral vessels may be the next to give way, so that in these cases attention should be directed to the state of the bowels, and if the patient be at all plethoric, his diet should be carefully regulated.

In the presence of head symptoms, the history of epistaxis is in favour of cerebral hæmorrhage, as it is not uncommon to find epistaxis preceding a fatal attack of sanguineous apoplexy.

Treatment.—In cases of epistaxis occurring in young people, the hæmorrhage is to be regarded as an effort of nature to relieve undue plethora, and may, therefore, be considered as salutary rather than injurious. In these cases, all that need be done is to direct the patient to remain quiet, to keep the feet warm, the head cool, and the neck free from any constriction, as by tight collar, etc. The best position for the patient to assume is leaning back in an arm-chair, with the head supported, so that the blood may trickle out of the anterior nares. The same line of treatment is required in cases of congestion due to cardiac, pulmonary, or hepatic disease. Supposing that it is considered advisable to check the hæmorrhage, it would be well, in the first instance, to try the effect of some of the recognised popular methods of treatment, *e.g.*, the elevation of the arms above the head, the application of an ice-bag to the nape of the neck and to the nose, or putting the feet into water as hot as can be borne.

Should these simple plans of treatment fail, a rhinoscopic examination should be made, and if, as is usually the case, the bleeding is seen to come from the "site of predilection" on the anterior part of the septum, the flow may often be

speedily arrested by introducing a small pledget of lint or iodoform gauze into the nostril, and applying the finger on the ala without, so as to bring pressure to bear upon the bleeding-point. Some authorities recommend that the lint should be soaked in a dilute solution of perchloride of iron, tincture of hamamelis, or some other astringent. I have found hamamelis answer very well. Should there be a frequent recurrence of hæmorrhage from one nostril, and a lesion be found on the septum, the most certain plan of effecting a radical cure is by the use of the galvano-cautery. A 20 per cent. solution of cocaine should be applied to the affected part by means of cotton-wool on a holder. Usually, two applications, with an interval of a minute between them, will suffice to render the mucous membrane anæsthetic. A flat platinum burner should be heated to a dull red heat, and applied crucially to the seat of the hæmorrhage, the outer wall of the nose being protected by a speculum. After cauterisation, a small pledget, smeared with carbolized vaseline or boric acid ointment, should be introduced up the nostril, and the patient should be directed to apply some ointment to the part every night until the burn made by the cautery has healed. The success which has attended the carrying out of this line of treatment has been most marked, and my own experience is in complete accord with that of Chiari and others who have recommended it. Chromic acid, applied with the precautions mentioned on p. 21, has also been successfully employed to cause cicatrisation of the eroded surface. Houdeville* has found nitrate of silver quite as efficacious as chromic acid, and without its drawbacks. After checking the hæmorrhage by pressure, he applies a 20 per cent. solution of cocaine, and then wipes the spot dry. A probe is dipped into melted nitrate of silver, so as to form a coating, and the point is applied

* *Medical Week*, December 2nd, 1892.

to the spot whence the bleeding has come, and held there for a little time until an eschar has been formed. A second application is usually sufficient to effect a cure.

Supposing, however, that a careful rhinoscopic examination fails to reveal the immediate source of the hæmorrhage, or that the loss of blood is so excessive as to prevent, for the time being, an examination being made, recourse must be had to plugging, of which there are two varieties, anterior and posterior. The former is best carried out by taking a piece of iodoform gauze about two inches wide, the length varying with the capacity of the nostril, and passing it up the nostril through a speculum. By this means, plugging can be effected with the least amount of discomfort to the patient. If a speculum be not available, the gauze may be pushed up the nostril with the aid of a probe, but this procedure is more painful than when a speculum is used.

Other methods of anterior plugging are described by Hamilton,* Daly,† and others. Various astringents have been recommended for the purpose of saturating the plugs, *e.g.*, turpentine, tincture of the perchloride of iron, tincture of hamamelis, solutions of tannic acid, antipyrin, etc., but I have found firm packing with iodoform gauze answers admirably, and there is less risk of injuring the nasal mucous membrane than if astringents are used. Cooper Rose has designed an ingenious instrument for plugging the nostril (Fig. 25). It consists of an india-rubber bag connected with a tube, which is provided with a stop-cock. The bag is introduced into the nostril in a flaccid state, and then distended by blowing it up through the tube. A modification of Cooper Rose's instrument consists of a canula, through which the patient can breathe, surrounded by an india-rubber ball which can be inflated when *in situ*. If either of

* *British Medical Journal*, May 8th, 1880.

† *Ibid.*, 1891, vol. i., p. 1123.

these instruments be at hand, it certainly should be tried in preference to other methods of plugging the nostril anteriorly, as it is very easy to apply, and causes the minimum amount of discomfort to the patient. A condom attached to the end of a gum-elastic catheter four inches long, to which is fastened a piece of india-rubber tubing provided with an ordinary clamp, has been proposed as a substitute for Cooper Rose's apparatus.*

In some cases, in spite of the most careful plugging

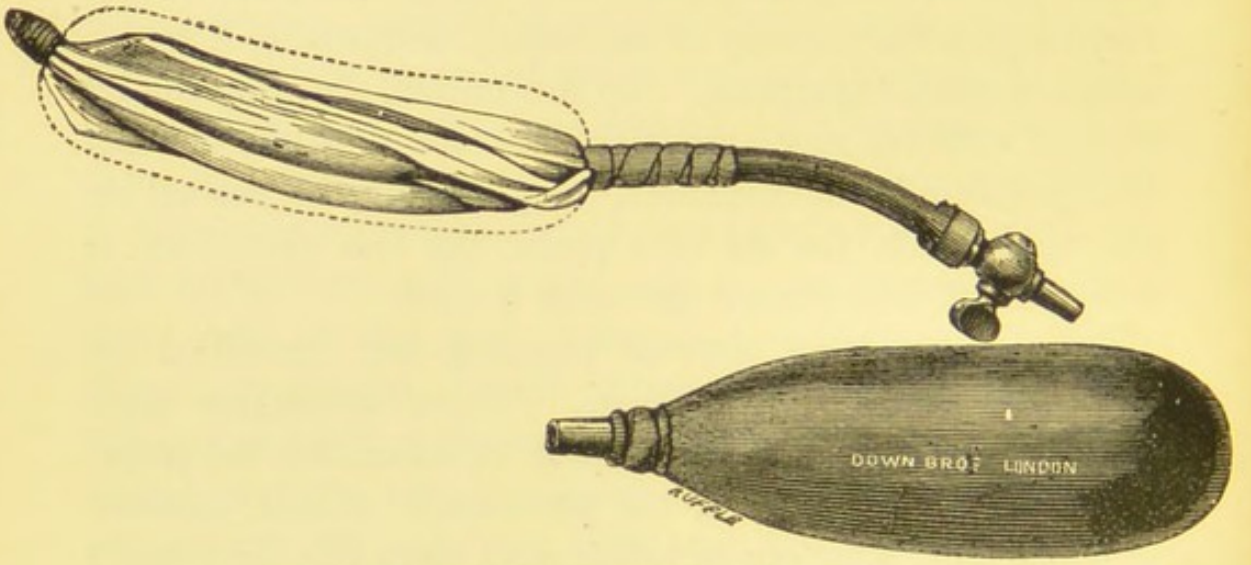


Fig. 25.—Cooper Rose's Inflating Plug.

anteriorly, the hæmorrhage continues; and then recourse must be had to the method of posterior plugging. The best instrument for carrying out the posterior tamponade is Bellocq's canula (Fig. 26). The canula, which contains a watch-spring fixed to a stylet, is passed into the nostril. By turning a screw, the watch-spring runs down the canula and protrudes into the mouth. The piece of string, which is tied to the extremity of the spring, can be attached to a pledget of lint of sufficient size to occlude the posterior nares, care of course being taken to have a second string fastened to the

* *British Medical Journal* 1884, vol. i., p. 1143.

pledget and coming out through the mouth, by means of which, when the time comes, the plug may be pulled back into the mouth and thus removed. It is a convenient plan to tie together the ends of the strings coming through the mouth and nostril respectively. After the posterior plug has been fixed, the nostril should be plugged anteriorly as described at p. 117. Before plugging, iodoform may be insufflated up the nostril, or the plug may be impregnated with this or some other antiseptic. It is not advisable to leave the plug in the nostril more than forty-eight hours. If any difficulty is experienced in withdrawing it, the best

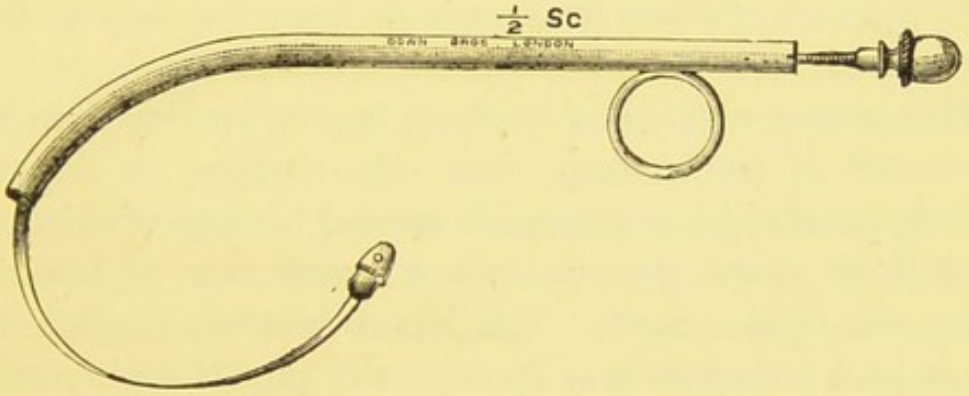


Fig. 26.—Bellocq's Canula.

plan is to irrigate the nostril with a saline antiseptic solution, such as formula No. 52. After the plug is removed, iodoform should be insufflated. In the absence of Bellocq's canula, an ordinary gum-elastic catheter will be a ready substitute for passing the string through the nostril, or a piece of silver wire, doubled so as to form a loop 16 inches long, may be used. It must always be borne in mind that posterior plugging is not a procedure to be lightly undertaken, as several deaths have been recorded from otitis media and pyæmia as a result of the operation. Quite recently, a case of tetanus, consequent on plugging, has been reported.*

* Epitome, *British Medical Journal* 1893, vol. ii., p. 66.

Instead of plugging the posterior nares by a pledget of lint introduced through the mouth, St. Ange's rhinobyon may be used. This consists of a tube opening into a small india-rubber bag. The bag is passed through the nose backwards by means of a sound, and when in position it is inflated with a syringe, and the tube is closed by a clip. To supersede the necessity of plugging, either anteriorly or posteriorly, various plans of treatment have been adopted, among which the following may be mentioned :—

Some authorities recommend that the nose should be irrigated with ice-cold water. This plan is said to have been very successful in some cases, but I do not advise it, as the stream of water tends to wash away the clots as they are formed.

Hot water, which has been so largely employed in the treatment of hæmorrhage from other organs, notably the uterus, has also been used with success in cases of epistaxis. Alvin * of Mont Dore records a severe case of bleeding from the right nostril. The blood trickled through the plugs, and forced its way through the puncta lachrymalia. The nose was swollen, owing to the collection of blood in the nasal fossæ. On the dressing being removed, blood flowed abundantly. Irrigation was performed with water at 65° to 70° Cent. (149° to 158° Fahr.). In two or three minutes the bleeding was checked. The operation was not painful, notwithstanding the high temperature of the water; it was repeated twice during the evening. MacDonald † recommends water at a temperature of 110° Fahr. It would be better to begin with water at this temperature, and if it fails, hotter water can be employed. Most of the astringents have been tried at one time or another in the treatment of this condition. If they

* *British Medical Journal* 1887, vol. ii., p. 1355.

† *Diseases of the Nose*, p. 304.

are sprayed or syringed up the nostril, they have the disadvantage of washing the clot away.

Hazeline and its pharmacopœial representative, the tincture of hamamelis, have obtained considerable repute as hæmostatics. Vinegar has long been recognised as a local astringent, and indeed it often proves very useful. Lemon-juice acts in the same way, and Geneuil * claims to have succeeded in checking epistaxis by injecting it after every other kind of hæmostatic had failed.

Various methods have been employed to retain the blood in the extremities, as, for instance, the application of a tourniquet on the thigh, fastening a ligature round the thighs close to the body, and if necessary also round each arm so as to check the venous circulation, but not the arterial, and, as previously mentioned, putting the feet into hot water.

Allusion has already been made to the importance of the liver as a factor in the coming on of hæmorrhage from the nose. Galen directed attention to the treatment of certain forms of epistaxis by the application of blisters or cupping-glasses to the right hypochondrium. Of late years, Verneuil and Harkin have been the great exponents of this doctrine. The former is of opinion that the revulsion obtained from placing a large blister on the right hypochondrium is the best means of curing certain forms of epistaxis, not responding to the usual treatment. The mode of action of this remedy, Verneuil is unable to explain. Harkin believes that the speedy cure of epistaxis is to be effected by the administration of chlorate of potassium and iron, by a combination of these hæmostatic remedies and counter-irritation, and by counter-irritation alone. The counter-irritation is to be carried out by the application of a large blister over the hepatic region.

* *British Medical Journal* 1888, vol. ii., p. 1412.

Fischer * reports a case of epistaxis, occurring in a patient suffering from typhoid fever, in which, after the failure of all kinds of treatment, local and general, energetic counter-irritation over the liver by means of a mixture of turpentine and lard, followed by hot poultices, effected a cure in three hours. Echevarria † records the case of a man, sixty-two years old, who for thirteen years had had severe attacks of epistaxis, which had led him to the verge of death. His physicians declared that he was suffering from hæmophilia. Plugging the nares anteriorly and posteriorly failed to control the hæmorrhage, but on applying a blister over the hepatic region, the flow of blood was arrested. These, and the numerous cases brought forward by Harkin, are sufficient to establish the fact that, in certain cases, counter-irritation to the hepatic region is successful in arresting an obstinate nasal hæmorrhage.

A rapid cure of profuse epistaxis in a case of syphilitic hepatitis has followed upon the administration of full doses of iodide of potassium. Gaucher ‡ mentions the case of a man suffering from nephritis accompanied with repeated epistaxis. When the patient was put on a milk diet, the epistaxis disappeared, after the ineffectual application of blisters to the liver. These cases emphasize the importance of making a thorough examination of the patient.

After the hæmorrhage has ceased, either spontaneously or by means of treatment, it is advisable, when there has been a large loss of blood, or the patient is debilitated, to adopt measures to prevent its recurrence. A mixture containing sulphate of iron and sulphate of magnesium (formula No. 18) generally answers well, or the same mixture may be given in combination with ergot or

* *Centralblatt*, vol. iv., p. 438.
† *Journal of Laryngology*, vol. i., p. 340.
‡ *Ibid.*, vol. ii., p. 375.

digitalis. Ergot may also be administered hypodermically. Tincture of hamamelis in twenty-minim doses, or fifteen minims of oil of turpentine, have been found to answer in some cases. In the intervals between the attacks, treatment should be directed against the underlying cause. For instance, the local condition should be carefully seen to, and any erosion or ulceration of the mucous membrane treated. It is most important that no crusts should be allowed to form in the nose, on account of the tendency to bleeding which their separation entails. To prevent this, the nostril from which the bleeding proceeds should be filled two or three times daily, with vaseline or some simple ointment, such as the boric acid ointment, or benzoated lard containing one in forty of carbolic acid.

Portal congestion should be treated by the administration of saline aperients and a suitable diet. If, as is often the case, the patient be anæmic from loss of blood, it will be necessary to give iron in some form or another. The addition of arsenic will often increase the good effect of the iron. Should the iron cause headache, or otherwise disagree with the patient, it will be better to give liquor ammonii acetatis, or some other saline, for a few days, and then return to the iron. Finally, an objection may be raised that it is not desirable to cure an habitual epistaxis. Chiari says distinctly that he has seen no drawback from the cure of the condition. I cannot go quite as far as this; but if the precautions to which I have already alluded be taken, the hæmorrhage from the nose may be arrested without fear of any injurious effects. This is especially true in the case of the young and middle-aged; in old age a little more caution must be exercised.*

* For further information on epistaxis see paper by Author in *Westminster Hospital Reports*, vol. viii.

26. ANOSMIA, HYPEROSMIA, AND PAROSMIA.

By the first is signified loss of the sense of smell; by the second, an increased sensitiveness of the sense of smell; and by the third, perverted olfactory sensations.

The appreciation of flavour, *aroma* or *bouquet*, apart from the sensation produced by salt, sweet, bitter, or sour things, is an attribute of the sense of smell.

For the proper working of the sense of smell, it is essential that gaseous, odorous substances should be brought into direct contact with the olfactory cells during the act of inspiration. It must be remembered that the olfactory nerves are distributed over the mucous membrane covering the upper part of the septum, the superior, and part of the middle turbinated bones. This is called the *olfactory* region; the mucous membrane is thick, and is covered by a single layer of cylindrical epithelium. The portion of the nasal cavity below this is called the *respiratory* region, and it is covered with ciliated epithelium.

From what has just been stated, it follows that anosmia may be brought about by causes preventing the access of odorous particles to the olfactory region; by changes in the mucous membrane affecting the peripheral ends of the olfactory nerves; and, lastly, by injury or disease of the olfactory bulb or the nerve centres. Hence one of the most common causes of anosmia is obstruction of the nostril by polypi, and they act not only directly, by giving rise to mechanical obstruction, but also by producing a sodden condition of the mucous membrane, very unfavourable to the sense of smell. Any other cause of obstruction, such as deflection of, or outgrowths on, the septum, rhinoliths and other foreign bodies, act in the same way. Dundas Grant* mentions the case of a patient of his with facial

* *Journal of Laryngology*, vol. ii., p. 476.

paralysis resulting from a sarcoma, which involved the right *portio dura*, and who was, therefore, incapable of sniffing, or appreciating odours in the nostril of the affected side.

Changes in the nasal mucous membrane are responsible for most of the temporary and some of the permanent cases of anosmia. The familiar experience of the effect of a cold in the head, in producing partial or complete loss of smell for the time being, is an example of this cause. Atrophic rhinitis, especially if attended with the formation of large crusts, is invariably accompanied with more or less loss of the sense of smell, possibly to the benefit of the patient, who is unable to perceive the disgusting odour emitted from his nostrils. The constant use of douches is said to act injuriously on the sense of smell by injuring the epithelium. Spirit lotions and sprays are said to act in the same way, but though I frequently order these sprays, I have not seen anything but satisfactory results from their use.

As regards changes in the periphery of the olfactory nerves, loss of pigment seems to play an important part. In a case of congenital anosmia seen by Dundas Grant,* he speaks of the pallor of the olfactory portion of the mucous membranes, as being most striking. The effects of too-powerful smells, such as those from sewers, bisulphide of carbon, carbolic acid, † etc., probably act by exhausting the irritability of the end-organs of the olfactory nerve. I have noticed that cocaine produces temporary anosmia, and Zwaardemaker ‡ states that this anosmia is preceded by an hyperæsthesia of the olfactory sense (hyperosmia), and that

* *Journal of Laryngology*, vol. ii., p. 477.

† Case recorded by the writer, *Westminster Hospital Reports*, vol. i., p. 137.

‡ *Revue de Laryngologie, d'Otologie, et de Rhinologie*, December 1st, 1889, p. 738.

it exists at the same time for distinctly different odours. Anosmia has been recorded as a result of excessive tobacco smoking. The patient was accustomed to blow the smoke through the nose. He suffered from pharyngitis and atrophic rhinitis, and he also had some weakness of sight. Discontinuance of smoking, and the use of electricity and strychnine, led to a cure.* Clinton Wagner † has observed that if the sense of smell has been exposed for a long time to a particular odour, the nerve endings become insensitive to this particular odour, but not to others. Anosmia may be due to injury or disease of the olfactory nerves, caused by blows, or falls on the head, (the occiput being the part generally struck) tumours and disease of bone or membrane, as in syphilis. Cases of congenital absence of the olfactory nerves have been met with. Disease of the posterior third of the internal capsule may give rise to hemi-anosmia, which occurs in connection with hysterical hemi-anæsthesia.‡ Or the centre for smell, localised by Ferrier in the anterior part of the uncinate or hippocampal convolution, may be affected. Cases of the occurrence of aphasia and right-sided hemiplegia with left-sided anosmia have been met with. The rule is, that the anosmia is on the same side as the lesion, but there are exceptions.

Hyperosmia is met with in some cases of hysteria and insanity, and also as a result of the increased nervous sensibility which occurs in chronic debilitating illness.§ It must be remembered that, as a rule, the sense of smell is at least twice as acute in men as in women.‖

* *Journal of Laryngology*, vol. iv., p. 468.
† *Centralblatt*, vol. i., p. 140.
‡ Zwaardemaker, *Centralblatt*, vol. viii., p. 372.
§ Gowers. Quain's *Dictionary of Medicine*, p. 1058.
‖ *Lancet* 1893, vol. ii., p. 1231.

Parosmia has occurred after an acute coryza; it has also been one of the sequelæ of the recent epidemic of influenza, or, it may be the result of an irritation affecting the olfactory nerve either at its origin or its distribution. The patient usually complains of unpleasant smells, such as that of phosphorus, sulphur, tar, pitch, petroleum, garlic, burnt hair, urine, etc.

Under the head of Parosmia may also be considered

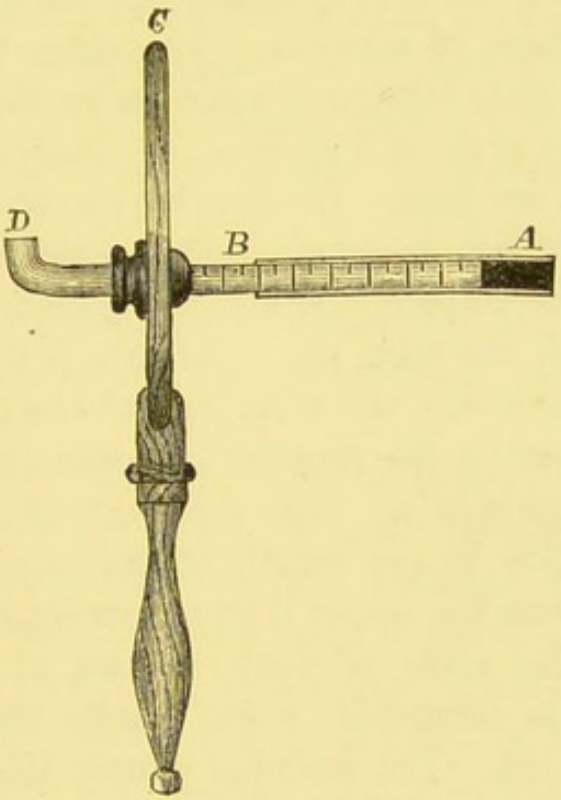


Fig. 27.—Zwaardemaker's Olfactometer.

subjective sensations of smell. These cases occur in the insane, constituting the so-called olfactory hallucinations; and in epileptics the aura may be referred to the olfactory nerves.

Diagnosis.—For the purpose of estimating the acuteness of the sense of smell, Zwaardemaker * has invented an ingenious instrument, which he calls an olfactometer (Fig. 27).

* *British Medical Journal* 1888, vol. ii., p. 1295.

The instrument consists of three parts; a vulcanised gutta-percha tube (A), containing on its inner surface the odorous substance; a glass tube (B), graduated in centimètres, and turned up at a right angle at one end (D) to fit conveniently into the nostril; this tube is mounted, for convenience of manipulation, in a wooden plate, provided with a handle (C). The odorous substances employed by Zwaardemaker are red india-rubber tubing and ammoniacum gutta-percha; the former for testing normal, or nearly normal, sense of smell, the latter for cases of anosmia. The outer tube fits easily over the inner glass tube, and when an estimation is to be made, the outer is pushed up over the inner until the outer end of the two are flush. On drawing air through the tube, the patient perceives no odour, as the air does not pass over the odoriferous surface. While the patient continues to breathe through the tube, the outer tube is withdrawn until the odour is perceived, the acuteness of his sense of smell being ascertained by the number of centimètres shown on the graduated glass tube. The acuteness of the sense is in inverse proportion to the length of the tube drawn out at the moment when the odour is first perceived.

In testing the sense of smell, the use of pungent substances, such as ammonia, which excite the fifth nerve, should be avoided. The essential volatile oils—like cloves, bergamot, and the fœtid gum resins, or musk and camphor—should be employed.*

In many instances, the patient's attention is first directed to the condition of the olfactory nerve owing to the fact that he cannot taste properly, *i.e.*, that he cannot appreciate flavours.

It must also be remembered that in cases of unilateral anosmia the defect will not, in all probability, be discovered unless the affected nostril be carefully tested.

* Landois' *Physiology* (English translation), p. 1080.

Prognosis.—In cases due to such causes as the presence of polypi, foreign bodies, etc., which are removable, the prognosis is good, always providing that the functional activity of the nerve has not been too long suspended. Cases are, however, recorded in which there has been restoration of the sense of smell following upon the removal of polypi, even after its complete loss for many years; *e.g.*, D'Aguanno * records a case which recovered after forty years. The case is quite different when the cause is seated in the mucous membrane itself, as, for example, in cases of chronic rhinitis. Here changes take place in the end-organs of the olfactory nerves, and Mackenzie † has never known recovery to take place in anosmia dependent on catarrh, where the loss of smell has existed for more than two years. In anosmia due to traumatism and central nerve disease, the prognosis is very unfavourable, except in cases of syphilitic origin.

Treatment.—If the anosmia, or other disturbance of the sense of smell, be due to local disease, this should receive its appropriate treatment. Should there be any delay in the restoration of the sense of smell after the nasal passages have regained a healthy condition, attempts may be made to stimulate it by the use of strong scents, both pleasant and unpleasant. The insufflation of irritant powders, *e.g.*, snuff, and spraying out the nostril with alcohol, have been suggested with the same object. Counter-irritation, in the shape of a blister to the neck, has been found of use. Of drugs used internally, strychnine and iodide of potassium are the only ones which seem to have any influence. The former acts by stimulating the nervous system, the latter by promoting the absorption of inflammatory material, and is, of course, especially useful in the syphilitic

* *Journal of Laryngology*, vol. iv., p. 516.

† *Diseases of the Throat and Nose*, vol. ii., p. 471.

cases. Mackenzie * has seen good effect follow the insufflation twice daily of a powder containing $\frac{1}{24}$ grain of strychnine, with 2 grains of starch.

Gowers † points out that the olfactory nerve is not accessible to electrical stimulation, though faradisation of the nasal mucous membrane has been recommended in hysterical cases. Amputation of the uvula has been followed by restoration of the sense of smell in more than one instance. According to Lennox Browne,‡ the evil was in the relaxation of the soft palate. Irritation was propagated upward and forward. The removal of the uvula relieved this irritation, and, with it, the cause of the anosmia.

27. THE ANATOMY OF THE SINUSES.

The **Maxillary Sinus,** or antrum of Highmore, is usually a pyramidal-shaped cavity, hollowed out of the body of the maxillary bone. Its form, however, varies considerably, and not unfrequently there is a want of correspondence between the two antra. The antrum is larger in the male than in the female. In early life, it is small and has thick walls. It attains its maximum size in adult life, and becomes smaller in old age. The base of the cavity is formed by the outer wall of the nose, its apex by the malar process, and its sides are formed by the orbital plate, the malar process, the alveolar process, and the zygomatic surface. Projecting into the floor are seen the processes corresponding to the teeth, usually the second bicuspid and the first and second molars. The number of teeth which may project into the antrum varies. According to Salter,§ the antrum

* *Diseases of the Throat and Nose,* vol. ii., p. 471.

† Quain's *Dictionary*, p. 1059.

‡ *Journal of Laryngology*, vol. ii., p. 280.

§ Holmes's *System of Surgery*, 2nd edition, vol. iv., p. 356.

"may extend so as to be in the relation to all the teeth of the true maxilla, from the canine to the *dens sapientiæ*." The ostium maxillare or orifice of the antrum opens into the hiatus semilunaris, a furrow extending backwards from

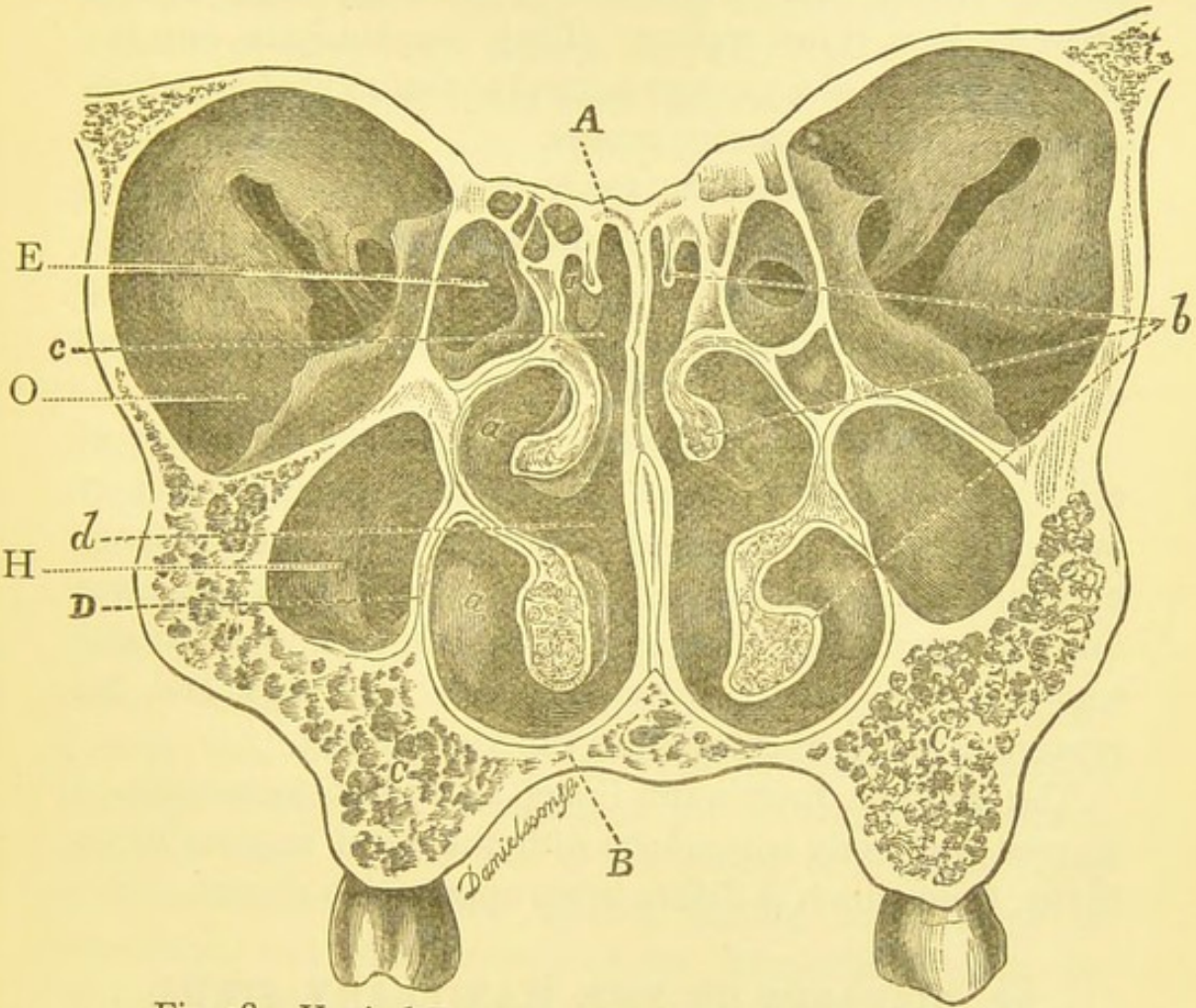


Fig. 28.—Vertical Transverse Section of the Nasal Fossæ.*

A. Roof of nasal cavity. B. Floor of nasal cavity. C. C. Alveolar processes. D. External wall of nasal cavity. *a. a. a.* Three meatuses. *b. b. b.* Three turbinated bodies. *c.* Olfactory slit. *d.* Respiratory region. E. Ethmoidal sinus. H. Antrum of Highmore. O. The orbit.

the anterior extremity of the lower border of the middle turbinal.

The **Frontal Sinuses**† are two triangular-shaped cavities,

* From Cresswell Baber's *Guide to the Examination of the Nose.*

† See Fig. 4, p. 3.

situated on either side of the base of the nasal spine. The cavities extend upwards and outwards between the two tables of the skull. They vary much in size; in childhood they are absent, but they gradually develop towards adult life. Occasionally, the thin, bony septum between them is incomplete. They communicate with the nose by means of a passage termed the infundibulum, which opens into the hiatus semilunaris.

The Sphenoidal Sinuses * are two irregular cavities hollowed out in the body of the sphenoid, and separated, more or less completely, by a thin, bony septum. They open into the spheno-ethmoidal recess at the posterior part of the superior meatus.

The Ethmoidal Sinuses are formed by a number of cellular cavities, interposed between two vertical plates of bone, the outer one forming part of the orbit, and the inner one part of the nasal fossa. The sinuses divide themselves into two groups—the anterior, which open into the hiatus semilunaris by means of several small openings, and the posterior, which open into the superior meatus.

The mucous membrane lining all the above-mentioned sinuses is directly continuous with the nasal mucous membrane, from which it differs in no appreciable degree.

28. DISEASES OF THE MAXILLARY SINUS.

Suppuration of the Maxillary Sinus.—Empyema of the Antrum.

A collection of pus in the antrum of Highmore.

Ætiology.—The difference in the views, held by dentists and surgeons as to the influence of disease of the teeth on the production of empyema of the antrum, is to be explained by the fact, that those patients who have trouble with their

* See Fig. 4, p. 3.

teeth naturally consult the dentist, whereas those in whom the nasal symptoms are more marked will seek the advice of a surgeon. H. Sewill,* for example, states that "dental disease is by far the commonest cause." On the other hand, Greville MacDonald,† having diagnosed and treated upwards of forty cases, affirms that only four of these cases were unassociated with intra-nasal suppuration, the latter being generally connected with ethmoidal disease. He further states that in the large majority of cases of nasal polypus, associated with a purulent nasal discharge, there also exists pus in the antrum.‡ Statistics, however, seem to be in favour of the dental origin of empyema. Hunter Mackenzie § found that in only one case out of thirty was empyema due to a cause other than decayed teeth. Lennox Browne ‖ puts the proportion at one in over fifty cases, and Schmiegelow ¶ says that out of twenty cases of empyema, thirteen were due to dental disease, six to the extension of purulent nasal catarrh to the antrum, and in one case no cause was detected. Twice the primary purulent nasal catarrh was brought about by nasal operations. Among the rarer causes of suppuration of the antrum may be mentioned a blow on the cheek, the stump of a tooth being forcibly driven into the antrum during an attempt at extraction, and after section of the infra-orbital nerve by Malgaigne's method. Spencer Watson ** mentions a case due to injuries received by the infant during parturition.

Morbid Anatomy and Pathology.—The reason of the frequent occurrence of empyema of the antrum as a result

* *Lancet* 1891, vol. i., p. 397.
† *Ibid.*, p. 457.
‡ *Ibid.*, p. 626.
§ *Journal of Laryngology*, vol. v., p. 37.
‖ *Ibid.*
¶ *Ibid.*, vol. ii., p. 453.
** *Diseases of the Nose*, 1890, p. 164.

of dental disease is not far to seek. Sewill * puts this very tersely: "The roots of several teeth are separated from the cavity by merely a thin layer of bone; sometimes the roots of molars extend within, covered only by a thin osseous film beneath the mucous membrane. Periodontitis, affecting such roots, may give rise to suppuration, and this extending to the antrum may establish empyema, or pent-up discharges from suppurating or gangrenous pulp of the teeth may make their way through root foramina into the cavity and excite the disease."

On the other hand, Zuckerkandl † has shown that in the later stages of empyema, the teeth whose roots project into the antrum may become carious as the result of periostitis and necrosis involving the thin, bony plates covering them. In these cases the dental mischief is secondary to the antral condition, and not the cause of it. When the antrum is affected secondarily to nasal disease, it becomes involved by extension, just as the Eustachian tubes do.

Suppuration having occurred in the antrum, it is impossible for the whole of the pus to escape. When it reaches the ostium it will run out, and if the head be lowered, a further quantity will escape; but there is always some retained unless artificial means are employed to evacuate it. As a result of the retention of the pus, the mucous membrane lining the antrum becomes still further irritated, so that eventually a pyogenic membrane is formed. Empyema of the antrum is occasionally associated with a similar condition of the ethmoid cells and frontal sinus. In these cases, the presence of nasal polypi is probably the exciting cause of the disease.

Symptoms.—Cases of empyema of the antrum may be divided into two groups—(1) Those in which there is no

* *Lancet* 1891, vol. i., p. 397.

† Bosworth, *Diseases of the Nose and Naso-pharynx*, p. 471.

exit for the pus, and (2) Cases in which the ostium is patent, and allows the pus to escape into the nasal cavity. Dundas Grant* quotes Virchow to the effect that when there is distension of the antrum it usually depends on the presence of a cystic tumour and not on pus. The first class of cases is much rarer than the second, though at one time it was regarded as being the typical form of empyema of the antrum. In these cases, there may be bulging of any of the walls of the antrum; most commonly there is pressure on the floor of the orbit, causing eye troubles. The patient generally suffers from violent pains of a neuralgic character, and there may be swelling of the soft parts of the cheek, sometimes of an erysipelatous character.†

In cases of suppuration of the antrum where there is no impediment to the escape of pus through the normal opening, there will be a unilateral discharge of pus occurring in an intermittent manner. In cases in which both antra are affected, there may be a bilateral discharge. The amount will be increased if the patient lowers the head so as to make the ostium the most dependent part of the antrum. If the dental arch be the cause of the trouble, the pus is very offensive; but this is not the case, according to M. R. Brown,‡ if the disease has resulted from the extension of a coryza. As a rule, the patient is much more troubled by the odour of the discharge than those about him, except just when the pus is flowing from the nose. The pus is usually discharged anteriorly; but if it trickle backward, it may simulate naso-pharyngeal catarrh. Pain is a prominent symptom; it may be referred chiefly to the cheek or to the supra-orbital region, and in some cases its periodicity is very remarkable. In a recent case the pain began at 8 a.m. and lasted three

* *Journal of Laryngology*, vol. v., p. 485.
† Semon, *Lancet* 1890, vol. ii., p. 968.
‡ *New York Medical Journal*, vol. lii., p. 63.

hours, there being complete freedom in the after part of the day. The point of emergence of the infra-orbital nerve is, in some cases, painful to pressure. Toothache is a tolerably constant symptom, as would naturally be expected; and even when it is not present there is often pain on mastication. The presence of the suppuration exercises an injurious effect on the patients' general health; they suffer from malaise, loss of appetite, and depression. In both forms, the onset of suppuration may be accompanied by febrile disturbance and a slight rigor. In acute empyema, starting from acute coryza, the patient may complain of pain in the upper jaw, coming on suddenly, with a feeling of weight in the antrum, and perhaps some swelling and tenderness of the cheek.

Robertson * has pointed out "the considerable frequency of the association of otitis media with antral disease associated with ozæna."

Diagnosis.—The symptoms of empyema of the antrum, where there is no exit for the pus, are so characteristic that they can only be confounded with those produced by a growth in the cavity. To make a differential diagnosis between the two, an incision into the antrum is absolutely necessary.

Unilateral empyema, with free vent for the discharge, may be mistaken for chronic rhinitis. On rhinoscopic examination with a good light, in the former a few drops of pus can commonly be seen oozing from the middle meatus, and the flow is generally increased by getting the patient to lower the head. As a rule, in empyema the patient complains more of the smell from the discharge than those about him, the contrary being the case in the ozæna of rhinitis. Percussion will sometimes be of assistance, the forefinger being placed over the infra-orbital foramen.

* *Lancet* 1893, vol. i., p. 984.

The method of trans-illumination by the electric light carried out by Heryng is a valuable aid to diagnosis. The lamp (Fig. 92), attached to a suitable tongue-depressor, is introduced into the patient's mouth. The room is then darkened, and the electric light turned on. The patient may have charge of the switch, so as to turn the light out when the lamp becomes too hot. If the antrum be empty, the cheek will be seen to be translucent, the colour being especially bright beneath the lower eyelid, and the pupil is seen in red light. The amount of translucency varies with the size

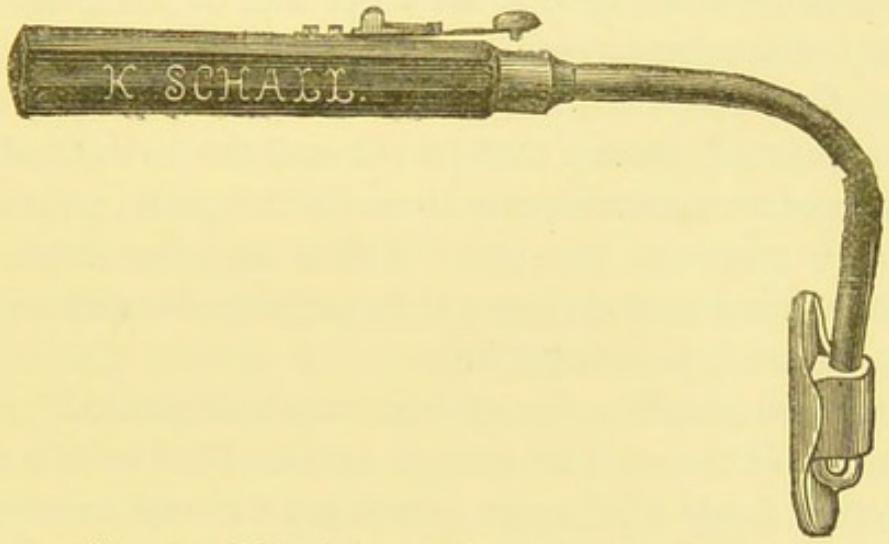


Fig. 29.—Electric Lamp for Trans-illumination.

of the cavity, the thickness of the bony wall and the soft parts. Trans-illumination is prevented if the antrum be occupied by fluid or a solid growth. Thickening of the lining membrane, such as results from an old-standing empyema, will also interfere with the translucency. This test, which at first seemed to promise to be of decisive value, is not altogether reliable, as the antra vary much in size and in the thickness of their walls; moreover, even in the same individual, the antrum on one side may differ from the other. In old people the bones become less translucent. Kelly *

* *British Journal of Dental Science*, April 1st, 1892.

points out that trans-illumination is of value in distinguishing a cyst from a solid growth in the antrum. If the cyst has thin walls and serous contents, the translucency is increased, whereas in a solid growth it is lessened. Schmidt * recommends that the antrum should be perforated from the nose by means of a Pravaz syringe. This is connected with a canula, bent like an Eustachian catheter, and sharp-pointed. The mucous membrane is painted with a 20 per cent. solution of cocaine. The syringe is passed about $1\frac{1}{4}$ to $1\frac{1}{2}$ inch from the columna; the point is pressed upwards and outwards against the outer wall of the nose, only sufficient force being employed to perforate the bony partition. On aspiration, the diagnosis is complete if pus flows. Schmidt states, that in five months he verified the diagnosis of empyema sixteen times by this plan; and twelve times the puncture was made with a negative result, but without any subsequent harm. As performed under cocaine, the operation is almost painless.

Should no pus flow, the syringe may be detached and the canula left *in situ*. The syringe is then filled with a warm solution of boric acid, again connected with the canula, and the fluid is driven into the antrum. Should there be any pus in the cavity, it will be forced out through the ostium. This is Lichwitz's method.† Dundas Grant ‡ has modified the instrument employed. He uses a canula three inches long, with a funnel-shaped tube at the proximal extremity, so as to facilitate the fitting of the trocar, which is three-and-a-half inches long, to it. He perforates without the speculum. He points out that there is a tendency not to push the point sufficiently outwards, so that instead of the cavity of the antrum being entered, the point of the canula

* *Berliner Klin. Wochenschrift*, 1888, No. 50.
† *Bull. Medical*, No. 86, 1890. Quoted by Kelly.
‡ *Journal of Laryngology*, vol. v., p. 485.

perforates the upper part of the inferior turbinal, and the fluid, passing into the pharynx, causes choking. He rightly insists that the scope of this proceeding is simply for diagnosis and not for treatment. Moreau Brown* claims that the method he has introduced is simple, free from danger, easy of application, and yet fully reliable. After the nasal passage has been thoroughly anæsthetised with cocaine, "a small hypodermic syringe, with a long canula, bent within a quarter of an inch of the distal end to a right angle, is passed into the hiatus semilunaris, and a solution of peroxide of hydrogen (one part to twelve parts of water) is injected into the antrum. If pus be present, it is driven out, and fills the nose as a white foam. That the solution has entered the antrum will be made evident by the patient complaining of slight pain at the roots of the teeth, and a sense of fulness in the cheek."

When there is a discharge of bright yellow pus appearing in the middle meatus on one side, there may be much difficulty in deciding as to whether it comes from the maxillary, sphenoidal, ethmoidal, or frontal sinuses. The pus may also proceed from a suppurating pouch in the middle turbinated body.

Treatment.—The treatment of empyema of the antrum may be considered under the following heads: (1) Perforating the floor of the antrum through the alveolus; (2) Perforating the superior maxillary bone in the canine fossa; (3) Perforating the outer wall of the nostril in the inferior meatus; (4) Enlarging the natural opening into the antrum. The majority of surgeons still adhere to the plan of opening the antrum through the alveolus, as originally suggested by Cooper. This is especially the case if any of the teeth immediately below the antrum are carious. If there be a choice, it is best to perforate the antrum from

* *New York Medical Journal*, vol. lii., p. 64.

the second molar. The operation can be so quickly performed, that nitrous oxide will generally suffice as the anæsthetic. For the instrument, an ordinary brad-awl does very well, or a special trocar and canula can be employed. Before perforating the antrum, the depth to which it is intended to introduce the instrument should be determined; otherwise, it is possible that the orbital plate might be injured. If the patient is placed under gas and ether, or chloroform, a passage may be bored into the antrum with a small hand-drill, or a dental engine, or an electro-motor may be employed to drive a burr. Having made a free opening into the antrum, the pus should be thoroughly washed out by some warm disinfecting fluid. A saturated solution of boric acid answers very well for this purpose. A Higginson's syringe, attached by a piece of rubber tubing to an ordinary Eustachian catheter in the alveolus, will be a convenient arrangement for washing out the antrum; or a syringe with a long, thin nozzle, as designed by Christopher Heath * for the treatment of these cases. If pus continues to be formed, various slightly astringent solutions may be tried, *e.g.*, permanganate of potassium, sulphate of zinc, tincture of iodine in water, etc. As regards the method of keeping the opening patent, the best plan is to have a gilt tube inserted in the alveolus, and connected with a metal plate fastened to one of the adjacent teeth. A small plug fits into the opening to prevent the entrance of food, etc. Greville MacDonald † recommends Ellis's smallest-sized spiral drainage-tube, instead of the tube and plate just mentioned. Ellis's tube is self-retaining; it can be removed and replaced by the patient, and it can be prevented from slipping in too far by widening

* *Lancet* 1891, vol. i., p. 397.

† *Ibid.*, p. 457.

the lower coil. After a little time, patients learn to wash out the antrum for themselves. They should first be instructed to thoroughly cleanse the mouth with an antiseptic solution (listerine, one part to three of water, answers admirably); then a mouthful should be taken, and, by the action of the buccinators, the fluid can be forced into the antrum and out through the nose.* If the surgeon supplements this by himself washing out the antrum once or twice a week, a good result may be confidently expected in the majority of cases.

If cure is not attained after carefully washing out the antrum, various plans of treatment may be tried. Krause† recommends that after the cavity has been cleansed, by irrigation with warm water, it should be dried by blowing air through it. Iodoform, or iodol, should then be insufflated through the canula by means of Kabierski's pulveriser (*see* Fig. 23, p. 86). By this plan, he maintains that cases have been cured within two weeks.

In old-standing cases, Hunter Mackenzie‡ recommends that the mucous membrane of the antrum should be thoroughly curetted, and, after the sloughs and *débris* have been washed away, dry boric acid should be insufflated. In order to carry out this procedure, it is requisite to insert a larger tube than is commonly employed; but it is not necessary to make the opening large enough to admit the little finger, as has been proposed. Schech,§ in obstinate cases, advises that the opening should be enlarged, or a fresh one made in the canine fossa, and the cavity tamponaded with iodoform gauze. The existence of bony septa in the floor of the antrum will

* *British Medical Journal* 1887, vol. i., p. 1259.
† *Journal of Laryngology*, vol. iii., p. 481.
‡ *Lancet* 1891, vol. i., p. 574.
§ Quoted by Kelly, *British Journal of Dental Science*, April 15th, 1892.

sometimes be an obstacle to the successful treatment of the case.

The second method of penetrating the antrum is by making an opening in the canine fossa. Moreau Brown* recommends that after the mucous membrane has been locally anæsthetised, an incision should be made into it just below the gingivo-labial fold between the roots of the second bicuspid and first molar teeth. The drill, which can be driven by a dental engine or an electro-motor, should be entered at the point of incision, and directed upward, inward, and slightly backward. A few revolutions will suffice for the drill to enter the antrum. A gold tube, attached by a collar round a tooth, is fitted into the hole, and the cavity can be washed out as already described. Christopher Heath† prefers "the puncture above the alveolus, except when a tooth obviously requires extraction."

The third plan is that of making the opening into the antrum through the outer wall of the nasal passage. Mikulicz is the chief advocate of this method. The advantages claimed for the various intra-nasal operations are: "(1) Particles of food cannot gain access to the antrum; (2) Pus does not flow into the mouth, and injure the digestion; (3) Extraction of a tooth is unnecessary. On the other hand, the disadvantages are: (1) Drainage cannot be so thorough, because the opening is not in the lowest part of the cavity; (2) It is uncomfortable, difficult, and, in some cases, impossible for the patient himself to carry out the after-treatment."‡

Mikulicz§ makes the opening into the antrum just below the middle of the inferior turbinated body, by

* *New York Medical Journal*, vol. lii., p. 65.
† *British Medical Journal* 1887, vol. i., p. 1259.
‡ Kelly, *British Journal of Dental Science*, April 15th, 1892.
§ Quoted by Bronner, *Lancet* 1888, vol. ii., p. 367.

means of a suitably bent knife; and, when done under cocaine, he says the operation is painless. He has constructed a special trocar for the purpose. The after-treatment is the same as when the alveolus is perforated. The fourth method is that of enlarging the natural opening in the middle meatus. This may be effected by the galvano-cautery, or a suitably shaped trocar. This plan has not met with much favour; it is not easily carried out, the patient is unable to irrigate the cavity himself, and, moreover, drainage is impossible, as the opening is above the level of the fluid, and it is only when the head is in a dependent position that the cavity has a chance of emptying itself. Lastly, attempts have been made to wash out the antrum through the ostium in its natural condition, and even by injections introduced into the nasal fossa.

Bronner* advocates syringing out the antrum through the natural opening, and employs for this purpose a common Eustachian catheter, or small bent silver tube. He claims for this method "that (1) it is the most natural way of syringing the cavity, as no new opening has to be made; (2) it is very simple; and (3) not at all painful. The disadvantages have been already pointed out when describing the last method. It need hardly be said that injections introduced into the nasal passages are useless so far as washing out the antrum is concerned.

Cystic Disease of the Antrum.

In addition to containing pus, the antrum may occasionally be distended with a clear fluid. As already stated, if there be much distension of the antrum, this is probably due to a cystic formation rather than to empyema. The fluid is

* *Lancet* 1888, vol. ii., p. 367.

usually clear, and of a viscid nature; it may become flaky from the presence of cholesterine. Occasionally, the fluid has a greenish tinge, or it may even be purulent.

Treatment.—Christopher Heath recommends that the bony wall, which is usually thinned by pressure, be incised, and the fluid evacuated. The finger can then be introduced, in order to discover if there be any growth or tooth in the cavity. Syringing with a stimulating lotion is usually sufficient to effect a cure.

Polypi are occasionally met with in the antrum. In a case recorded by Paget,* the only symptom of the polypi, which were discovered *post mortem*, was the constant dropping of a clear, watery fluid from the left nostril.

Cysts in connection with the teeth may involve the antrum.†

29. DISEASES OF THE FRONTAL SINUS.

With the exception of the hyperæmic condition of the mucous membrane lining the sinus, which attends acute attacks of coryza, affections of this sinus are very uncommon. The disease which occurs most frequently is empyema; this may be the result of an acute catarrh. Several cases have been reported following an attack of influenza, or it may be due to a blow, or to syphilitic disease of the nose. Like empyema of the antrum, suppuration in the frontal sinus may be caused by polypi; these block up the infundibulum, and prevent the exit of fluid from the sinus. As already mentioned, suppuration of the frontal sinus is sometimes found associated with purulent ethmoiditis and empyema of the antrum. Schech‡

* *Clinical Society's Transactions*, vol. xii., p. 43.

† Heath, *British Medical Journal*, 1887, vol. i., p. 1261.

‡ *Sajous' Annual* 1891, vol. iv., D. 30.

gives the following as the order of frequency in which affections of the sinuses occur: Disease of the antrum, after that, the frontal sinus, ethmoidal cells, and, rarest of all, the sphenoidal sinus.

In some cases, the sinus is expanded by an accumulation of glairy mucus.* In other cases, polypi resembling the ordinary nasal polypus are found in the sinus. Generally, polypi are simultaneously present in the nose, but sometimes they occur in the sinus when the nose is free. Osseous, sarcomatous, and other tumours, occasionally arise in the sinus.

Hulke† points out "how much more grave is the occurrence of polypi in the frontal sinuses than in the nose; that in these they have a similar obstinate tendency to recrudescence which they exhibit in the latter; and that, owing to their more strict confinement in the sinuses, they more quickly expand, and waste the bony walls, than they do those of the nose, where their restriction is less." Their diagnosis, except in very advanced stages, is probably impracticable; but the presence of nasal polypi affords a clue.

Symptoms.—The symptoms of distension of the frontal sinus are severe frontal headache, with supra-orbital neuralgia and pain at the root of the nose, œdema of the upper eyelid, protrusion of the eyeball downwards and outwards, and a swelling at the inner and upper part of the orbit. The swelling is at first hard, but after a time it may become soft and fluctuating.‡ Occasionally, cerebral symptoms, due to pressure, arise. A case of suppuration in the sinus, with abscess in the brain, leading to death, has been recorded as a sequel to influenza.§

* J. W. Hulke, *Lancet*, 1891, vol. i., p. 589.
† *Ibid.*, p. 590.
‡ Juler, *Ophthalmic Science and Practice*, p. 406.
§ *Centralblatt*, vol. ix., p. 171.

Diagnosis.—Dilatation of the sinus, the infundibulum being closed, may be mistaken for a sarcoma or other tumour of the orbit, and the true nature of the swelling is sometimes only revealed by an incision. It also requires to be distinguished from a distended lachrymal sac. The latter is situated at the lower margin of the orbit, and can be emptied on pressure. If the infundibulum be patent, pus may be seen in the middle nasal meatus, which does not increase on holding the head down. Occasionally, by pressure on the inner angle of the orbit, pus may be made to trickle down into the nasal passages.* Trans-illumination with the electric light will also assist in excluding empyema of the antrum.

Prognosis.—The results of the surgical treatment of abscess of the frontal sinus have been good. The possibility of necrosis of the frontal bone and subsequent meningitis, and of pyæmia, must be borne in mind.

Treatment.—If there be a swelling at the inner angle of the orbit, and protrusion of the eyeball, the swelling should be incised, and a communication between the sinus and the nose opened up. A drainage-tube is passed through the external wound into the nostril, and the two ends of the tube may be tied together. The cavity should be irrigated with a solution of carbolic acid (1 in 40), or tincture of iodine (1 in 50). If polypi are present, they must be removed, and the walls carefully scraped with a sharp spoon.

In the absence of any local bulging, persistent and severe frontal headache, with the presence of pus in the middle meatus,—empyema of the antrum either having been excluded or, if present, treated,—may lead to trephining of the frontal sinus. The incision should be made in the inner wall of the orbit, immediately below the eyebrow.

* R. Williams, *Lancet* 1890, vol. i., p. 457.

30. DISEASES OF THE SPHENOIDAL SINUS.

Mucous and purulent collections have been noticed in the sphenoidal sinus in tubercular and cerebro-spinal meningitis.* Syphilitic disease of the bone may also lead to suppuration of the sinus.

Symptoms.—There is usually pain in the middle of the head, which radiates to the neck, occipital, and supra-orbital regions.† A puriform discharge may be seen trickling down the posterior wall of the pharynx ‡; more rarely in the choanæ, between the superior and middle turbinated bodies.

Treatment.—It has been suggested to puncture the anterior wall of the sinus at the level of the middle turbinal; but the close proximity of the brain renders any operative procedure in this neighbourhood extremely dangerous.

31. DISEASES OF THE ETHMOIDAL CELLS.

Bosworth § places diseases of the ethmoidal cells in three classes, viz., extra-cellular myxomatous degeneration, intra-cellular myxomatous degeneration, and purulent ethmoiditis. The causes of the first two are doubtful. In all of the thirteen cases of the latter under his observation, the ethmoiditis came on in connection with polypi, and in seven cases there also existed an affection of the antrum. As already mentioned, Gruenwald ‖ has pointed out the intimate relation which exists between polypus-formation

* Schech, *Diseases of the Mouth, Throat, and Nose*, p. 280.
† Max Schaeffer, *Sajous' Annual* 1891, vol. iv., D. 30.
‡ G. MacDonald, *Diseases of Nose*, p. 179.
§ *Centralblatt*, vol. ix., p. 14.
‖ *Die Lehre von den Naseneiterungen*, p. 54.

and suppuration in the ethmoidal cells and the other accessory cavities, and he regards the polypi as being caused by the suppuration.

Symptoms.—If pain be experienced, it is referred to the cheek and infra-orbital region. When the anterior ethmoidal cells are affected, pus will appear in the nasal cavity behind the middle turbinal, at the spot where the antrum also discharges its contents. When the posterior cells are implicated, pus may be seen to ooze from the upper surface of the middle turbinal. In most of Gruenwald's cases * of caries of the ethmoidal cells, there was nothing in the rhinoscopic appearance to suggest the suspicion of any deep-seated disease.

Treatment.—If suppuration of the ethmoid cells be diagnosed, they may be opened by a puncture made in the middle turbinal, and the trabeculæ should be broken up by the curette. W. R. H. Stewart † has reported a case in which, after puncturing the middle turbinal, he inserted his little finger into the nostril, and was enabled to pass it on into the orbit. All dead bone was removed, the cavity was washed out with a warm boric acid solution, and a drainage-tube inserted. The patient made a good recovery.

Cyst of the Middle Turbinated Body.

The middle turbinal may, by a process of osteophytic periostitis, become the seat of a cyst, and, in rare cases, the fluid contents become purulent. Greville MacDonald ‡ has given an excellent account of this condition. In his cases, the cysts were "of varying size, from that of a filbert to such as would probably contain half an ounce of fluid."

* *Die Lehre von den Naseneiterungen*, p. 128.
† *Lancet* 1893, vol. i., p. 994.
‡ *Ibid.*, 1891, vol. i., p. 1374.

Symptoms.—Patients usually complain of interference with nasal respiration, impaired sense of smell, and persistent headache. The voice has a nasal quality, and there may be a considerable amount of post-nasal discharge.

Diagnosis.—Cyst of the middle turbinal may be distinguished from a large polypus by its immobility, its hardness, and, at the same time, its fragility.*

Treatment.—If the cyst is not too large, a loop should be passed over it, and the mass torn away like a polypus. Any remaining portions may be removed by means of forceps. If the cyst be large, it must be pierced with the galvano-cautery or knife, and removed piecemeal by means of forceps. In spite of the free use of cocaine, the pain of the operation is usually considerable, but there is seldom much hæmorrhage.

32. THE ANATOMY OF THE PHARYNGEAL TONSIL

In the upper and central part of the naso-pharynx is a soft mass of adenoid tissue, to which the name of pharyngeal tonsil, the tonsil of Luschka, or the third tonsil, has been applied. This tissue is about a quarter of an inch in thickness, and covers the whole extent of the under surface of the basilar process of the occipital bone. In the median line at the lower border of the tonsil is usually found a depression of the mucosa. Tornwaldt† regarded it as a special anatomical formation, but Schwabach† has shown that it is nothing but the remnant of the middle cleft of embryonic life, the primary element of the pharyngeal tonsil.

* C. H. Knight, *Paper read before the Thirteenth Annual Congress of American Laryngological Association.*

† *Sajous' Annual* 1889, vol. iv., D. 19.

33. DISEASES OF THE PHARYNGEAL TONSIL.

The pharyngeal tonsil may be attacked by precisely the same diseases as attack the faucial tonsils, *i.e.*, there may be parenchymatous or follicular inflammation,* and it may be the seat of syphilis, or diphtheria. I have seen severe follicular inflammation of the pharyngeal tonsil as a sequel of influenza.

The inflammatory affections of the pharyngeal tonsil give rise to more or less nasal stenosis. The patient complains of pain in the back of the nose accompanied with headache.

Treatment.—The general treatment is the same as for inflammatory affections of the faucial tonsils. If suppuration has occurred in the tonsil, and there is delay in the pus being evacuated, the surgeon, after carefully washing his hand, should dip his forefinger into absolute alcohol, and then scrape down the tonsil. Should the tonsil remain enlarged, it may be removed with the curette, ring-knife, or artificial nail, as described in the section on adenoid vegetations (*see* p. 158).

Fourteen cases of primary syphilis of the naso-pharynx have been recorded. In every case, infection has been conveyed by the Eustachian catheter.† Secondary syphilitic affections of the naso-pharynx occur more frequently than is commonly supposed.

Occasionally, tertiary syphilis or diphtheria may be localised in the naso-pharynx, usually on the pharyngeal tonsil, without any recognisable change in the oro-pharynx. It is sufficient to direct attention to the possibility of these conditions, in order to lead to a careful rhinoscopic examination in suspicious cases.

* Paulsen, *Centralblatt*, vol. i., p. 276.

† *Centralblatt*, vol. x., p. 329.

34. NASO-PHARYNGEAL CATARRH.

In connection with the pharyngeal tonsil must be discussed certain symptoms which are said to depend on affections of the pharyngeal bursa (*see* p. 149). Among these may be mentioned a sense of dryness and persistent slight pain in the throat, frequent desire to cough or hawk, especially in the morning, relief being experienced after the expectoration of a firm, sticky mass of greyish-yellow colour. Pharyngeal, laryngeal and Eustachian catarrh, otitis media, tinnitus, and deafness, have also been attributed to bursal affections. On rhinoscopic examination, the pharyngeal tonsil is found to be swollen, and sometimes covered with a muco-purulent exudation. By some authorities, and notably by Tornwaldt, the pharyngeal bursa has been regarded as the seat *par excellence* of those processes which lead to naso-pharyngeal catarrh. There are certainly some cases of this affection which seem to owe their origin to a diseased state of the pharyngeal tonsil, and which may be cured by treatment directed to that organ; but in the majority of cases there is also a chronic catarrhal state of the nasal passages. Gastro-intestinal disturbance is also occasionally present; and treatment which relieves this will generally benefit the naso-pharyngeal catarrh.

Treatment.—Direct local treatment to the pharyngeal tonsil offers the best prospect of cure in old-standing cases of post-nasal inflammation. In the less severe cases, palliatives, such as antiseptic and astringent lotions (formulæ Nos. 52 to 55, 65 and 66), may be employed, either with the anterior or posterior spray apparatus. I have had good results from applying solutions of iodine (formulæ Nos. 44 and 45) with a suitably curved brush. In more severe cases, nitrate of silver, fused on an aluminium holder suitably bent, or the galvano-cautery, may be applied to the tonsil. Should the

tonsil be much enlarged, it may be removed with the post-nasal forceps, the curette, or by scraping with the artificial nail or simply the finger-nail.

Naso-pharyngeal catarrh is frequently a very troublesome condition to cure. In the first place, the general directions given on p. 9 for the treatment of nasal catarrh should be carried out. Then the nasal passages should be carefully examined, and if deflection of the septum, spurs, hypertrophy of mucous membrane, or polypi, are present, they should receive appropriate treatment. If the catarrh exist notwithstanding the absence of these abnormalities, or continues after their removal, then the pharyngeal tonsil should be treated as described above.

35. ADENOID VEGETATIONS.

Hypertrophy of the adenoid tissue, normally existing in the naso-pharynx.

Ætiology.—All authorities are agreed in regarding *youth* as the most important predisposing cause for adenoid vegetations. They would seem, in some instances, to be congenital; but no dissections of new-born infants have confirmed this theory. According to Trautmann, ten months is the earliest age at which they have been recognised; but they are usually overlooked until the age of three or four. They are most common between the ages of five and fifteen, and rarely occur after twenty-five years of age, though adenoid vegetations, giving rise to nasal obstruction and nasal speech, are occasionally met with in adults, and Luc * has found them in one patient of the age of fifty-four. As regards *sex*, recent statistics have confirmed Meyer's observation that they are more common in boys than girls.

* *Centralblatt*, vol. vii., p. 232.

Heredity undoubtedly exercises some influence in the development of adenoid vegetations: it is not at all uncommon to find two or more members of the same family affected.

These growths are met with in all climates, but a damp and cold atmosphere is certainly a predisposing cause. Massei* remarks, for example, that adenoid vegetations are quite rare in Italy, and that those found seldom present extensive development. The *rôle* which scrofula plays in the production of adenoid vegetations is obscure; that there is a tendency to lymphoid hypertrophy in scrofula is well established, so that it can readily be understood that a slighter exciting cause may determine the growth in a scrofulous child, than would suffice in a healthy one. As the exciting cause, may be mentioned nasal catarrh. This may be symptomatic of one of the exanthemata, especially measles, or it may come on in connection with gastro-intestinal irritation. Adenoid vegetations are usually well marked in cases of cleft palate, and this is possibly due to the direct irritation of food and cold air.

Morbid Anatomy and Pathology.—In the less severe forms of the disease the growth may be confined to the roof of the naso-pharyngeal cavity, and when regular and lobular is designated hypertrophy of the pharyngeal tonsil. In the severe forms the vegetations are very numerous, large and irregular, and are not confined to the roof of the cavity, but extend to the lateral walls, grow from the fossa of Rosenmüller, and even cover the orifices of the Eustachian tubes. In structure, they are similar to the faucial tonsils and to the granulations seen on the posterior wall of the pharynx in cases of granular pharyngitis. There is frequently a connection between the enlarged pharyngeal and faucial tonsils, and sometimes even the adenoid tissue at the base of the tongue—the so-called lingual tonsil—is included

* *Sajous' Annual* 1889, vol. iv., D. 23.

in the chain. The surface of the vegetations is formed of columnar ciliated epithelium. The substance of the tumours is composed of lymphoid tissue, *i.e.*, a delicate reticulum, within the meshes of which are contained lymph corpuscles. The only respect in which these vegetations differ from an enlarged tonsil is, that in the latter there is a great amount of connective tissue, due to the irritation produced by the passage of food, etc., whereas the vegetations from their situation are protected from these injurious influences. The adenoid vegetations of adults only differ from those met with in children, in being of a somewhat firmer consistence, *i.e.*, they have undergone a fibrous change.

Symptoms.—The practised eye can at once pick out a child who is suffering from extensive adenoid vegetations. The face is long, the nose pinched, and there is loss of power in the muscles of the nose, there is often lateral narrowing of the alveolar arch and prominence of the upper incisor teeth, the mouth is kept open, and the lips are swollen and thick. Naso-pharyngeal obstruction, by causing oral respiration, produces elevation of the palate through the influence of atmospheric pressure.* Scanes Spicer † has directed attention to the distension of the transverse nasal vein as one of the indications of the presence of adenoid vegetations. The general aspect of the child is vacant, and this is increased by the deafness which is a very common accompaniment of the disease. The amount of interference with hearing caused by adenoid vegetations very much depends on the relation of the Eustachian orifice to the vault of the pharynx. If the orifice be situated high up, a comparatively small amount of growth will block it and cause auditory troubles, whereas if it be low down

* *British Medical Journal* 1890, vol. ii., p. 619.

† *Ibid.*, 1887, vol. ii., p. 459.

there may be extensive vegetations without the Eustachian tube being implicated.* The voice has a "dead," muffled sound, with a marked nasal twang, and inability to pronounce *m*, *n*, and *ng*. Stammering, or stuttering, has in several cases been completely cured by the removal of adenoid vegetations, the explanation being that the spasmodic action of the muscles of the throat was due to reflex irritation. Breathing is almost entirely carried on through the mouth and is noisy, and snoring is all but an invariable symptom.

Children affected with these vegetations are frequently having colds in the head; sometimes they seem unable to blow the nose properly. They dribble at night, and the fluid from the mouth is often blood-stained, and ptyalism may occur in the daytime. Occasionally the loss of blood may amount to some ounces, giving rise to the suspicion of lung or gastric disease.† On examining the throat, a muco-purulent exudation will be seen trickling down the posterior wall of the pharynx. There is usually a cough and a good deal of hawking, as if the child was conscious of an obstruction which it wanted to remove. The discharge trickling down the pharynx is apt to irritate the larynx and set up chronic laryngeal catarrh, and it may also give rise to gastric disturbance. Attacks of laryngismus stridulus or even convulsions may be due to the presence of these vegetations. One child was brought to see me on account of the inelegant manner in which he ate, and the noise he made in so doing. This was due to his being unable to breathe through the nose while eating. The symptom for which, however, as a rule, advice is sought, is deafness, accompanied, or not, as the case may be, with purulent discharge from the ears. At times, the child has

* *Sajous' Annual* 1888, vol. iii., p. 278.

† *British Medical Journal* 1893, vol. i., p. 1322.

violent attacks of earache. Epistaxis is sometimes a result of these growths.

For the general symptoms produced by adenoid vegetations, reference should be made to the section on nasal stenosis (*see* p. 59).

If the adenoid vegetations are allowed to remain, they usually atrophy after the age of puberty, but unfortunately not until irreparable damage has, too frequently, been done. The long face and underhung jaw are the outward manifestations of the disease. The voice remains thick, and the

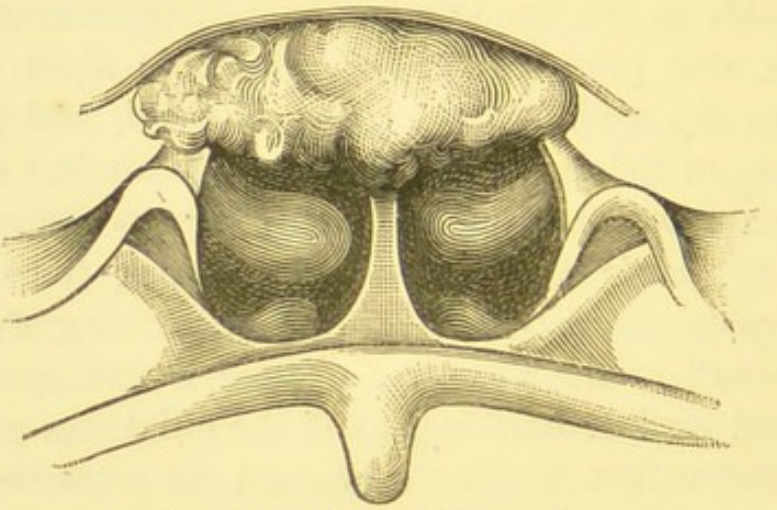


Fig. 30.—Adenoid Vegetations.

patient has a tendency to naso-pharyngeal and laryngeal catarrh. The most serious sequela, however, is deafness, which results from the chronic catarrh of the Eustachian tubes, set up by the presence of these growths.

Diagnosis.—In a typical case, the appearance of the patient, and mouth-breathing and snoring at night, are sufficient to establish the nature of the case. In many patients, the diagnosis can be confirmed by the use of the rhinoscope (Fig. 30). The naso-pharynx will be seen occupied by an irregularly lobulated mass or masses blocking up the choanæ, and preventing the posterior aspect of the septum being

seen. If the rhinoscope cannot be used satisfactorily, the finger should be passed up behind the soft palate, when it comes upon a mass which feels like a bag of worms. Unless the patient is anæsthetised and has a gag in the mouth, the finger should be protected from an attempt at biting by a leather guard.

Prognosis.—The harmful effect of leaving the naso-pharynx blocked up with these growths is so certain, and the success attending their removal so great, that an operation can confidently be advised. If the vegetations are thoroughly removed under an anæsthetic, there is no likelihood of a recurrence; when this seems to occur, it is generally due to the growth having been imperfectly removed, and the portions left behind sprouting afresh. There is some ground for believing that the presence of adenoid vegetations increases the risk of catching the acute specific diseases, and still more for the view that they are a potent cause of ear trouble in measles and scarlet fever.*

Treatment.—Early and radical treatment of these growths is indicated in cases in which earache, discharge from the ears, or deafness, is present. Prompt measures should also be taken if the child suffers from laryngismus, or other convulsive affections, if there be a tendency to catarrhal affections of the larynx and bronchi, and, finally, if the general health of the child be suffering, as shown by anæmia, loss of appetite, etc. If there are no very urgent symptoms, it is wise to postpone the operation until after the sixth year. I have seen the best results in patients who have been operated on about the eighth year. As far as possible, I recommend that the operation should be done in the summer time.

As we are indebted to Meyer of Copenhagen for pointing out the importance of adenoid vegetations, so we are likewise

* *Centralblatt*, vol. i., p. 278.

indebted to him for the plan of treatment to be pursued in these cases. The various methods for the removal of these growths are modifications of the plan originally introduced by him, which have developed out of increased experience in dealing with them. The only point about which there is any great difference of opinion is as to the advisability of anæsthetics. To my mind, there can be no doubt but that it is far better to operate on the patient while under the influence of an anæsthetic, so as to clean out the naso-pharynx thoroughly, than to put to the pain and discomfort involved in the repeated sittings, sometimes amounting to five or six, required if the patient is not anæsthetised. In children, it is very difficult to ensure the complete removal of the vegetation unless an anæsthetic is employed. The night before the operation, it is well to give the patient a simple aperient. The position of the patient during the operation is a matter of great importance. Some operators prefer that the head should hang over the end of the table; but I am convinced that the hæmorrhage is more severe in this position than in the one recommended by Butlin,* viz., the patient lying on the side, with the thighs flexed, the head a little forward and on a low pillow. The administration of nitrous oxide, followed by ether, is the best means of producing anæsthesia; and when this has been attained, it is important, as Silk† has pointed out, to give as little additional anæsthetic as possible. As regards the instruments used for the removal of adenoid vegetations, they may be divided into forceps, curettes, ring-knives, and artificial nails.

Loewenberg may be considered the introducer of the forceps, and all the recently devised forceps are constructed on the same plan (Fig. 31). His instrument has a double

* *Lancet*, vol. i., 1893, p. 363.

† *Ibid.*, p. 497.

curve, one at the handle and one at the shoulder, so as to allow of the blade being passed behind the soft palate. The cutting edge is at the distal extremity of the blades. In

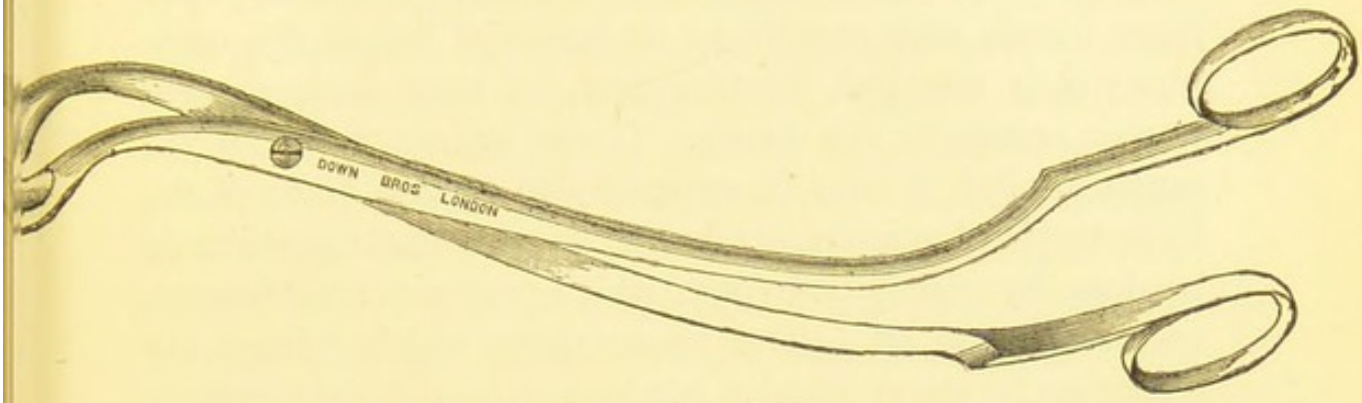


Fig. 31.—Loewenberg's Forceps.

Mark Hovell's* modification of Loewenberg's forceps, the cutting edges form a complete circle, and overlap so as to act like a punch (Fig. 32).

The forceps are passed up behind the soft palate, under the guidance of the left index finger, care being taken not

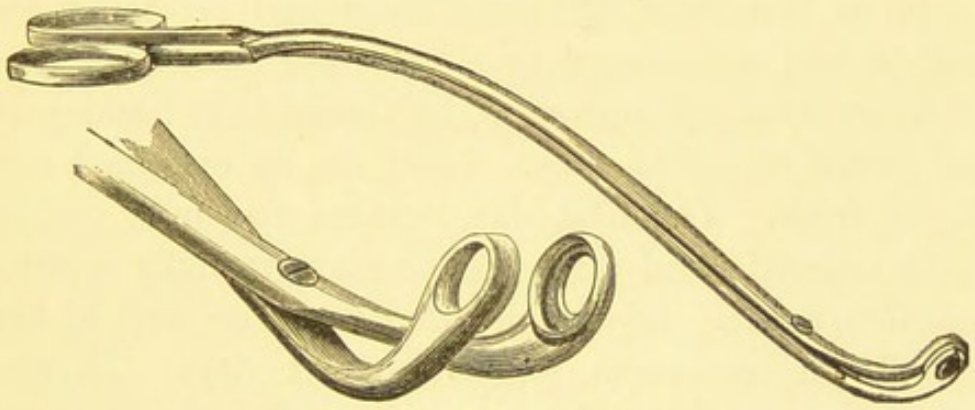


Fig. 32.—Mark Hovell's Forceps.

to injure the uvula. The growth is seized and torn away piecemeal. No great force is required to effect this. The forceps should not be directed too far forwards, otherwise the septum may be injured. After the bulk of the growth

* *British Medical Journal* 1888, vol. i., p. 474.

has been removed by the forceps, the remainder can be scraped away with the finger-nail.

Should the tonsils be enlarged, they may be removed, at the end of the operation, by the ordinary guillotine. Very large tonsils may require to be removed before the naso-pharynx is attacked, as they may, by their bulk, prevent proper access to this cavity. If the inferior turbinals are much swollen, it may be necessary to remove some of the hypertrophied mucous membrane; this can most conveniently be done by seizing the hypertrophied part with nasal forceps, and tearing it off. The hæmorrhage which follows the operation for the removal of adenoids is usually very profuse, but I have never known it to persist for any length of time after the operation is over, nor does it require any treatment. The same may be said of the epistaxis which sometimes follows the operation. Hæmorrhage is only to be feared in patients suffering from hæmophilia. A considerable quantity of blood is usually swallowed, and vomited as the patient recovers from the anæsthetic. The patient should be put to bed in a darkened room and protected from draughts, and encouraged to sleep. For the first three or four hours after the operation, he should have nothing but small pieces of ice to suck. Later on, he may have some milk to drink. The next day, beef-tea and milk pudding may be ordered; and after this he may gradually return to his ordinary diet. In cold weather it will be well to keep the child in one room for five or six days. In warm weather two or three days may be sufficient; but great care should be taken not to expose the patient to cold or draught, on account of the danger of setting up otitis media. No syringing, or treatment of the kind, is needed after the operation, unless the discharge from the nostrils becomes offensive, and then iodoform should be insufflated. Should oral breathing persist after the operation, tying

up the jaw at night, or Guye's contra-respirator, may be tried.

In the great majority of cases, the result of the operation is to cause almost an immediate improvement in the speech; but occasionally, the phonetic imperfection which accompanies the presence of vegetations, persists after their removal. Meyer attributes this result to paresis of the soft palate: and in one case complete cure was only obtained in a year's time. Cartaz * recommends systematic vocal training and the use of electricity, if the phonetic trouble persists. In one of my patients, articulation before the operation was so imperfect that he could hardly be understood; and as he did not improve much afterwards, I advised

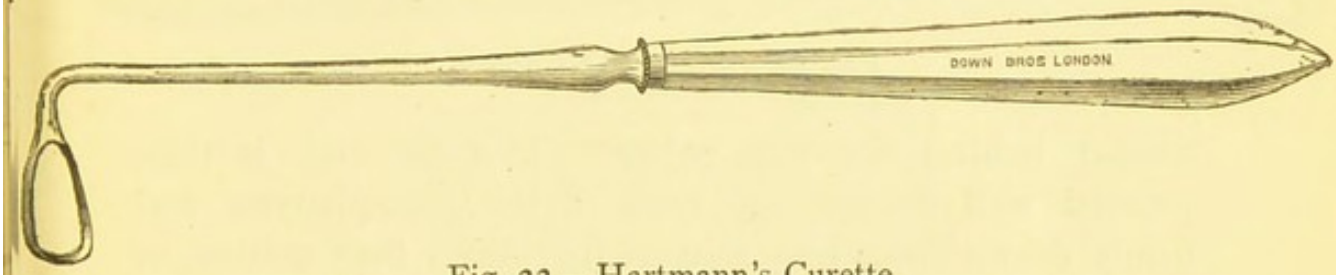


Fig. 33.—Hartmann's Curette.

three months' careful and regular training of the voice, and the result was most satisfactory. Follicular tonsillitis has been observed in a few cases, coming on soon after the operation. Traumatic fever, erysipelas, and otitis media, have all been met with as sequelæ of the operation; but, with strict antiseptic precautions, and keeping the patient protected against draughts and sudden changes of temperature, these complications may almost certainly be prevented.

A brief description of the three other methods of removing adenoids will suffice :—

Bronner † uses the ring-shaped curette as recommended by Hartmann, of Berlin (Fig. 33). "It removes the growth

* *Archives de Laryngologie*, December 1887.

† *British Medical Journal* 1888, vol. ii., p. 73.

very readily, the operation is not very painful, there is no danger of wounding any important structures, and, what seems to me to be of very great importance, the operation can be performed without an anæsthetic. . . . The head and arms of the patient are firmly held by an assistant; the tongue is depressed, and the bent end of the curette is

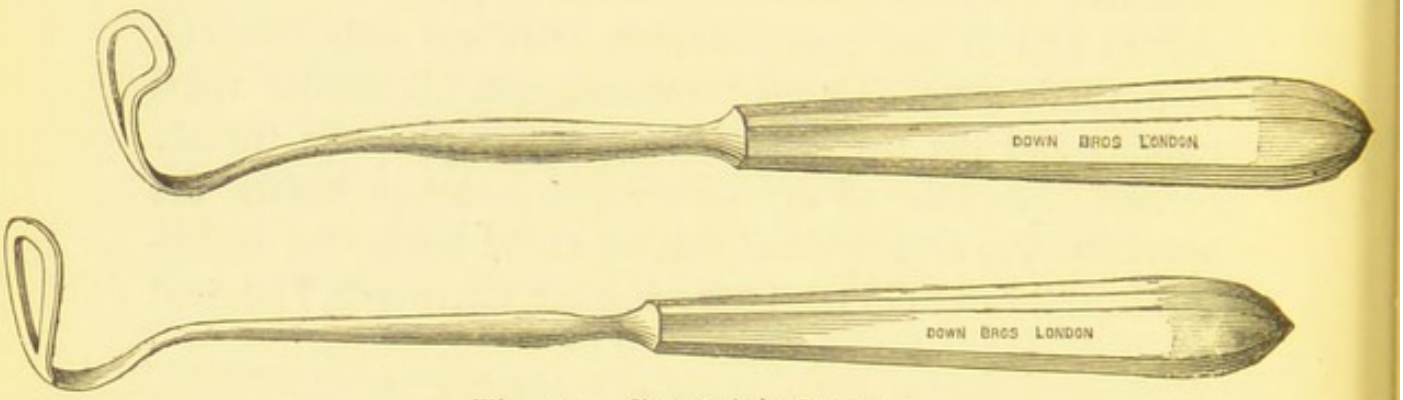


Fig. 34.—Gottstein's Curette.

passed behind the soft palate. The flat end is then pressed well against the vault of the naso-pharynx, and firmly drawn from one side to the other, thus cutting, or rather slicing, off the growths." Gottstein uses a similar instrument, only it is constructed to work in the antero-posterior diameter of the naso-pharynx, and not from side to side (Fig. 34).



Fig. 35.—Meyer's Ring-Knife.

In operating with Meyer's ring-knife (Fig. 35), an assistant is required to stand behind the patient, and hold a gag between the patient's left molar teeth. The operator passes the ring-knife through the wider side of the nose, the axis of the ring being kept perpendicular. He then introduces his left forefinger behind the soft palate. "The

finger and the ring having met behind the posterior nares, the ring is moved in a downward direction, so as to scrape off the vegetations at their base, the point of the finger serving as a *point d'appui* for the instrument. In this way, the operator works gradually on from above downwards, the finger all the time controlling the movements of the ring until everything necessary has been removed." *

The steel nail recommended by Dalby † (Fig. 36), or the modification suggested by Black, ‡ may be used. Black very rightly insists on the importance of securing the artificial nail by a string to the wrist, to prevent the risk of the instrument slipping or being dragged off and possibly getting into the larynx. To obviate the chance of being bitten, Dundas Grant's leather guard may be worn.

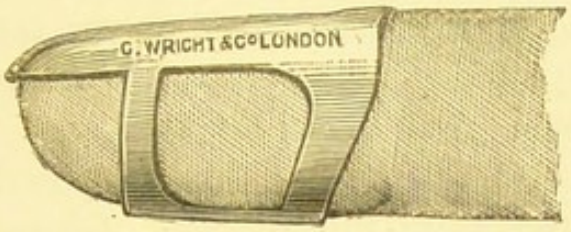


Fig. 36.—Dalby's Steel Nail.

Some surgeons prefer the use of the natural finger-nail for the removal of the adenoid vegetations; if the nail be well developed, and the growths soft, it may be possible to remove them; but in most cases the growths are too large and firm to be removed in this way.

In cases in which the symptoms are hardly sufficient to justify an operation, or while waiting until a favourable time, I have seen great benefit result from the administration of syrup of the iodide of iron in full doses, *i.e.*, half a drachm to a drachm, three times a day, and the application of a

* *Transactions International Medical Congress* 1881, vol. iii., p. 281.
† *Lancet* 1886, vol. ii., p. 618.
‡ *British Medical Journal* 1888, vol. ii., p. 488.

dilute preparation of iodine (formulæ Nos. 44, 45), with a suitably curved brush, to the naso-pharynx.

36. NON-MALIGNANT NEW GROWTHS OF THE NASO-PHARYNX.

The most recent statistics on the subject of naso-pharyngeal polypi are those collected by Groenbech.* Under this head, he groups cases of fibroma and sarcoma, and transition forms, such as fibro-sarcoma and fibro-myxoma; myxoma and enchondroma occur but rarely. Of the 176 cases he has collected, in only 59 was the nature of the growth verified by microscopical examination; and of these, 41 were fibromata. If, however, as Walsham † points out, any growth occupying the naso-pharynx is included under the head of naso-pharyngeal polypi, then the soft or gelatinous polypus will be found to occur more frequently than would appear from Groenbech's figures.

Ætiology.—At one time, it was supposed that females were almost free from this disease. Groenbech's figures, however, show that this is not the case, as among the 41 patients there were 5 women. The period of puberty is the age at which they most frequently occur. In 28 cases, the tumours began between the ages of 12 and 23; in 3 cases they appeared between the ages of ten and eleven, and in 5 cases after the twenty-third year. In 5 cases the age at which they commenced could not be ascertained.

The causation of these growths is wrapped in obscurity, and no explanation is forthcoming as to why males are attacked so much more frequently than females.

Morbid Anatomy and Pathology.—According to Groenbech, these tumours always spring from the lateral

* *Centralblatt*, vol. v., p. 418.

† *St. Bartholomew's Hospital Reports* 1892, p. 69.

parts of the roof of the naso-pharynx, and never from the middle line.

The tumours are exceedingly vascular, hence the occurrence and persistence of spontaneous hæmorrhages. Immediately beneath the epithelium are found numerous large capillaries, while in the substance of the tumour cavernous tissue may be found.

Symptoms.—The symptom which usually first attracts attention is the obstruction in the nose which the tumour produces in its growth, with all the consequences which result from it. Drowsiness and sleepiness are frequently met with. As already mentioned, spontaneous hæmorrhages are common. Fatty degeneration of the heart is said to be an occasional complication. There is great difficulty, clinically, in deciding whether the growth has extended into the cranial cavity, because, on the one hand, cases in which no such extension had taken place were accompanied with cerebral symptoms, while, on the other hand, there were cases without cerebral symptoms, notwithstanding the fact that the tumour had perforated the skull.

By anterior rhinoscopy, prolongations of the tumour into the nostril may be seen, and they may be mistaken for mucous polypi, especially as tumours growing from the posterior nasal opening are of a transitional form—fibro-myxomatous—and the nasal offshoots are of a mucous character.* By posterior rhinoscopy, the naso-pharynx is seen to be more or less occupied by a tumour, which is generally of a pale red or pink colour, smooth and elastic to the touch. In some instances, the tumour attains such a size that it may be visible below the soft palate. On introducing the finger behind the soft palate, the attachment of the tumour may be made out, unless it is so large as to completely occupy one side of the naso-pharynx.

* Warden, *British Medical Journal* 1888, vol. ii., p. 609.

Treatment.—The results yielded by operations involving section of the bones of the face are so unsatisfactory, that this method of procedure should only be undertaken when the less formidable operations are impracticable, or have failed to prevent recurrence. According to Lincoln,* of 28 cases treated in this manner, in 8 cases—*i.e.*, more than 28 per cent.—death followed immediately, or in a few days, and in only 14 per cent. did the neoplasm not return within the year.

Nor are the results afforded by the use of the knife, scissors, or avulsion by forceps, much better. Fortunately, the advance of science has placed at the disposal of the surgeon modes of treatment much superior to those already mentioned. The two which promise the best chance of success are the galvano-caustic loop, and electrolysis. As regards removal by the galvano-caustic loop, Lincoln's statistics show that, of 11 operations in 10 patients, in 3, recurrence took place within a year; in 6 under observation for a year or more, there had been no recurrence; in 2 there is no record subsequent to the operation, or a few months later; and there was no fatal case. The operation is performed in the following manner: The patient is put under the influence of chloroform, and a loop of piano-wire (Nos. 5 to 7, according to the size and consistence of the tumour) is introduced through the nose, and guided, by the operator's finger in the naso-pharynx, over the tumour up to its attachment. The free ends of the wire are then passed through the double canula attached to the electrode, and the loop tightened. As soon as the loop is quite tight, connection is made with the battery. If the tumour is thick and tough, it is advisable to burn through the pedicle very slowly, cutting off the connection with the battery from time to time; otherwise, the tubes carrying the wires become over-heated, and, owing to the consequent increased elec-

* *Archives of Laryngology*, vol. iv., p. 259.

trical resistance, sufficient current does not pass along the wires. If the polypus be exceptionally large, platinum wire would have to be substituted for steel wire. In some cases, it may be necessary to apply the galvano-cautery to the stump three or four times; these applications can be made at intervals of about a week. One objection which has been raised against the galvano-caustic loop is, that if the tumour is very large, it is impossible to pass the loop around it. But to this it may be replied, that before the tumour has attained so great a size, some operative interference would certainly have been called for; and, moreover, as Walsham * has pointed out, room may be obtained by splitting the soft palate, and, if necessary, cutting away part of the hard. The real difficulty is not the size of the tumour, but its place of origin. A polypus extending in a lateral direction from the pterygoid process will give rise to almost insuperable difficulties in endeavouring to loop it. Groenbech strongly recommends electrolysis as a method of treatment, and has collected 32 cases treated in this way by different operators, 17 of which were cured, in 13 there was an improvement, and in 2 there was no result.

Among the other non-malignant growths occurring in the naso-pharynx is *adenoma*. McKenzie Johnston † describes a case in a boy of thirteen, associated with mouth-breathing deafness, liability to colds and asthmatic attacks. He attempted to remove it with the cold écraseur, but, owing to the smoothness and sessile nature of the growth, the wire slipped immediately tension was applied. He finally removed the growth, bit by bit, with the cutting forceps. The boy lost all his former troubles, including the asthma, and a year later he was in excellent condition.

Cysts may occur in the naso-pharynx. They vary in

* *St. Bartholomew's Hospital Reports* 1892, p. 72.

† *British Medical Journal* 1888, vol. ii., p. 608.

size from a pea to a nut, and they contain a viscous liquid, resembling that met with in colloid cysts. They probably result from the degeneration of old adenoid vegetations or glands, and they must be differentiated from vegetations and myxomata. The smaller cysts may be treated by the galvano-cautery ; the larger ones must be extirpated.*

A congenital hairy polypus,† an autochthonous teratoma, has been met with in the naso-pharynx.

37. MALIGNANT NEW GROWTHS OF THE NASO-PHARYNX.

The usual form of malignant disease in the naso-pharynx is sarcoma. Nothing is definitely known as to the causes of these growths ; in some cases, there is evidence in favour of their being the result of the transformation of what was originally a benign new formation.

The **symptoms** produced by the presence of a sarcoma differ in no material respect from those met with in other tumours of the naso-pharynx ; possibly the hæmorrhage may be a little more frequent, and the pain more intense. The rapidity of their growth is, however, somewhat characteristic. Neither rhinoscopic examination, nor investigation with the finger, affords any very certain means of diagnosis.

Clutton ‡ reports a case in which he removed the tumour by means of a strong wire snare introduced through the nostril ; the base was freely attacked with a sharp spoon. As there was evidence of recurrence a month later, the cavity in the basilar process of the occipital bone was enlarged, and masses of soft growth scooped away. The vomer and the rostrum were broken away with Loewenberg's forceps, and more of the same growth scraped away. No recurrence had taken place two years after the last operation.

* Raulin, *Revue de Laryngologie*, September 1st, 1891.

† *Sajous' Annual* 1889, vol. iv., D. 28.

‡ *Lancet* 1888, vol. ii., p. 1059.

PART II.

DISEASES OF THE PHARYNX.

---

1. EXAMINATION OF THE PHARYNX.

For the purpose of making a complete and satisfactory examination of the pharynx, it is advisable to use the light and reflector described in Part III., Section 1, and the patient should be placed in the same position as for the examination of the larynx. He should be told to open the mouth and to take a short inspiration; if a sufficient view is not obtained by this means, the tongue should be depressed by a suitable instrument. For some purposes, Tuerck's (Fig. 37) answers well, and it is very convenient for operations about the mouth, as the patient can keep his own tongue down with it. For general use, the ordinary folding tongue-depressor, or Fraenkel's (Fig. 6, p. 5), is to be recommended. Whatever instrument be employed, the pressure on the tongue should be gentle at first, and only gradually increased. Anything like violence causes the tongue to contract and arch up, and thus prevents a view of the pharynx being obtained, whereas the resistance of the tongue is almost always overcome by gentle and continuous pressure. The examination of the mouth and pharynx should be conducted in a methodical manner. In the first place, any alteration in the colour of the parts should be noted; then attention should be directed to the

mobility of the soft palate and tongue; finally, the condition of the tonsils, as regards size and shape, the presence or absence of granules on the posterior wall of the pharynx, and the existence of any kind of ulceration or new growth in the pharynx, should be noted.

The examination of the deeper parts of the pharynx requires the use of the laryngoscope.

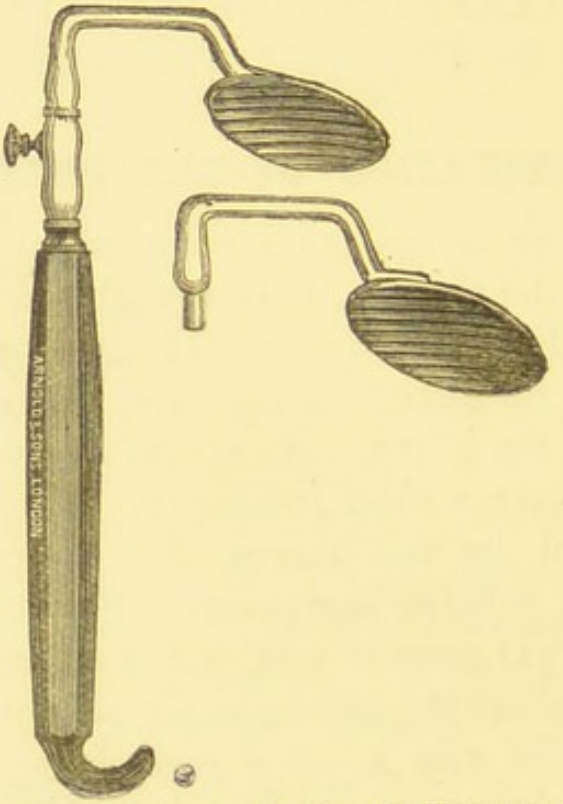


Fig. 37.—Tuerck's Tongue Depressor.

2. ACUTE PHARYNGITIS.

Acute Pharyngeal Catarrh.

This is an acute inflammatory affection of the pharynx and adjacent parts.

Ætiology.—As predisposing causes of acute pharyngitis may be enumerated the rheumatic or gouty diathesis, a strumous inheritance, errors of diet—especially over-feeding, excess of alcohol, and a sedentary life. The most common

exciting cause is a chill; or the disease may commence with a nasal catarrh, the pharynx being implicated secondarily. Epidemics of acute pharyngitis have been described, but no definite cause for these outbreaks has been discovered. Infectious pharyngitis is the name applied to a series of cases in which the disease is communicable, and runs a rapid course, resembling in this respect erysipelas of the pharynx, of which it may indeed be a variety. See Part II., Section 25.

An acute pharyngitis is present in many of the acute specific diseases, notably scarlet fever. An erythema of the pharynx has been found associated with erythema scarlatiniforme simplex, and is also one of the early syphilitic manifestations. A condition of pharyngeal catarrh has been noticed as occurring in some women at the menstrual periods.

Morbid Anatomy and Pathology.—There are, at first, hyperæmia and swelling of the mucous membrane, with arrest of secretion, and then a viscid, muco-purulent fluid is poured out. In the event of a fibrinous exudation being met with, the case should be regarded as almost certainly of diphtheritic origin.

Symptoms.—These are general and local. The general symptoms are those which usually usher in an acute inflammatory affection, viz., a feeling of chilliness, or even rigors, followed by rise of temperature, headache, pains in the limbs, and a sense of malaise. Loss of appetite, furred tongue, constipation, and scanty, high-coloured urine occur. Locally, the patient usually complains of some stiffness and discomfort in moving the neck. There is a frequent desire to swallow; at first, this is only difficult, but soon the act of swallowing becomes painful. If the uvula be markedly enlarged, there will be the sensation of a foreign body in the throat, and probably a hacking

cough, especially on lying down, from the uvula coming in contact with the back of the tongue, or even the epiglottis. If the inflammation extends upwards into the naso-pharynx and nares, or has spread downwards from these regions, the voice will have a nasal twang; and if there be much interference with respiration through the nose, the mouth-breathing which is the result will aggravate the pharyngeal symptoms. Implication of the Eustachian tubes may give rise to deafness, earache, or even otitis media. Extension downwards into the larynx will cause hoarseness and increase of the tendency to cough.

On inspection, the soft palate, uvula, tonsils, and pharynx will be seen to be swollen, and viscid mucus adherent in places. In cases of unusual severity, the mucous membrane becomes of a dusky purple colour. The uvula is generally affected early, and may attain the size of a thumb from œdema (*see* p. 253).

Diagnosis.—The difficulty which arises, on first seeing the case, is the question as to whether the condition is due to one of the specific fevers or is merely a simple catarrhal pharyngitis. To settle this doubt, time is usually necessary.

Bosworth * rightly points out that the diagnosis of pharyngitis is often made on very slight grounds. He regards acute idiopathic pharyngitis as an exceedingly rare disease.

Prognosis.—Simple catarrhal pharyngitis is usually an affair of a few days to a week. It is only when the disease assumes an erysipelatous type that danger need be feared.

Treatment.—At the commencement of an attack of acute pharyngitis, three grains of calomel, followed by a saline aperient, are generally useful. The patient should be confined to bed, or to a room kept at a temperature of

* *Diseases of the Throat*, 1892, p. 27.

64° Fahr., and if the air is dry, and east winds prevalent, a bronchitis kettle, or a vaporiser containing the compound tincture of benzoin, will be found beneficial. The diet should be light and unstimulating, and not taken too hot. A free supply of fluids, such as soda-water and milk, barley-water, home-made lemonade, is desirable.

Medicinally, drugs which act on the skin are indicated; *e.g.*, formula No. 11. If the temperature be high, the tincture of aconite in minim doses every half-hour for three or four doses, and then at less frequent intervals, will have a good effect. Phenazonum (antipyrin) given in 5- to 10-grain doses every two hours, for two or three doses, has frequently a most satisfactory effect in reducing the temperature and relieving pain; for patients who are not under constant observation, it is much to be preferred to aconite.

Guaiacum answers admirably with some patients; it may be given in 5-grain doses, mixed with black-currant jam, every two or three hours, or the trochisci guaiaci of the Throat Hospital Pharmacopœia may be ordered. If the patient be debilitated, carbonate of ammonium in an effervescing mixture (formula No. 28) will have a stimulating effect. The addition to this mixture of 10 or 15 grains of the salicylate of sodium will be found useful if the case be of rheumatic origin. The linctus morphinæ (formula No. 15), or glycerine lozenges, can be ordered if troublesome cough is present. In the stage of convalescence, iron, quinine, and other tonics, are indicated.

Locally, ice, both externally in the form of ice compresses, and internally, is to be preferred to warmth. Spraying the throat with a 10 per cent. solution of cocaine, will facilitate deglutition if this be very painful. In the acute stage, gargles are useless, and only increase the patient's discomfort. A 10 to 20 per cent. solution of menthol in olive oil, or vaseline, has an excellent effect;

the vaseline mixture can be applied by a brush; the solution in olive oil is best used in the form of spray.

3. CHRONIC PHARYNGITIS.

Chronic Pharyngeal Catarrh.

This is a chronic inflammation of the pharynx and adjacent parts.

Ætiology.—It may be the sequel of an acute attack; more usually, however, it comes on gradually in persons of lax fibre, who lead sedentary lives in an unhealthy atmosphere. Bosworth,* however, maintains that "chronic pharyngitis is in no instance the result of repeated attacks of acute inflammation of this region, but, on the contrary, the chronic process sets in first, whereupon its clinical history is marked by repeated attacks of acute catarrhal sore throat." Excesses in eating, drinking, and smoking increase the predisposition to this disease, especially if they be combined with exposure to vicissitudes of the weather; hence, adult males are more frequently attacked than women and children. The strumous, gouty, rheumatic, and syphilitic diatheses predispose to the disease. The intimate connection existing between nasal affections and chronic pharyngitis should lead to a careful examination of the nose in all cases of chronic pharyngitis. Obstruction to nasal respiration, by causing the breathing to be carried on through the mouth, is a fertile cause of chronic pharyngitis, the explanation being, that the air, not being moistened, warmed, and filtered of foreign particles, by passing through the nares, dries up and irritates the pharynx. The nasal trouble may also cause pharyngeal disease by direct extension of the mischief, or by the action of the abnormal nasal

* *Diseases of Nose and Throat*, vol. ii., p. 40.

secretion upon the pharyngeal mucous membrane, or, lastly, by the hawking, coughing, etc., caused by the effort to remove this secretion. Atrophic rhinitis is almost invariably accompanied by a dry, glistening condition of the pharynx, to which the term *pharnygitis sicca* has been applied. Pharyngitis sicca has also been noted in diabetes mellitus, and a similar condition has been attributed to excessive tea-drinking in badly-nourished females.* In some cases, the pharyngeal affection is apparently preceded and kept up by gastric catarrh. Defective liver action may also be regarded as a cause of chronic pharyngitis, and, just as hæmorrhages from the rectum are met with in liver affections, so also you may find slight hæmorrhages from the pharyngeal mucous membrane, the so-called hæmorrhagic pharyngitis.†

Morbid Anatomy and Pathology.—Under chronic pharyngitis, two different pathological conditions are included, viz., the hypertrophic and the atrophic forms. In the former there is a chronic hyperæmia of the mucous membrane of the pharynx; this leads to proliferation of the cells of the connective tissue, and formation of fibrous tissue. The blood-vessels of the part dilate and become tortuous. The mucous glands may be enlarged at first, but after a time atrophic changes take place in the glandular structures as a result of the pressure of the newly-formed fibrous tissue. There is usually an increase in the lymphatic structures; this is particularly the case in granular pharyngitis, where the growth of adenoid tissue leads to the formation of small nodules upon the surface of the mucous membrane. In consequence of the changes that have taken place in the glandular structure, their secretion is markedly altered, so that the mucus becomes scanty and viscid.

* A. Downie, *Practitioner*, October 1887.

† Jamison, *British Medical Journal*, 1888, vol. i., p. 846.

The second, or the atrophic, form may be considered a further stage of the hypertrophic, though some authorities look upon it as a dry catarrh from the commencement. In it there is marked atrophy of all the glandular structures, the mucous coat being reduced to a thin fibrous membrane, firmly fixed to the subjacent parts; the atrophic changes even affect the subjacent muscular tissue, according to Moure.

Symptoms.—The symptoms of chronic pharyngitis are those enumerated under the head of local symptoms of acute pharyngitis, but they are less severe. One of the most troublesome is the hawking and clearing of the throat necessitated by the presence of viscid mucus at the back of the pharynx; this may give rise to retching, especially in the morning. The expectoration is sometimes streaked with blood, generally the result of much straining; that hæmorrhage from the pharynx, except as just mentioned, is anything but an extremely rare symptom, was the unanimous opinion of those who took part in the discussion, at the Glasgow meeting of the British Medical Association, on hæmorrhage from the pharynx and larynx.* Of late, attention has been directed to the connection between pain in the occipital region and pharyngeal affections. The pain affects the nape of the neck, the lower part of the occiput, and sometimes the temple and the mastoid process —in a word, the domain of the great occipital nerve. In some cases, the symptoms are so severe, and there is so much interference with the general health, that inflammation of the mastoid cells may be suspected. The term "Legal's disease" has been applied to that form of temporo-occipital headache, having a pharyngeal and tympanic origin, and which can be relieved by inflating the Eustachian tube, and cured by treatment directed to the pharynx and ear.†

* *British Medical Journal* 1888, vol. ii., p. 609.

† *Centralblatt*, vol. v., pp. 18, 19.

Pharyngitis, with extension to the Eustachian tube, may very closely simulate Menière's disease.

On examining the throat of a patient suffering from hypertrophic pharyngitis, the tonsils, soft palate, uvula, and fauces will be found much swollen, and the posterior wall of the pharynx has a velvety appearance. The mucous membrane is of a deeper red colour than usual, and is covered, in places, with viscid mucus. Owing to the swollen condition of the parts, it is often impossible to get a view of the naso-pharynx. In the atrophic form, or pharyngitis sicca, as it is called, the mucous membrane is pale, dry, and glistening, or black in colour from the sticky, discoloured mucus adhering to it. Rhinoscopic examination in these cases is usually easy, on account of the wasting of tissues making more room in the naso-pharynx.

Complication.—The most important complication in connection with chronic pharyngitis is due to the extension of the inflammatory mischief up the Eustachian tube, causing deafness.

Diagnosis.—The appearance of the throat, and the symptoms, are so characteristic, that the diagnosis is easily made.

Prognosis.—Chronic pharyngitis is a very troublesome and obstinate affection.

Treatment.—The essential points in the treatment of chronic pharyngeal catarrh are to combat, as far as possible, the constitutional causes which underlie it, and to treat any nasal trouble which may exist. A tepid or cold sponge-bath, with vigorous friction of the skin, wearing flannel next the skin, exercise in the open air, great moderation in the use of stimulants, leaving off smoking, avoidance of pepper, mustard, curry, and other pungent articles of diet, will be of service. A gorged state of the pharynx is often found associated with affections of the liver, with or without

piles; in these cases, saline aperients (formulæ Nos. 18 and 27) will be found to act beneficially. If there be any affection of the nose, this must be treated as is directed under the head of Rhinitis. Especial attention must be directed to the pharyngeal tonsil, as an inflammatory condition of this organ is frequently accompanied by chronic pharyngitis. Certain mineral waters, notably those of Ems, have a marked effect in some cases of chronic pharyngeal catarrh, so that patients who are in a position to undergo the treatment should certainly be advised to try it.

As regards local treatment, the first thing to be done is to cleanse the mucous membrane from the viscid secretion adhering to it. For this purpose, the simple alkaline spray (No. 52) used in the nose, naso-pharynx, and pharynx will be found extremely useful. It should be employed, at least, night and morning. Should a more stimulating application be desirable, spray No. 54 may be substituted, or listerine may be added to the alkaline spray. When the mucous membrane is in a healthier state, astringent sprays may be tried, such as Nos. 62, 63, or 64. The glycerine of tannin is sometimes useful as a local application, and the writer has seen much benefit from the employment, at night, of No. 45 (or No. 44 may be used). This should be painted on with a large camel-hair brush. If the secretion be profuse, the trochisi cubebæ (T. H. P.) will be found useful. Half a drachm of a 15 to 20 per cent. solution of menthol in olive oil may be injected through each nostril, and will be found to have an excellent effect in some cases of pharyngeal catarrh.

In the atrophic form, alkaline sprays are indicated. The systematic use of the chloride of ammonium inhaler will be found of some use, as also the chloride of ammonium tabloids. Unfortunately, the disease represents a condition of failure of secretion, due to loss of the glandular tissue of

the part, and it is not possible to repair this damage, though the application of the constant current is said to give good results. The medicated throat pastilles will be found a convenient mode of applying local remedies. Among the most valuable may be mentioned those of chlorate of potassium and borax, rhatany, and chloride of ammonium. If there be much irritation, the compound rhatany pastilles, which contain $\frac{1}{10}$ grain of hydrochlorate of cocaine, may be ordered; they are especially useful in the irritating cough of granular pharyngitis, and that caused by an elongated uvula. Gargles are of little use, sprays being much more efficacious.

4. GRANULAR PHARYNGITIS.

(*Clergyman's Sore Throat.*)

This is a chronic form of pharyngitis, characterised by the presence of granular bodies on the mucous membrane of the pharynx.

Ætiology.—The causes which have been mentioned as producing chronic pharyngitis are also concerned in the production of granular pharyngitis, and notably, obstruction to nasal respiration; but the most powerful of all causes is undoubtedly over-use of the voice, especially under unfavourable circumstances, as, for instance, when the individual is suffering from catarrh, in the open air, or in an atmosphere rendered impure by chemical vapours, dust, smoking, etc. Pungent foods and drinks have also an injurious effect. Women are more affected than men—or, at least, they more often apply for treatment of this condition. At the menopause, it is often a very troublesome affection, the symptoms, however, disappearing when the patient has passed the change of life. Neurotic and anæmic persons, and those debilitated from any cause, are particularly liable to suffer.

Morbid Anatomy and Pathology.—Granular pharyngitis may be a part of a general tendency to lymphoid hypertrophy, and may accompany enlargement of the faucial and pharyngeal tonsils. Bosworth* believes that the disease commences during childhood, but that it does not attract the patient's attention until adult life. The granules are due to a circumscribed proliferation of lymphatic tissue around the efferent ducts of the mucous glands; the pavement epithelium of the mucous membrane extends over the granule, though it is thinned, and may be absent over the top of it. In some instances, the inflammatory process is more or less limited to the lateral walls of the pharynx. To this condition, the term *pharyngitis lateralis hypertrophica* has been applied. In such cases, a round or flat swelling may be seen immediately behind the posterior pillar of the fauces; sometimes the growth is irregular and knobby, or it may even suggest the idea of a cockscomb. The epithelium, consisting of enlarged squamous cells, falls off in places, leaving superficial ulceration. The layers beneath are composed of swollen follicles, and the connective tissue surrounding them is infiltrated with lymphoid cells, the blood-vessels, particularly the veins, are dilated, and there is also more or less hypertrophy of the salpingo-pharyngeal fold.†

Symptoms.—The amount of discomfort the patient suffers is out of all proportion to the objective condition. A feeling of irritation is complained of, as though a foreign body were in the throat; there is also a cough, but usually without expectoration. The cough is, at times, of a particularly irritating character, and may resemble the bark of a dog. Some of the cases described by Sir Andrew Clark,‡

* *Diseases of Nose and Throat*, vol. ii., p. 47.

† Honoré Loupiac, *De la Pharyngite latérale.*

‡ See Part III., Section 44.

under the term of the "barking cough of puberty," are caused by the irritation of a granular pharyngitis. Tickling, a sense of constriction, or choking, a feeling of heat or dryness, and other paræsthesiæ, are frequently complained of. The voice is not at first affected, but sooner or later the individual finds that he must clear the throat before beginning to speak; in course of time he finds that he cannot talk for long without clearing the throat, and eventually the voice becomes much impaired, in consequence of the strain thrown on the larynx by the constant hawking. In lateral pharyngitis, the voice may have a nasal twang, and there is often considerable pain in swallowing, owing to the lateral folds being compressed during deglutition. The mental effect must also be borne in mind, as patients are apt to imagine that they have some grave disorder of the throat, such as cancer or consumption, and are consequently subject to great depression. The objective symptoms of granular pharyngitis consist in the presence of roundish or oval prominences on the mucous membrane of the pharynx. They are of red colour, and usually rather darker than the neighbouring mucous membrane; they vary in size from a pin's head to a pea, but by coalescence larger masses may be formed. The vessels of the pharynx are enlarged, and a stellate arrangement is not uncommon.

Diagnosis.—The discovery of the granules on the back of the pharynx, together with the arrangement of the vessels above described, is characteristic of the disease.

Prognosis.—The disease is apt to be very annoying and very chronic. Recent improvements in treatment have, however, done much to remove the disease from the category of those which have to be endured, because they cannot be cured.

Treatment.—Before commencing the local treatment of granular pharyngitis, it is most important that attention

should be paid to the general health of the patient. If there be any symptoms of indigestion, these should be seen to. If the patient be debilitated, tonics and a change of air should be advised. The spas of Bagnères-de-Luchon, Barèges, Cauterets, Mont Dore, and Ems, will often benefit the patient, especially in cases of lateral pharyngitis. If the nervous system be in an excitable condition, the combination of tonics and sedatives should be tried (*e.g.*, formula No. 22). Small doses of iodide of potassium, or the syrup of the iodide of iron, are sometimes beneficial. Other possible causes of throat irritation must be excluded, such as nasal stenosis, enlargement of the adenoid tissue at the root of the tongue, etc. It is only when general treatment has failed, and other causes have been excluded, that the local treatment should come into play. For this purpose, the galvano-cautery is by far the best form of caustic. Each granule must be touched with the galvano-caustic point or blade at a dull red heat; four or five applications can be made at a sitting. Any prominent vessels may be divided by applying the blade at right angles to them. If the throat be unusually irritable, it may be sprayed with a 10 per cent. solution of cocaine, but as a rule so little pain is experienced that this is unnecessary. The feeling of sore throat which follows is best relieved by effervescing lozenges containing chlorate of potassium and cocaine, or by the compound rhatany pastilles already mentioned. Only in very exceptional cases does the amount of inflammatory reaction require the use of ice pills.

The sittings should be at intervals of a week or ten days, and usually four or five suffice for the cauterisation of all the granules. If this be thoroughly carried out, the result is most satisfactory, and there is but little tendency to a relapse. If the granules are very large, it has been sug-

gested that they should be split with a bistoury, and a concentrated solution of carbolic acid in glycerine applied to the cut surface: however, the galvano-cautery answers excellently, even in advanced cases. Electrolysis has also been used for the destruction of the granules. Pure carbolic acid, carefully applied with cotton on a suitable holder, and the application made twice a week, has been found successful.

"London paste" was formerly much employed to destroy the granules; but since the introduction of the galvano-caustic plan of treatment, the "paste" has fallen into disuse. Surgeons who do not possess a galvano-cautery will find that chromic acid answers fairly well. The acid should be fused on to the roughened end of a probe; the bead thus formed should be of a reddish-brown colour. The granules are to be touched with the bead, and any excess of the acid is to be neutralised by gargling with a solution of bicarbonate of sodium, twenty grains to the ounce.

The treatment of lateral pharyngitis is longer, more painful, and less successful, than that of granular pharyngitis. Schech * says that in cases where time has been an object, and the bands very hard and thick, he has often excised them with a knife. The plan of treatment which offers the best prospect of cure is to destroy the exuberant growth by the free use of the galvano-cautery. The chief difficulty in the matter is that the lateral bands are so obscured by the posterior pillars of the fauces, that they are often only freely visible during phonation or retching, and it requires the greatest skill to avoid burning normal structures.

* *Diseases of the Mouth, Throat, and Nose*, p. 128.

5. DILATATION OF THE PHARYNX.

Dilatation of the pharynx may be either general or sacculated; to the latter variety the term *pharyngocele* is applied.

Ætiology.—This condition may occasionally be congenital. Usually, however, it is acquired; and it is then brought about by the giving way of the wall of the pharynx. The sacculated variety is the more common form. Nothing is definitely known as to its cause.

Symptoms.—When the patient swallows all the food does not pass into the œsophagus, but some collects in the pouch and forms an external swelling, by pressing over which he can force out the food.

Treatment.—As a palliative measure, the patient may wear some kind of apparatus in the form of a collar, so as to exercise pressure upon the pouch during deglutition. The radical cure consists in excising the pouch and sewing the edges together, as has been practised for œsophageal diverticula.

6. PERFORATIONS.

Perforations are sometimes seen in the anterior pillars of the fauces. At the present time I have a marked example in a patient under my care. The result of my observations in this and similar cases is to confirm in part Fowler's * statement that these perforations are generally not congenital, nor due to syphilis, but that they are the result of suppurative disease of the tonsils, usually occurring in the course of scarlet fever. Some of these perforations are, however, doubtless due, as Cohen has pointed out, to "a separate mucous investment of the palato-glossus muscle in the anterior fold of the palate." †

* *Lancet* 1889, vol. ii., p. 1113.

† Lennox Browne, *Diseases of Throat and Nose*, 4th edition, p. 228.

7. PULSATING ARTERIES.

Pulsating arteries in the posterior wall of the pharynx are not uncommon. The vessel affected is generally the ascending pharyngeal artery. Aneurysms may also be seen, but very rarely in comparison with pulsating arteries.*

Not infrequently there is a want of symmetry in the posterior wall of the pharynx, one side may project more than the other. It is important to remember that this may be a congenital condition, otherwise a tumour might be suspected. Lennox Browne † has pointed out that the lower pharynx may be narrowed by an angular curvature of the cervical portion of the spinal column. Exostoses of the cervical vertebræ projecting into the pharynx have occasionally caused difficulty in swallowing.‡

8. RETRO-PHARYNGEAL ABSCESS.

Inflammation terminating in suppuration in the connective tissue between the spinal column and the pharynx.

Ætiology.—This is especially a disease of infancy and childhood. Cases of retro-pharyngeal abscess occurring in children two and three months old have been recorded. Seventy-five per cent. of the cases of the so-called *idiopathic* retro-pharyngeal abscess occurs in children under one year of age, and, according to Sokoloff,§ it never attacks those above four. Bosworth ‖ has drawn attention to the fact that retro-pharyngeal abscess may occur in adult life. He has himself seen a case as late as the age of thirty-seven.

* *Sajous' Annual* 1891, vol. iv., E. 2.
† *Diseases of the Throat and Nose*, 4th edition, p. 228.
‡ Schech, *Diseases of the Mouth, Nose, and Throat*, p. 89.
§ *Journal of Laryngology*, vol. v., p. 207.
‖ *Diseases of the Nose and Throat*, vol. ii., p. 74.

The occurrence of a retro-pharyngeal abscess after the period of childhood is, however, a rare event. Retro-pharyngeal abscess may occur idiopathically, or be secondary to disease of the spine, or be due to traumatism. According to Bókai, out of 144 cases, 129 were idiopathic. Rickets and scrofulosis favour the onset of the malady, but the acute specific diseases do not appear to have as much influence as was formerly thought to be the case. Any inflammatory condition of the mucous membrane of the pharynx and adjacent cavities, as well as eczema and other skin affections, may be the starting-point of the abscess. The secondary variety usually occurs as the result of caries of the spine in tubercular, rachitic, or syphilitic patients. Sometimes it may be due to traumatism, such as a fall on the back, and a case is reported in which the abscess came on in a young man as a result of injury to the posterior pharyngeal wall, from swallowing a hard morsel. It may also occur as the result of septicæmia.

Morbid Anatomy and Pathology.—It has been shown that there are two lymphatic glands, situated in the retro-pharyngeal tissue at the level of the second and third cervical vertebræ, and it is to the extension of inflammation from the mucous membrane to these glands, that we owe the existence of retro-pharyngeal abscess. As these glands begin to dwindle away about the third year of life, and have disappeared by the fifth year, the idiopathic disease is practically confined to the period of childhood. Hence, also, retro-pharyngeal abscesses are not often of tubercular origin, because at the age at which tubercular affections have become common, these glands have already disappeared. In the adult, retro-pharyngeal abscess is due to the same causes as give rise to the formation of an abscess in any other part of the body.

Symptoms.—In idiopathic cases the symptoms usually

come on rapidly, and dysphagia is the first to be noticed; in some cases there may be acute pain, rapid pulse and fever; in others, the disease may come on insidiously. As the abscess enlarges, difficulty in breathing occurs, the respiration is stridulous, and there is usually a croupy cough. If the child be old enough to speak, the tone of the voice will be found altered, and it may have a nasal twang.

Wheelock* has drawn attention to the "hen-cluck" stertor as pathognomonic of retro-pharyngeal abscess with pressure on the larynx. When secondary to disease of the cervical vertebræ, the affection is preceded by stiffness of the neck and deformity of the spine, the symptoms come on more gradually, and there may be an entire absence of fever. On examination, a projection of the posterior wall of the pharynx may be seen, and on palpation this may be felt to be elastic and fluctuating. Externally, a swelling may be seen and felt at the angle of the lower jaw. If it can be used, the laryngoscope is the best means of ascertaining the size and situation of the abscess.

Diagnosis.—This is often difficult, because at the age at which the disease commonly occurs a pharyngeal examination is not very easily carried out. In a doubtful case a digital examination will generally afford the most reliable information. The dysphagia, dyspnœa, and croupy cough may give rise to the suspicion of diphtheria, but an examination of the fauces should suffice to clear up this difficulty.

In a child, the bulging of the posterior wall of the pharynx should suggest the existence of an abscess; in an adult, a gumma should be first thought of. A softening gumma sometimes so closely resembles a retro-pharyngeal abscess, that it is desirable, in doubtful cases, to try the effect of full doses of iodide of potassium before incising the swelling.

* *Centralblatt*, vol. vi., p. 243.

Prognosis.—This must in all cases be guarded. Unless the case be treated promptly, death may occur from complete closure of the glottis by pressure, or from the occurrence of œdema; or the abscess may burst during sleep and the contents enter the larynx, and suffocate the patient. Even when the abscess is opened surgically there is some risk of the pus passing into the larynx. Moreover, all danger is not over after the abscess has been evacuated, as some pus may find its way into the air passages, and set up broncho-pneumonia or abscesses in the lungs. Turner * records a case in which death was caused by pressure on the trachea though tracheotomy had been performed.

Where the retro-pharyngeal abscess is secondary, the prognosis is very grave, on account of the nature of the disease with which it is associated.

Treatment.—This is essentially of a surgical nature. All surgeons are agreed as to the importance of opening the abscess as soon as possible, the only point in dispute being as to whether the abscess should be opened internally or externally. Bókai says the results of opening the abscess through the mouth are very good; there were only three deaths in 106 cases. The operation is a slight one, is only exceptionally followed by the aspiration of pus into the air passages, and can be repeated without hesitation if the abscess refills. In opening the abscess through the mouth, a vertical incision should be made, and the head of the child held forwards to favour the escape of the pus from the throat. To avoid asphyxia or swallowing of pus, Dupré's † method of first inserting a trochar and then enlarging the incision with a bistoury may be employed, instead of a simple incision.

On the other hand the operation from without is often

* *Lancet* 1887, Jan. 1st.

† *Journal of Laryngology*, vol. i., p. 289.

very difficult; but if the abscess be due to spondylitis, Bókai* thinks it is to be preferred. Contrary to the opinion of most surgeons, Burckhardt† advises the external opening of a retro-pharyngeal abscess, whether it be of idiopathic or septic origin, or due to spondylitis. By the plan he adopts it is possible to use proper antiseptic precaution and anæsthesia, and the incision can be kept open until the cavity has healed. He makes an incision along the inner border of the sterno-mastoid muscle at the level of the larynx. After cutting through the skin and platysma, the vessels going to the thyroid are to be drawn aside, and then the inner side of the common carotid can easily be reached. A small opening is to be made in the connective tissue; this can be enlarged after Hilton's plan with dressing forceps, and thus access to the retro-pharyngeal space can be obtained. Among English surgeons the external method is advocated by Watson Cheyne and Pollard.

After local surgical treatment has been carried out the patient will require careful supervision. If there be symptoms of a strumous or tubercular diathesis, the syrup of the iodide of iron and cod-liver oil will be found useful, and convalescence will be accelerated by change of air. If there be any tendency to laryngeal spasm bromide of potassium should be given.

9. NON-MALIGNANT GROWTHS OF THE PHARYNX.

All kinds of new growths have been recorded as occurring in the pharynx. Attention has, of late, been especially directed to the so-called dermoid tumours of this region; these consist of a fatty mass with a fibrous stroma, some-

* *Centralblatt*, vol. vii., p. 617.
† *Ibid.*, vol. v., p. 390.

times containing cartilage and striated muscular fibre, and covered with skin and fine hair. They are met with in infants at birth or in the early years of life, and they are considered by Arnold * to be teratomata of heterogenic or autogenic origin. Highet † exhibited a remarkable specimen of tumour of the pharynx. It was described as a large mucous polypus, three inches long by an inch and three-quarters wide, and consisted of loose connective tissue covered with mucous membrane; it resembled the tongue very closely. Papillomata are fairly common, and grow from all parts of the mucous membrane. Fibromata are also occasionally seen, and they may attain considerable dimensions.

Wolfenden ‡ has described an interesting case, in which the whole of the right side of the posterior wall of the pharynx, in the pharyngo-oral region, was occupied by a large angioma. "It was knotty, dense, and of a purple colour."

The subject of tumours of the palate has been exhaustively and ably treated by Stephen Paget.§ He points out that "in the small space of the palate almost every kind and sort of tumour have been observed: cysts, nævi, papillary growths; tumours of bone and of cartilage; glandular, sarcomatous, and cancerous growths."

Symptoms.—The most important symptom is dyspnœa; this varies according to the situation and size of the tumour. In Highet's case the tumour grew from the left great cornu of the hyoid bone, and caused the sudden death of the patient. Dysphagia is also a frequent symptom if the tumour is of large size. Cough, and the sensation of a

* *Virchow's Archiv.*, Jan. 5th, 1888.
† *British Medical Journal*, 1885, vol. ii., p. 756.
‡ *Ibid.*, 1887, vol. i., p. 1271.
§ *St. Bartholomew's Hospital Reports* 1886, p. 315.

foreign body or tickling in the throat, are constant symptoms.

Prognosis.—The benign tumours of the pharynx are usually readily removed, and consequently, if they are recognised early and properly treated, the risk to life is small. Paget points out that "rapid growth, infiltration, extension outward and downward, advanced age in the patient, enlarged lymphatic glands, glossy smoothness and adhesion of the mucous membrane over the tumour,—all these are bad signs," inasmuch as they indicate that the disease is of a malignant nature.

Treatment.—The smaller tumours, especially if they are pedunculated, may readily be removed by means of the galvano-caustic loop, the parts having been previously rendered anæsthetic by the application of a 20 per cent. solution of cocaine. The adenomata of the soft palate may usually be shelled out. Paget recommends that cocaine should be injected under the mucous membrane covering the tumour, and not only applied over the surface. The mucous membrane should then be incised, care being taken not to wound the growth; the tumour is now to be enucleated, and hæmorrhage should be arrested by steady pressure.

10. MALIGNANT GROWTHS OF THE PHARYNX.

The pharynx is attacked by both carcinoma and sarcoma; epithelioma (squamous-celled carcinoma) is the form of malignant disease most frequently met with in this region.

Morbid Anatomy and Pathology.—The morbid anatomy of growths occurring in the pharynx differs in no respect from growths of the same nature occurring in other parts of the body.

Pharyngeal carcinoma is met with most frequently in the

lateral walls, more rarely behind the larynx at the upper border of the œsophagus, and is very seldom seen in the vault of the pharynx.

Symptoms.—In sarcoma of the pharynx, the chief symptom is dysphagia. Pain is not a very marked feature. Dyspnœa only occurs when the growth is sufficiently large to obstruct the glottis.

In cancer, on the other hand, a very constant symptom is pain on swallowing, extending up to one or both ears, and in advanced cases the patient may be quite unable to swallow. He complains of a feeling of soreness in the pharynx, or the sensation of a foreign body in the throat, and is constantly hawking and making efforts to clear the throat of the blood-stained mucus, which is so commonly secreted in these cases.

The inability to take food, pain, and want of sleep, all tend to induce cachexia in the patient. Should the folds of mucous membrane between the upper and lower jaw become infiltrated, fearful pain on chewing, swallowing, and talking will be complained of. If the growth obstructs the choanæ, there will of course be an interference with nasal respiration, on one or both sides as the case may be. In sarcoma of the pharynx there is much less tendency for the lymphatic glands to become affected, than when the tonsil is attacked. In carcinoma, the glands are almost invariably enlarged, and occasionally the glandular swelling is the most marked feature of the disease.

Diagnosis.—In the early stage the diagnosis may be extremely difficult, and time is the only thing which clears it up. When ulceration has occurred, the diagnosis is fairly easy; the marked induration of the edges and the fungoid appearance of the surface will usually suffice to distinguish it from tertiary syphilis. It must be borne in mind that

it is not safe to rely on the effect of iodide of potassium as a means of diagnosis, because there are many cases of indubitable cancer, which are temporarily benefited by this drug, and oftentimes to a great extent. The most certain evidence is the removal of a portion of the growth, and the discovery in it, on microscopical examination, of a cancerous structure.

Prognosis.—Owing to the localisation of the disease, and to the non-implication of the lymphatic glands, sarcoma of the pharynx is not so grave a disease as sarcoma of the tonsil, inasmuch as it is possible, in some cases, to extirpate the growth completely. In carcinoma of the pharynx, on the other hand, the prognosis is practically hopeless; death usually puts an end to the patient's sufferings within a year, three to six months being a very common period.

Treatment.—In cases of encapsulated sarcoma, it may be possible to enucleate the growth by the index finger through a linear or crossed incision. If the growth be pedunculated, it can be removed by the cold wire loop, or the galvano-caustic loop.* In carcinoma of the pharynx, measures such as cauterisation, scraping, etc., are to be avoided, as they only irritate the part and cause a more rapid growth. The results of sub-hyoidean pharyngotomy in carcinoma of the posterior wall of the pharynx, as shown by a series of 28 cases, are unfavourable. Half of all the cases died under operation, the other half from relapses; only one case was definitely cured.† If, as is usually the case, the disease is beyond the reach of radical surgical interference, all that can be done is to keep the patient's mouth as clean as possible with antiseptic gargles and sprays (formulæ Nos. 1 to 3), to relieve the dysphagia by spraying or painting the pharynx with a 20 per cent. solution of cocaine five

* Bosworth, *Diseases of the Nose and Throat*, vol. ii., p. 397.

† *Sajous' Annual* 1891, vol. iv., E. 3.

minutes before food is taken, or, in extreme cases, feeding the patient *per rectum*. The pain must be met by the free administration of morphia, preferably subcutaneously.

11. TUBERCULOSIS OF THE PHARYNX AND TONSILS.

Though, in comparison with the frequency of tuberculosis in some other parts of the body, the number of cases of tuberculosis of the pharynx is small, still it occurs more frequently than was formerly supposed, and the careful examination to which the throat has been subjected of late years has led to numerous examples of the disease being put on record. Abercrombie and Gay* "believe that a sharp distinction can, and ought, to be drawn between chronic and acute tubercular ulceration of the fauces. The former is essentially a local tuberculosis commencing in the pharynx, or spreading there from the larynx; the latter is only a part of general tuberculosis."

Ætiology.—Tuberculosis of the pharynx may be either primary or secondary. At one time the existence of a primary tuberculosis of the pharynx, as of the larynx, was denied, but the labours of B. Fraenkel and Isambert have settled the question in the affirmative. As a matter of course, however, the vast majority of the cases are secondary to pulmonary tuberculosis. Out of a total of 6,500 patients with laryngeal and pharyngeal affections, Tauber† observed 13 cases of tuberculosis of the pharynx; in 12 cases it was secondary to tuberculosis of the lungs and larynx, and in 1 case it appeared to be primary. What determines the implication of the pharynx yet remains to be decided. In the cases hitherto recorded there has

* *Medico-Chirurgical Transactions*, vol. lxx., p. 101.

† *Journal of Laryngology*, vol. iii., p. 11.

been nothing discovered to explain why the part has been attacked, and the accounts given by the patients themselves did not appear to indicate any especial tendency to pharyngeal affections, previous to the onset of the tubercular disease.

Cases of tuberculosis of the pharynx have been met with at all ages. Isambert has seen it in a child four years of age, and it has been observed at the age of fifty-four. It occurs most frequently, however, in men between the ages of twenty and thirty.

Morbid Anatomy and Pathology.—Two forms of tubercular affections of the pharynx are to be distinguished. In the one we have to do with a deposit of miliary tubercle, which appears as greyish-yellow nodules on the soft palate and pillars of the fauces; in the other the disease is more advanced, and has gone on to ulceration.

The progress of the miliary tubercle towards ulceration can sometimes be exactly followed. The ulcers at first are lenticular, having a greyish appearance, with a scanty muco-purulent secretion. Very soon the ulcers coalesce and form irregular patches. The ulceration spreads laterally, and has no tendency to destroy the deeper structures, so that it is usually superficial. The disease is localised most frequently to the arches of the palate, then to the uvula, the posterior pharyngeal wall, and most rarely the naso-pharynx. But wherever the disease commences, sooner or later the uvula is affected, and in advanced cases it becomes much enlarged, sometimes attaining the size of a man's thumb. Though the ulceration may extend downwards, it ends abruptly at the œsophagus.

In some cases tissue formation is in excess of tissue destruction, and we get nodular excrescences and thickening of the mucous membrane; these are the cases which it is so difficult to distinguish from lupus of the pharynx.

The lymphatic glands are often much enlarged; not only the cervical glands, but also the axillary, cubital, and inguinal glands, have been found affected.

Symptoms.—The characteristic symptom of tuberculosis of the pharynx is the pain in the throat, which frequently radiates up to the ears; this is due in some cases to the extension of the disease into the Eustachian tubes. In addition to the more or less constant soreness in the throat, the attempt at swallowing usually brings on a severe paroxysm of pain, and in some cases the agony is so intense that patients choose rather to suffer the pangs of hunger than take food. Besides the pain there is also difficulty in swallowing, owing to the infiltration between the muscles. If the soft palate be affected, liquids may be forced back through the nose. As a natural result of the pain and difficulty in swallowing there is rapid emaciation and loss of strength. Fever is almost invariably present, but not of a very characteristic type; the temperature usually varies between 98·4° to 100·4° Fahr. in the morning, and 101° to 103° Fahr. in the evening. The mucous membrane of the palate and pharynx generally is very pale, resembling in this respect the tuberculous larynx. In some cases, but not in all, the breath is fœtid, and there is usually a considerable quantity of a viscid secretion and a troublesome cough. The voice has almost always a nasal twang.

Complications.—Tuberculosis of the pharynx may be complicated with tuberculosis of the tongue or lips. In some cases the disease commences in the pharynx and extends forwards, in other cases the converse occurs. In the majority of cases, as already mentioned, the pharyngeal affection exists as a complication of pulmonary tuberculosis.

Diagnosis.—Acute pharyngeal tuberculosis may be confounded with follicular tonsillitis, diphtheria, herpes of the pharynx, pharyngo-mycosis, and syphilis. Follicular tonsil-

litis may be excluded by its acute onset and by the limitation of the disease to the tonsils.

In diphtheria there is a membrane, whereas in tuberculosis we have to do with superficial ulceration; but if seen late in the disease and in the absence of any definite history, the diagnosis between these two conditions may be far from easy.* An herpetic eruption may present considerable difficulty, but the vesicles usually heal in the course of a week or ten days. A microscopic examination of particles of the deposit will suffice to distinguish pharyngo-mycosis. The mucous patches of inherited or acquired syphilis can usually be recognised by the existence of other evidences of syphilis.

The only conditions with which chronic pharyngeal tuberculosis is liable to be confounded are syphilis and lupus of the pharynx.

From the former, the diagnosis is sometimes only to be cleared up by the discovery of the tubercle bacillus. It must be borne in mind that the presence of tuberculosis in other organs does not necessarily imply that the pharyngeal affection is tubercular, nor, on the other hand, does the existence of syphilis in the past prove conclusively that the throat affection is of syphilitic origin. Again, the condition may have originally been of a syphilitic nature, but the tubercle bacillus having found a suitable soil has developed there afterwards.

Tubercular ulceration may be distinguished from lupus by the fact that it does not heal spontaneously, whereas lupus may. The rapid growth of tuberculosis is in contrast to the much slower progress of lupus. In tuberculosis pain on coughing or swallowing is a marked symptom, in lupus it may be almost absent. Objectively tuberculosis and lupus have much in common; the latter, however, is more knobby,

* Gee, *St. Bartholomew's Hospital Reports*, vol. vii., p. 142.

and the edges of the ulceration are more thickened than is the case in tuberculosis. Moreover, lupus hardly ever occurs on the posterior pharyngeal wall or on the tonsils.

The pallor of the pharyngeal mucous membrane in tuberculosis is usually characteristic, the ulcers are shallow and the edges are ill-defined; in syphilis the ulcers are deeper and the margins are sharply defined.

Prognosis.—The outlook in tuberculosis of the pharynx is almost invariably unfavourable, and until recently no actually cured cases of pharyngeal tuberculosis had been reported.

The average duration of the cases is from two to six months from the commencement of the ulceration. Death takes place in the majority of cases in from six to twelve weeks. A patient of mine died exactly six weeks from the commencement of the throat symptoms, death being accelerated by the inability to take food by the mouth.

It is possible, by means of energetic local treatment, to cause the ulcerated patches to cicatrise, but the relief is generally only temporary. Gleitsmann * has, however, reported a remarkable case, verified by the discovery of tubercle bacilli in the secretions of the part, in which, after the employment of active measures locally, the patient was alive and well two years later; and Heryng † has reported two cases of cure.

Treatment.—The constitutional treatment is the same as for tuberculosis of any other organ, so it will suffice here to describe only the local treatment. The lactic acid treatment has now taken the place of other methods of endeavouring to attain cicatrisation of the ulcerated patches. The first thing to be done is to render the part anæsthetic by means of the application of cocaine in a 20 per cent. solution. If there be much thickening, the surface of the

* *New York Medical Journal*, October 11th, 1890, p. 404.

† *Centralblatt*, vol. v., p. 215.

ulcer may be scraped with a sharp spoon, and a 30 to 60 per cent. solution of lactic acid rubbed in by means of cotton-wool on a suitable holder. In obstinate cases undiluted lactic acid has been employed. Care must be taken, in making the first application or two, not to carry out the treatment too vigorously or over too large a surface, as patients differ much in the way they are affected by lactic acid. Notwithstanding the free use of cocaine the application is often very painful.

The case recorded by Gleitsmann and referred to above is a remarkable instance of the success attending vigorous local treatment. By means of curetting with a sharp spoon, the energetic application of lactic acid, and at times the use of the galvano-cautery, a complete cure was obtained in spite of several severe relapses, during which the epiglottis became infiltrated. On the occasion of the last relapse, Gleitsmann scraped away all the diseased tissue most energetically, without regard to the subsequent hæmorrhage, and rubbed in undiluted lactic acid. The patient was examined and found perfectly well more than two years after the commencement of treatment.

Lennox Browne * records a similar case in which he first scraped the parts with a circular curette, and then applied with considerable firmness a 20 per cent. solution of lactic acid. This was repeated daily, the strength being increased to 40 and 60 per cent. At the end of three weeks acute inflammation of the pharynx and larynx took place; on recovery the parts cicatrised healthily. At the date of report the improvement had continued for three months. If the patient be unable to stand the lactic acid treatment, a 10 or 20 per cent. solution of menthol in olive oil or paroleine may be applied to the ulcerated

* *Medical Society's Proceedings* 1887, p. 241.

surface. Heryng * recommends that the uvula be removed should it be thickened and ulcerated. If the case be deemed unsuitable to attempt a radical cure, all that can be done locally is to keep the surface of the ulcer as clean as possible by means of antiseptic sprays and gargles. The insufflation of powder No. 47 at night will often have a good effect. To relieve the intense pain on swallowing, the application of a 20 per cent. solution of cocaine should be made. When the patient becomes unable to swallow, attempts should be made to introduce food into the stomach through a soft tube passed through the nostril or the mouth ; if this cannot be done, the patient must be fed by the rectum. In persons suffering from pulmonary tuberculosis or with a phthisical family history, any erosion of the pharynx, or chronic pharyngeal catarrh, should be regarded with suspicion, and prompt steps taken to treat any threatened ulceration.

Tuberculosis of the Tonsils.

The tonsils may be affected as a part of tubercular pharyngitis, but occasionally they are attacked when the rest of the pharynx is free. In these cases, however, evidences of tuberculosis will be found in the larynx or lungs.

Strassmann † has directed attention to the fact that tubercles may be found *post mortem* in tonsils which, to outward appearance, are normal. The bacilli find their way into the crypts, and there set up an ulcerative process, which is not visible on the surface of the tonsil; to detect this change, tonsils which are apparently healthy require to be examined carefully, sections being made through the tonsils.

* *Centralblatt*, vol. v., p. 215.

† Virchow's *Archiv. Band* lxix., Heft 2.

Abraham * has reported a case of primary tuberculosis of the tonsils. Isolated tuberculosis of the tonsils is, however, of very rare occurrence, but its existence requires to be borne in mind, as otherwise the ulcers might be regarded as syphilitic.

Lublinski † gives the following description of a case under his care: "On right tonsil, which is enlarged and greatly congested, there are several (five) ulcers, varying in size from the head of a pin to a lentil, whose bases are covered with a whitish detritus, and the margins of which are only slightly raised, but somewhat redder than the surrounding parts. There was nothing characteristic about the shape of the ulcers, but the larger ones were more oval in form. There were only two ulcers on the left tonsil." Microscopic examination of a portion of the tonsil removed for the purpose showed that the tissue was infiltrated with round cells enclosing numerous giant cells. Large numbers of bacilli were present. There was advanced tubercular disease of the right lung.

The treatment of tuberculosis of the tonsils is the same as that employed in cases of tuberculosis of the pharynx.

12. LUPUS OF THE PHARYNX AND LARYNX.

As the pharynx and larynx are commonly simultaneously affected with lupus, it will save repetition if the consideration of the affection of these organs be taken together.

Ætiology.—Lupus occurs at least twice as frequently in females as in males. It generally begins before puberty and is rare in very young children.

Bosworth's ‡ statistics show that out of 79 cases 51

* *Dublin Journal of Medical Science*, October 1885.
† *British Medical Journal* 1887, vol. ii., p. 456.
‡ *Diseases of the Nose and Throat*, vol. ii., p. 307.

occurred in females and only 18 in males, the sex not being reported in the other instances.

The scrofulous diathesis predisposes to it, and a family history of phthisis is often to be obtained. No conclusion can be drawn as to the effect of heredity. Neither smoking, drinking, over-use of voice, irritating substances, or the application of the galvano-cautery seem to have any effect on the onset of lupus.*

Lennox Browne† estimates the frequency with which lupus of the external parts is accompanied with secondary deposit in the pharynx or larynx, at about 20 per cent.

Morbid Anatomy and Pathology.—In lupus affecting the pharynx and larynx there is an infiltration of the mucous membrane with small cells, the disease belonging to the class of granuloma. Some authorities have assumed that the single determining cause is the penetration of Koch's bacillus into the mucous membrane, but, as Radcliffe Crocker‡ and other observers have pointed out, it is strange that lupus should be capable of effecting so much damage, and yet that the bacilli are so sparsely distributed through the tissue.

Marty§ regards laryngeal lupus as a form of laryngeal tuberculosis characterised by a lack of the infectious element of the bacillus, *i.e.*, it is an attenuated tuberculosis. Lupus of mucous surfaces is more liable to be complicated with inflammation and ulceration than when it affects the skin. It may also lead to stenosis. Lupus of pharynx or larynx may occur primarily; usually, however, it is secondary, and is met with in persons affected with lupus of the skin or nose. The fauces are almost invariably affected before

* *Centralblatt*, vol. iii., p. 146.
† *Journal of Laryngology*, vol. iii., p. 360.
‡ *Diseases of the Skin*, p. 393.
§ *Sajous' Annual* 1889, vol. iv., G. 11.

the larynx. The lymphatic glands are seldom, if ever, enlarged in lupus; consequently the view that the disease follows the lymphatics is erroneous.*

Symptoms.—Lupus of the throat is not usually a painful affection; indeed, there is often anæsthesia of the surface, in exceptional cases hyperæsthesia has been noticed. Ramon de la Sota,† however, states that there is no alteration in the sensibility of the mucous membrane in lupus, and he regards this as one of the diagnostic points between lupus and leprosy, the latter being generally accompanied by anæsthesia. In pharyngeal lupus the patient does not complain much of the throat, only feeling slight discomfort and stiffness in the fauces; later on, especially when destruction of the soft palate has occurred, deglutition becomes difficult, and fluids return through the nose on attempts at swallowing. As lupus of the larynx causes very little trouble at first, it may be overlooked, unless a laryngoscopic examination be made. Usually, however, there is hoarseness, sometimes going on to complete aphonia, and when the soft parts become infiltrated or cicatricial contraction has occurred, dyspnœa may result. The epiglottis is the seat of predilection, and if it be destroyed the patient frequently experiences difficulty in deglutition, cough being excited by the entrance of food into the larynx.

J. M. Hunt ‡ mentions a case in which ulceration of the pharynx and epiglottis had proceeded painlessly, but there was a considerable amount of pain on swallowing as long as an ulcer on the summit of the right arytenoid remained unhealed. Cough is a comparatively rare symptom, and depends upon the position and extent of the lesion, but it

* Lennox Browne, *Centralblatt*, vol. v., p. 149.
† *Centralblatt*, vol. iii., p. 147.
‡ *Journal of Laryngology*, vol. iii., p. 361.

may be violent and continuous, as in Asch's* case, where it was due to "tubercular masses at the base of the tongue pressing on the epiglottis."

In the pharynx, lupus, if observed at the onset, is seen to give rise to thickening and irregularity of the mucous membrane, which may have a granular appearance. The part attacked is usually of a deeper colour than the healthy mucous membrane. Then small nodules may develop and attain the size of a pea; sometimes they appear in apparently healthy mucous membrane. The nodules may be superficial or extend even to the sub-mucous tissue; they have the usual rosy-red colour of lupus nodules elsewhere. The affected part of the mucous membrane becomes stiff and loses its mobility, and after a time softening may occur, giving rise to ulceration, sometimes superficial, sometimes extending deeply. Occasionally the ulceration is accompanied by extensive loss of substance, the uvula may be destroyed and a gap may even be left in the soft palate. Ulceration usually runs a chronic course, but at times destruction of tissue takes place with startling rapidity. The healing of the ulceration is accompanied by the formation of radiating, firm cicatrices, and the recurrence of ulceration in these scars is pathognomonic of lupus.† In cases of some duration the mucous membrane is as a rule pale, but the pallor is more marked in the larynx than in the pharynx. The epiglottis is usually irregularly enlarged; not infrequently there is considerable loss of substance and a mere stump may be left, or it becomes pale, stiff, and fibrous. The ventricular bands may become swollen, and nodules may form in them. The general appearance of the larynx is rough, thick, and granular, giving it a worm-eaten look.

The **diagnosis** of primary lupus of the pharynx or larynx

* *Archives of Laryngology*, vol. iii., p. 247.

† Chiari, *Centralblatt*, vol. iii., p. 346

is very difficult: some authorities even go so far as to say that one can never be sure of lupus of these organs, unless one finds lupus on the exterior of the body. It requires to be distinguished from epithelioma, syphilis, and tuberculosis affecting these parts. As regards the differentiation of epithelioma of the larynx from lupus, in the former the age of the patients is greater, the growth is harder, and has a more unequal surface, and it is at its commencement commonly unilateral. Moreover, lancinating pains are a frequent accompaniment of cancer, whereas, as already stated, lupus is not usually a painful affection. Tertiary syphilitic affections of the pharynx and larynx generally run a more rapid course than lupus; they partake more of the nature of loss of substance than of new formation, and are usually speedily benefited by full doses of iodide of potassium. The extensive formation of cicatricial tissue, which is so characteristic of syphilis, is wanting in lupus. The presence or absence of necrosis or caries of bone has been suggested as a crucial test between syphilis and lupus. Hutchinson * for example, states that in lupus "the bones are never involved," and "no perforations of the palate occur." This statement, however, requires qualification, as there are cases of undoubted lupus on record in which necrosis of bone has occurred (J. M. Hunt †). According to Lennox Browne ‡ tertiary syphilis usually attacks the palate from the nasal surface, whereas lupus does so from the buccal aspect. The tonsils, moreover, are not affected in lupus. The ulceration of the pharynx met with in inherited syphilis may be mistaken for lupus; the history of the case, and the presence of notched central incisors and other signs of syphilis, will usually enable the diagnosis

* *British Medical Journal* 1888, vol. i., p. 62.
† *Journal of Laryngology*, vol. iii., p. 362.
‡ *Medical Society's Proceedings*, vol. xi., p. 352.

to be made; but at times it will be almost impossible to be absolutely certain of the nature of the lesion. From tuberculosis of the pharynx or larynx, lupus is differentiated by its slower course, its tendency to heal in one direction while it is advancing in another, by the absence of pain and dysphagia, and by the maintenance of good general health.

Prognosis.—Under the methods of treatment at present in vogue, the cure of a pharyngeal lupus may be looked for in certain favourable cases; the same may be said, though to a much less degree, of the laryngeal affection. In both pharynx and larynx, lupus runs a slow course, and apart from the possible risk of stenosis of the larynx brought about by small-celled infiltration of the tissues, or by acute œdema, there is no immediate danger to life. As to whether pulmonary or general tuberculosis may result from lupus of the throat, there is not sufficient clinical evidence to answer this question either in the negative or affirmative.

Treatment.—The constitutional treatment of lupus of the pharynx or larynx must be directed towards the improvement of the general health of the patient. Residence in the country or at the seaside should be tried. The diet should be simple and easily digested—cream and milk being important constituents. As regards drugs, cod-liver oil, the syrup of the iodide of iron, and arsenic, are those from which most benefit is to be expected. The waters of La Bourboule are said to give good results in some cases. If iodide of potassium has a marked effect, the probability is that the case has a syphilitic basis. Locally, scraping, scarification, and the galvano-cautery are most efficacious. Semon * has recorded a case in which, by the persevering use of the galvano-cautery, he effected the permanent cure

* *British Medical Journal* 1886, vol. i., p. 645.

of laryngeal lupus. The application of a solution of perchloride of iron, one hundred and twenty grains to the ounce, has been attended with success, as has also nitrate of silver in stick. Rubbing in lactic acid (20 to 60 per cent. or even stronger solutions) after previously anæsthetising the part with cocaine has answered well. If necessary, the affected parts may be curetted before the lactic acid is rubbed in. Should the more caustic applications excite too much irritation, liquor iodi (B. P.) or formula No. 44 may be employed. If ulceration has occurred, insufflations of iodol or iodoform should be employed; if much pain is present, a sedative insufflation (formula No. 47) should be used.

In exceptional cases stenosis of the larynx may require treatment, or even tracheotomy may be necessary.

In a case of lupus of the introitus laryngis, after tamponing the trachea, Gané* extirpated all diseased tissue by sub-hyoid pharyngotomy. Cicatricial stenosis was prevented by transplantation of mucous membrane of the circumference. Feeding was at first effected by enemata, but after some days by means of a tube. A cure resulted.

13. SYPHILIS OF THE PHARYNX.

The pharynx may be affected with all three stages of syphilis. The hard sore of *primary syphilis* is met with, and the soft, non-infecting sore also occurs. Besides the cases of primary syphilis of the pharynx due to unnatural causes, there are numerous instances of chancres from the use of infected pipes, spoons, tooth-brushes, and drinking vessels, and from sucking the bottle of a syphilitic child. As illustrating one method of infection, the following case of a soft sore affecting the tonsil may be mentioned. The

* *Journal of Laryngology*, vol. iv., p. 347.

patient had a soft sore on the prepuce, and having occasion to remove a splinter of bone from the right tonsil, he conveyed the virus to it.

In about 80 per cent. of the cases of primary syphilis of the pharynx, the tonsil is the part affected, as the tonsillar crypts afford a ready ingress to the syphilitic virus. Thus, out of 179 cases of primary syphilis of the pharynx collected from literature, in 149 the tonsil was the affected part.* According to Diday, kissing is the most frequent cause of a tonsillar chancre. Linderstroem † records three cases of tonsillar chancre occurring in the same family within the space of a month.

I have had two patients with the primary sore on the tonsil. Both patients complained of sore throat, and had some discomfort in swallowing. The tonsil was enlarged and felt very hard. There was great enlargement of the glands at the angle of the jaw. The surface of the tonsil was slightly ulcerated, and covered with a greyish slough.

Diagnosis.—The diagnosis of a tonsillar chancre is difficult, because it occurs in different forms. The most typical appearance is the induration of the tonsil, and the unilateral, large, hard, and usually painless swelling at the angle of the jaw.

The points to which attention must be paid in making a diagnosis are the following :—

1. An endeavour must be made to detect the mode of infection.

2. The unilateral development of the chancre and the pronounced enlargement of the glands of the same side.

3. The hardness of the tonsil.

4. The difficulty and sometimes even pain on swallowing, which is always referred to the one side.

* *Centralblatt*, vol. x., p. 329.

† *British Medical Journal* 1889, vol. i., p. 33.

5. The absence of a chancre on any other spot.

Very frequently the diagnosis is only made on the appearance of secondary symptoms. Chancre of the tonsil has to be distinguished from a soft sore, from mucous patches occurring on the tonsils, and from later syphilitic ulceration and sclerosis. In both the latter cases the lesions are not so sharply limited to one side, and they are not accompanied by so pronounced a glandular swelling.

In my first case the enlargement and hardness of the tonsil, together with the enlarged glands at the angle of the jaw, gave rise to a suspicion of epithelioma of the tonsil. The rapid response to an anti-syphilitic treatment soon cleared up the difficulty, and it hardly required the eruption, which shortly afterwards appeared, to enable one to arrive at a correct diagnosis. An ulcerating gumma and a tuberculous affection of the pharynx might be mistaken for a primary sore.

Secondary Syphilis of the Pharynx.

As is well known, one of the earliest manifestations of the constitutional effects of syphilis is seen on the pharynx. This may be a simple erythema of the soft palate or fauces which is of a dusky red colour, and not very characteristic. The so-called mucous patches are, on the other hand, almost pathognomonic. The mucous membrane presents the appearance of a snail track, *i.e.*, it looks as though it had been smeared over with white paint. The patches are often symmetrical, and most frequently occur on the soft palate and tonsil, though any part of the mucous membrane lining the oral cavity may be affected. If the patches become thickened and elevated they resemble the condylomata found at the anus. As a result of these patches, superficial ulceration of the mucous membrane may occur, and there

may be slight erosions of the margins of the soft palate and uvula. Symmetrical ulcers may also form on the tonsils; they have a grey base and well-defined edges, and do not extend deeply.

The patient complains of a sore throat, and there is usually some discomfort, and occasionally acute pain on swallowing. Condiments, and other irritating substances, will aggravate the symptoms.

Diagnosis.—A diphtheritic deposit may be confounded with mucous patches, and *vice versa*, but attention to the general symptoms should prevent this mistake.

Syphilitic and tubercular ulcerations of the soft palate are at times very difficult to differentiate. Indeed, syphilitic ulceration may become infected with the bacillus tuberculosis. The tubercular ulceration is a much more painful complaint, and, so far from being benefited by anti-syphilitic treatment, it is rather made worse. As in other tubercular affections, there is generally an evening rise of temperature.

Tertiary Syphilis of the Pharynx.

In tertiary syphilis three kinds of affections may occur, viz., gummata, ulceration (either due to, or independent of, gummata), and lastly cicatrisation and its results.

When seen before softening has commenced, a gumma is usually a smooth, roundish swelling, and the colour of the mucous membrane covering it is not materially different from that of normal mucous membrane. A gumma may be met with in any part of the pharynx, but the posterior wall is the favourite seat. According to Natier * it is very rarely located in the tonsils alone. When softening has taken place and the gumma has broken down, an ulcer is formed, and, corresponding to the shape of the gumma, it is usually round or oval.

* *Annales de la Policlinique de Paris*, November 1890.

The ulceration of tertiary syphilis may be either perforating or serpiginous, the latter form especially affecting the soft palate. As a result of the perforating form of ulceration, the vertebræ may be laid bare, and the spinal cord may become implicated. There are several cases recorded in which portions of the cervical vertebræ have become necrosed, and a purulent discharge has continued until the dead bone has been thrown off. To show the rapidity with which syphilis sometimes advances, a case is reported * in which syphilitic necrosis of the atlas occurred a few months after primary infection. As another result of the perforating ulcer, the internal carotid may become eroded and death may take place from hæmorrhage. It is important to bear in mind, that there may be a syphilitic affection of the naso-pharynx, without the presence of any apparent change in the lower pharynx, or other part of the body.† The amount of deformity brought about by cicatrisation is sometimes very remarkable; it is not at all uncommon for the pharynx to be partially or entirely cut off from the naso-pharynx, through the soft palate becoming adherent to the posterior wall of the pharynx; in one case a ring-shaped constriction of the upper part of the pharynx was brought about by ulceration of the posterior and lateral walls of the pharynx, co-existing with gummatous ulceration of the root of the tongue. The most common form of cicatrix, however, is the radiating one found on the posterior wall of the pharynx.

Symptoms.—A gumma situated in the soft palate or pharynx will naturally interfere with deglutition, and there may be considerable pain. When ulceration occurs these symptoms are intensified. The voice may acquire a nasal twang owing to the movements of the soft palate

* *Centralblatt*, vol. ii., p. 382.

† *Saious' Annual* 1891, vol. iv., E., p. 4.

being interfered with, and if it be perforated or destroyed by ulceration, fluids will return by the nose. In some cases the ulcers are covered with a viscid secretion, which is a source of great discomfort to the patient. As already mentioned, hæmorrhage may result from some vessel being eroded by extension of the ulcerative process.

In those cases in which the nares are cut off from the pharynx, by adhesion of the soft palate to the posterior aspect of the pharynx, the patient will experience much discomfort from being unable to get rid of the nasal mucus and from the mouth being dry, owing to the fact that respiration must be carried on through this orifice, instead of by the nose. The senses of smell and taste are lost.

Diagnosis.—Occasionally a gumma will form in the tonsil so rapidly, and with so much febrile reaction, that a quinsy may be suspected; in these cases, unless the syphilitic element is recognised at the outset and appropriate treatment started, time will be required to clear up the diagnosis.

For diagnosis from malignant disease *see* p. 192.

Inherited Syphilis.

The pharyngeal affections of inherited syphilis require separate consideration. Deep ulceration may invade the bucco-pharyngeal cavity at any period of life from the first week up to the age of puberty; out of 30 cases, 14 occurred within the first six months. Of the remaining cases, the majority occurred at a period more or less advanced towards puberty. Females are attacked more frequently than males. The peculiarity of these ulcerations is their centrality of position, and their special tendency to attack the bone and eventuate in caries and necrosis.*

* Mackenzie, *Archives of Laryngology*, vol. ii., p. 85.

The palate is the favourite seat of the ulceration, which, if situated at the posterior part of the palate, generally spreads to the soft palate, and thence to the naso-pharynx and nose. If situated more anteriorly, the nose is attacked more directly by perforation of the bone. The fauces, naso-pharynx, posterior wall of pharynx, and nasal fossæ, may serve as the starting-point of the ulceration. As a rule deep pharyngeal ulceration precedes, or co-exists with similar affections in the larynx, but the larynx may be affected independently of the pharynx. It is most important to recognise this particular kind of ulceration, because, as I have just pointed out, it often appears first at the period of puberty, and there are cases in which it has been met with even later; moreover, in these patients it is not at all uncommon for the ulceration to be the sole evidence of syphilis, hence the risk of confounding inherited with acquired syphilis. As in tertiary syphilis, so in the inherited variety, stenosis of the pharynx may be brought about by the cicatrisation, which takes place after extensive ulceration. Colcott Fox* exhibited a notable example of this before the Medical Society. The patient, "a girl of fourteen years, presented a perforation of the soft palate, adhesion of the soft palate to the posterior wall of the pharynx, and a button-hole stenosis of the lower part of the pharynx, about the site of the attachment of the epiglottis. The latter was destroyed, and immediately through the hole were seen the openings of the larynx and œsophagus. The larynx was healthy." No other signs of inherited syphilis were found in the bones, eyes, teeth, or other parts.

Treatment.—The constitutional treatment of primary syphilis occurring in the pharynx, when once it has been recognised, differs in no respect from that of primary syphilis generally. It will therefore be unnecessary to say more on

* *Transactions of Medical Society* 1890, p. 515.

the subject. Locally, antiseptic gargles, such as formulæ Nos. 5, 6, and 7, may be ordered.

In secondary syphilitic affections of the pharynx, if the patient has not had a thorough course of mercury previously, he may be ordered one or two grains of blue pill twice or thrice daily; or the same quantity of grey powder with or without a grain of Dover's powder, according to the presence or absence of bowel irritation, may be ordered. Formula No. 24 is a favourite prescription of mine; either this or formula No. 25 may be given three times a day. In some cases the iodide of potassium alone (formula No. 26) will answer best. Locally the tannic acid gargle (No. 3) or gargles Nos. 5, 6, and 7 may be ordered. I have found the solution of chromic acid (formula No. 33) as recommended by Butlin most useful. The ulcerated patch should be dried with a piece of blotting-paper or rag, and the solution should then be carefully painted over it. This may be done twice a day. At first the application will cause a good deal of smarting, but this soon passes off, and the patients obtain relief so quickly from the application that there is no difficulty in getting them to continue the painting. In fact there is only one drawback to the lotion, and that is, that under its use the local trouble often heals so quickly, that the patient is apt to neglect constitutional treatment, thinking that he is free from the complaint before this is really the case. The use of tobacco should be forbidden in the presence of secondary syphilitic affections of the pharynx or larynx. In obstinate cases of secondary syphilitic affections of the pharynx, the plan of treatment, as carried out at Aix-la-Chapelle, will sometimes succeed when all other plans have failed.

In the treatment of the gummatous and ulcerative stages of tertiary syphilis almost our entire reliance must be placed on iodide of potassium in large doses, *i.e.*, from

10 to 40 grains, three times a day. In some cases the progress of the cure is accelerated by the inunction of a drachm of blue ointment in the axilla every night, but as a rule mercury is not well borne in the tertiary stage of syphilis. The iodide of potassium will often act better if combined with quinine (as in formula No. 20). The general treatment should be of a tonic and supporting nature, milk, eggs, and a fair amount of meat being ordered. Stimulants should be taken with great moderation and only at meal-time.

With regard to local treatment it is necessary first to cleanse the surface of the ulcer; this can be done most conveniently by means of the hand-ball spray apparatus, a simple alkaline fluid (formula No. 52) being used for the purpose. When the surface is clean, iodol or iodoform may be applied to it by means of Kabierski's insufflator (*see* Fig. 23, p. 86). I find however that a solution of sulphate of copper (formula No. 35) yields the most satisfactory result.

The treatment of adhesion between the soft palate and the posterior wall of the pharynx is far from satisfactory. If the naso-pharynx is completely cut off from the pharynx, a sound should be passed first through one nostril and an incision made on the point of it in the pharynx. When one side has been set free, then the sound should be passed through the other nostril, and the same procedure repeated. Then comes the greatest difficulty of the case, viz., keeping the communication between the nose and pharynx patent. For some days after the operation, the patient should wear an india-rubber tube passing through the nostril, and the two ends tied together externally, a tube being required for each nostril. After the tubes are removed the patient should be instructed to prevent the parts uniting by introducing dilators, both anteriorly and posteriorly.*

* *Sajous' Annual* 1891, vol. iv., E., p. 4.

The pharyngeal affections of inherited syphilis require to be treated on similar lines to those employed in tertiary syphilis.

14. PARASITIC AFFECTIONS OF THE PHARYNX.

Pharyngomycosis.

It need hardly be mentioned that the same parasites as are found in the mouth also attack the pharynx. Thrush, for example, almost invariably appears on the tongue or buccal mucous membrane before the pharynx is affected. Thrush is due to the presence of a vegetable parasite, the *oidium albicans*, and it is now generally admitted that this is identical with the *oidium lactis*, the ferment fungus on the presence of which depends the acid fermentation of milk. This is the most common form of vegetable parasite met with in the mouth. When the white membrane of thrush is examined microscopically, it is found to be composed of spores and filaments with a granular basis. Thrush is for the most part a disease of infancy, occurring almost exclusively in children brought up by hand, but it may be met with in old people and in persons exhausted by some wasting disease, such as cancer or phthisis. Thorner * has recorded a case of thrush of the pharynx and nose in an adult, whose vitality had been greatly lowered by an unusually severe attack of influenza, but who nevertheless recovered. According to most authorities, thrush is limited to those parts of the mucous membrane which are lined with squamous epithelium, but in this case, Thorner was able to watch the gradual extension of the fungus from the pharynx to the naso-pharynx and thence into the nostrils.

The disease commences with the formation of circular

* Reprint from the *Cincinnati Lancet-Clinic*, February 20th, 1892.

spots about the size of a pin's head, slightly elevated and of a white colour. If the course of the disease be unchecked, the spots gradually coalesce until in some cases the mucous membrane of the pharynx is covered with patches of a whitish colour. The membrane is at first slightly adherent, so that a little oozing of blood follows attempts to remove it. Thrush is usually ushered in with some febrile disturbance and gastro-intestinal irritation, such as sickness, diarrhœa and abdominal pain and tenderness. In cases running a fatal course, the patient becomes drowsy, there is profuse diarrhœa with foul-smelling stools, and the nates and anus become red and excoriated.

The *mycosis sarcinica* composed of sarcinæ, and the *aspergillus mycosis* are also very occasionally met with in the throat.

In *mycosis leptothricia* the parasite is the lephtothrix buccalis. According to Chiari pharyngomycosis is not to be looked upon as a special disease, but only as an immoderate proliferation of leptothrix fungus which is constantly found in the mouth. The origin of this germ seems to be associated with carious teeth. The deposit consists partly of long fine threads, partly of tufts and sheaves, and also of various kinds of cocci. It occurs in two forms, diffuse and circumscribed. In the diffuse variety shiny, milk-white patches form on the mucous membrane; in the circumscribed variety white, or yellowish-grey, soft, sometimes horny, often pedunculated nodules or pointed excrescences make their appearance in the crypts of the tonsils, the pillars of the fauces, and the posterior wall of the pharynx; the lateral pharyngeal walls are sometimes covered with the parasite quite low down. In some cases the lingual tonsil is attacked and exceptionally the pharyngeal tonsil. Women appear to be slightly more prone to the affection than men, and it attacks in preference people between twenty-eight and

thirty-five years of age. An unhealthy condition of the tonsils appears to favour the development of the fungus, as it is met with after attacks of tonsillitis and diphtheria. The growths exhibit great stubbornness in existence and quickly recur after they have been artificially removed, but they have very little tendency to spread to neighbouring parts. They usually cause only inconsiderable local troubles, such as tickling in the throat, dryness, slight dysphagia, and as a rule they do not set up any inflammatory reaction in the parts affected by them. Only in rare cases, running a severe course, with great extension of the disease, have disturbances of the general health been noted in addition to the local troubles.

Diagnosis.—From diphtheria, mycosis leptothricia is differentiated by the absence of local inflammatory appearances, the non-feverish condition of the patient, the discrete occurrence of the deposit, its hardness, and usually the simultaneous implication of the root of the tongue. In follicular tonsillitis fever and local inflammation are never absent, and the exudation in the crypts is soft and can readily be removed.* The mycosis fungus can be more readily confounded with the concretions met with in chronic tonsillar affections.† The diagnosis can however be made by means of the microscope.

Prognosis.—When thrush occurs in adults or old people, it generally indicates a great want of vital power, and it is therefore of grave prognostic import. The other forms of mycosis are rather matters of clinical interest than of anxiety, though at times the cure of the disease demands careful and protracted treatment.

Treatment.—In cases of thrush the important indication is the observance of the most scrupulous cleanliness in

* Heryng, *Centralblatt*, vol. i., p. 16.

† Vanderpoel, *New York Medical Journal*, February 9th, 1889.

everything used; in children especial attention being paid to the state of the bottle. The pharynx should be carefully swabbed out two or three times daily with a weak solution of carbolic acid, permanganate of potassium, or sulphurous acid. In the interval spray No. 52 may be used. In a very severe case occurring in an adult under the care of the writer, the administration of an effervescing lozenge containing $\frac{1}{6}$ grain of cocaine and 5 grains of chlorate of potassium, every three or four hours, speedily effected a marked improvement in the local condition, and enabled the patient to take food without pain.

As regards mycosis leptothricia an energetic local treatment must be carried out in order to destroy the parasite. The most effectual means is, undoubtedly, the galvano-cautery freely applied to the base of the growth. In obstinate cases Heryng extirpates the tonsils, and then burns down any remaining nodules with the galvano-cautery. The removal of the deposits by forceps and the subsequent application of absolute alcohol answers in some cases. Chiari supplements the action of the galvano-cautery by painting the affected part with sublimate solution (1 in 1000) and by ordering the same solution (1 in 10,000) for gargling.

15. FOREIGN BODIES IN THE PHARYNX.*

The majority of the foreign bodies, which become lodged in the pharynx, find their way there through being taken with food. This fact should be borne in mind in the event of a person becoming unconscious while eating. Gubb † records a striking example of this. He was called to an old

* This subject is exhaustively treated by J. O. Roe, in vol. ii. of Burnett's *System of Diseases of the Ear, Nose, and Throat.*

† *British Medical Journal* 1888, vol. i., p. 189.

man who was said to have had "a fit" while eating his dinner. On his arrival he found the patient lying with his head over the back of the chair, livid and unconscious. Seeing an empty plate in front of the old man, he introduced his finger down the throat in search of any morsel which might have become impacted. Nothing however could be felt, but on tickling the fauces with a feather pen, the patient gave a desperate gulp or two and brought up a large piece of half-chewed meat. The writer knows of a similar case. The explanation of the cause of the fatal seizure was however only obtained at the *post mortem* examination, when the end of a mutton-chop was found blocking the larynx.

As a result of the funnel-shaped narrowing of the pharynx, and of the greatest narrowing being at the level of the cricoid cartilage, most foreign bodies become impacted here, if they are arrested in their downward course. If they are sufficiently large, they may block the larynx, and cause death from suffocation, as in the case last referred to. Small, sharp bodies cause pain, give rise to injuries, and produce dysphagia. A needle has been known to set up subcutaneous emphysema of the throat, and then to pass into the stomach, and be discharged per rectum without doing further damage. Rivington * records a case in which the left common carotid artery had to be ligatured, in consequence of its having been wounded by a fish-bone, which had penetrated the pharynx. In an appendix to his paper Rivington has arranged an abstract of 44 cases of wounds of blood-vessels by foreign bodies introduced through the mouth. An examination of these cases shows the danger of passing bougies or probangs for the purpose of clearing the pharynx or œsophagus of sharp-pointed bodies. Rivington was of opinion that in his case the injury to the

* *Medical and Chirurgical Transactions*, vol. lxix., p. 63.

carotid was produced by the probang pushing the fish-bone through the wall of the pharynx, and he quotes Wagret's case * as a striking example of this risk : " After a physician had made attempts at the propulsion of the bone, the patient experienced entire relief, and said to his benefactor that he thanked him very much, and that he had saved his life. A few days later the patient died from perforation of the descending aorta."

The great risk of people going to sleep with dentures in the mouth is illustrated by the numerous cases, in which a set of false teeth has become impacted in the pharynx. The irregularity in shape of these appliances much inter-

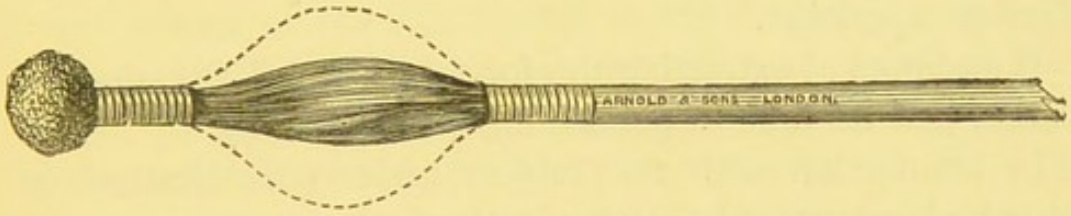


Fig. 38.—Expanding Probang.

fering with their downward progress, the wonder is that they ever pass safely through the intestinal tract.

Treatment.—From what has gone before, it will be seen that the use of bougies and probangs for diagnostic or other purposes is to be condemned, as they may force sharp foreign bodies through the pharynx, and cause severe injuries. The expanding probang (Fig. 38), used cautiously, is however often successful. Careful illumination of the pharynx with the laryngoscope will facilitate the removal of the foreign body with forceps; if the laryngoscope be not available, and the symptoms are urgent, digital examination will usually give most information, and this is easier during acts of swallowing or choking, as the pharynx and larynx

* Poulet, *Foreign Bodies in Surgery*, vol. i., p. 93.

then become elevated. J. G. Glover * recommends the use of emetics for the expulsion of bones stuck in the throat; he gives 30 grains of sulphate of zinc, followed if necessary in five minutes by a second dose. Apomorphia may safely be used hypodermically, in the case of adults, if emetics cannot be swallowed. Should the foreign body remain impacted, the patient should be fed on soft, semi-solid food, such as bread-and-milk, farinaceous puddings, etc. In the event of the foreign body passing into the stomach, aperients should be avoided, and the patient's diet should be restricted to potatoes, of which he should take as much as possible. Billroth is of opinion that, since the introduction of this procedure, gastrotomy for foreign bodies should become an obsolete operation.

If attempts at extracting the foreign body fail, the surgeon should lose no time in performing pharyngotomy.

In connection with the subject under consideration, it must be remembered that foreign bodies may penetrate the soft palate and become fixed there, or substances may be expelled from the stomach in the act of vomiting and become impacted in the naso-pharynx, or even enter the choanæ. Stevenson † records an interesting case of a man with a pipe in his mouth who fell forward; the stem penetrated the soft palate. When seen three days later the left posterior half of the hard palate, the soft palate, left tonsil, and uvula were acutely inflamed and swollen. The next day pus was seen exuding from a sinus, and with a probe what was thought to be dead bone was felt; on removal it proved to be a piece of clay pipe nearly an inch and a quarter in length. The history of the fall was only obtained after the removal of the piece of pipe.

* *Lancet* 1883, vol. ii., p. 632.

† *British Medical Journal* 1890, vol. ii., p. 205.

16. NEUROSES OF THE PHARYNX.

Under this head are included—

(A) Altered conditions of the motor nerves, giving rise to (1) spasm; (2) paralysis; and

(B) Altered conditions of the sensory nerves—(1) anæsthesia; (2) hyperæsthesia; (3) paræsthesia; (4) neuralgia.

These neuroses may either have their origin in the higher centres; in the peripheral nerves; or occur as reflex phenomena.

(A) *Motor Neuroses of the Pharynx.*

(1) Spasm of the pharyngeal muscles may be due to hysteria, and gives rise to the sensation of a ball in the throat, the *globus hystericus*. In some cases there are spasmodic contractions of the pharynx, occurring as often as forty to sixty times in the minute, during which air is swallowed, frequently in large quantities. This causes distension of the stomach and troublesome flatulence.

(2) Paralysis of the pharyngeal muscles is met with in labio-glosso-laryngeal paralysis, as the result of disease of the meninges or of the bones of the base of the skull, or as a sequel of diphtheria.

Cases of paresis of these muscles have been described in which the affection is assumed to be of a myopathic origin, the muscular fibres being weakened by extension of the inflammatory process from the mucous membrane covering them. That the difficulty in swallowing is not due to stricture is proved by the passage of a bougie. On examination it is found that the muscles do not respond so briskly as usual to the irritation of a probe, and that there is diminished response to faradism. In some of these cases hysteria plays a prominent *rôle*.

Treatment.—In hysterical spasms the cold douche to nape of neck and chest, the administration of anti-spasmodics, such as bromide of potassium and valerian, or the valerianate of zinc, followed by tonics, change of air, and moral treatment, usually suffice to effect a cure.

In the cases in which the pharyngeal affection comes on as a result of labio-glosso-laryngeal paralysis nothing can be done. Where diphtheria is the cause, change of air, the administration of iron and strychnia in full doses, will usually have a good effect. The application of a faradic current, both externally and internally, is exceedingly useful. Where the paresis is apparently of myopathic origin, the patient should be fed on liquid but stimulating food, and the same treatment should be carried out as is used for diphtheritic paralysis.

(B) *Sensory Neuroses of the Pharynx.*

(1) Anæsthesia of the pharynx is met with in hysteria, diphtheria, chronic bulbar paralysis, and is sometimes found in insane patients who have no paralysis elsewhere.* This diminution or absence of sensation in the pharynx will sometimes be found of assistance in the diagnosis of hysteria.

(2) Increased sensibility (hyperæsthesia) is met with in neurotic patients, especially those of an hysterical temperament.

(3) Perverted sensibility (paræsthesia) of the pharynx is a very common and troublesome symptom to treat. It occurs most frequently in women, especially about the menopause, and in neurotic patients generally. It is also occasionally a premonitory symptom of pulmonary phthisis. The possibility of paræsthesia of the pharynx being due to reflex disturbance, as, for example, swelling of the inferior

* W. P. Porcher, *Burnett's System*, vol. ii., p. 699.

or middle turbinals, should be borne in mind. Patients complain of the sensation of a foreign body in the throat, a feeling of constriction or sense of suffocation, tickling, itching, burning, or dry feelings in the throat. Frequently accompanying these sensations is an irritable, oftentimes barking, cough. It is most important that a careful examination of the nose, naso-pharynx, and base of the tongue should be made, as these symptoms are sometimes due to changes in the mucous membrane of the pharynx, etc., *e.g.*, granular pharyngitis, enlargement of the lingual tonsil, and it is not until every possible cause has been excluded that the diagnosis of a purely neurotic affection should be made.

(4) Neuralgia of the pharynx is a rare condition. There are however cases of acute lancinating pain, coming on in paroxysms and referred to the tonsils and pharynx, in which on the most careful examination nothing objective can be seen.

Treatment.—As already stated, any cause of irritation which exists should if possible be removed. The condition of the digestion should be inquired into; if there are signs of engorgement of the portal system, a mercurial pill followed by a saline aperient will be beneficial. The diet requires to be regulated; spiced articles of food, pepper and mustard are best avoided; excess in alcohol and tobacco is injurious. Anæmic patients should be treated by the administration of iron, arsenic and cod-liver oil. In cases occurring at the menopause, bromide of potassium will be found of great service. Nervine tonics may be used. Change of air, and especially a sea-voyage, will often have a good effect. Réthi * obtained a cure in one case of neuralgia of the pharynx by cauterising the painful points with chromic acid. Mackenzie † found the greatest

* *Centralblatt*, vol. iv., p. 394.

† *Diseases of the Throat and Nose*, vol. i., p. 114.

benefit in cases of neuralgia of the pharynx from the application of tincture of aconite three or four times a day.

17. TONSILLITIS.

Under the head of acute tonsillitis are included three forms of acute inflammation of the tonsil, viz., follicular tonsillitis, parenchymatous tonsillitis or quinsy, and a form in which the tonsillitis is a part of a general pharyngeal affection. All three varieties have much in common as regards their ætiology, symptoms, and treatment, so that it will be convenient to consider them together, pointing out their chief differences.

Ætiology.—Tonsillitis is essentially a disease of adolescence and early adult life, being rare before ten or after thirty. Cases have however been recorded of tonsillitis occurring in infancy (a case of quinsy at seven months of age has been reported *), and also in extreme old age. It is now almost universally agreed that there is an intimate connection between tonsillitis and acute rheumatism. The whole subject was most exhaustively discussed at the annual meeting of the British Medical Association in August 1889.† The papers of Haig-Brown and Archibald Garrod, who opened the discussion, contain a careful review of all that is at present known. It has been well said that if you wish to write down the causes of tonsillitis, all that is necessary is to take some systematic text-book of medicine, and to copy out from it the causes there assigned to rheumatism.‡ Haig-Brown found that there was a

* *Archives of Laryngology*, vol. i., p. 227.

† *British Medical Journal* 1889, vol. ii., p. 582.

‡ Lennox Browne, *The Throat and Nose and their Diseases*, 4th edition, p. 243.

suggestion of rheumatic origin in 76 out of 119 cases of tonsillitis occurring in school-boys.* Exposure to cold, wet, or sudden changes of temperature is therefore among the common exciting causes of tonsillitis, and as in rheumatism heredity plays an important part. Follicular tonsillitis often occurs in epidemics; this is not the case with quinsy.

The connection between gout and tonsillitis is much less marked, but I am of opinion that quinsy is more common in people of a gouty inheritance than in others. Cases are met with in which acute tonsillitis has preceded an attack of gout, and the throat trouble disappeared as soon as the joint mischief manifested itself.† Insanitary conditions, such as exposure to sewer gas, over-crowded hospital wards, etc., are powerful agents in the production of sore throat—hence the term "hospital sore-throat." It is highly probable that in these cases some septic poisoning is at the root of the evil. Tonsillitis has been known to follow intra-nasal operations; a case has occurred in my own practice. This complication is of an infectious nature, and depends upon the entrance of infectious agents with the inspired air. In susceptible persons the inhalation of air impregnated with coal-gas will cause an attack of tonsillitis.

Contagion is undoubtedly an important means of favouring the spread of tonsillitis. All forms of this disease are more or less contagious, quinsy being probably the least contagious; whereas in follicular tonsillitis there are all degrees of contagion, which in some cases almost equals that of diphtheria.

Anything which exhausts muscular or nervous energy, such as overwork and anxiety, favours the occurrence of

* See also W. Hill, *Tonsillitis in Rheumatic States*, 1889.

† See Part II., Section 27.

tonsillitis; this is especially the case in persons who have suffered previously from the affection, as a former attack seems to predispose to another.

Morbid Anatomy and Pathology.—We are still far from being able to speak definitely as to the nature of tonsillitis. Some authorities are disposed to regard it as essentially a manifestation of the rheumatic diathesis, and there is much to be said in favour of this view. There are others, however, who hold the opinion that it is an acute infectious disease, and that the shivering which ushers in the attack, the rheumatic pains and the high temperature, are to be considered as the expression of the general infection of the system. Tonsillitis with severe febrile symptoms and albuminuria suggests the absorption of an infectious substance through the tonsils. In the so-called hospital sore-throat the septic nature of the affection is manifest, and its occurrence should lead to a careful overhauling of the sanitary arrangements.

Various micro-organisms (staphylococci, streptococci, etc.) have been found in the secretion from the tonsils and in the tonsils themselves, but much work still remains to be done in this direction to clear up the precise connection between these organisms and tonsillitis.

In follicular tonsillitis the small depressions or lacunæ on the surface of the tonsils become inflamed and blocked up with a soft yellowish-white substance, consisting of fibrinous lymph, epithelial cells, micro-organisms and *débris*. Follicular tonsillitis hardly ever goes on to suppuration, but occasionally cases, which in their outset resembled it, later on suppurate like a quinsy. In parenchymatous tonsillitis or quinsy there is an inflammation of the tissue of the gland itself, which in the severer forms goes on to the formation of an abscess. In many instances the suppuration takes place in the connective tissue in which

the tonsil is imbedded. To these cases the term "peritonsillar abscess" is more correctly applied.

In the third form of tonsillitis we have an inflammation of the tonsils and adjacent part of the pharynx, with some superficial ulceration of the mucous membrane.

Symptoms.—The attack usually comes on with febrile disturbance, malaise and aching in the limbs. It may be preceded by a feeling of chilliness or even a distinct rigor. Stiffness in the neck and pain in the throat soon supervene; the pain is sometimes of an agonising character, shoots into the ears, and is increased by opening the mouth or attempting to swallow. There is a constant desire to swallow, but the difficulty in doing this is so great that the secretions dribble out of the mouth, and if fluids are taken they frequently return by the nose. The tongue is coated and the breath offensive, the bowels confined and the urine diminished in quantity, of high specific gravity, rich in urea and urates, and deficient in chlorides. The voice is thick and nasal, there is often deafness, the patient snores when asleep, and the breathing is sometimes noisy even when he is awake. The pulse is considerably increased in frequency, and at first may be full and bounding, and the temperature may rise to 105° Fahr. or even higher, but more commonly it ranges between 101° and 104°. All the symptoms are more marked in the parenchymatous form than in follicular tonsillitis, and the pain, difficulty in swallowing and breathing, attain their maximum just before the pus is evacuated, when the patient may suffer excruciatingly.

On examining the throat in a case of follicular tonsillitis, both tonsils will usually be found enlarged, and the surface dotted over with spots of a yellowish-white colour, due to retention of secretion in the lacunæ. Occasionally these spots coalesce, so that a considerable portion of the tonsil may be covered by the exudation.

In parenchymatous tonsillitis the tonsil and adjacent parts will be found greatly swollen, of a deep purple-red colour, and often covered with viscid mucus. Usually only one tonsil is affected, but the other tonsil is frequently attacked just as the patient is hoping that he has passed through the worst of his illness. There is enlargement of the glands at the angle of the jaw, and the side of the face may be much swollen. In the third variety of tonsillitis, the tonsils, soft palate, and fauces are redder than natural, and the mucous membrane is swollen and relaxed. In more severe cases ulceration occurs. In ulcerative tonsillitis (hospital sore-throat) the tonsils and fauces are swollen and small white superficial ulcers are seen. The loss of strength and general depression, which accompany the hospital sore-throat, are much more marked than in the other varieties of tonsillitis, and point to the septic origin of the disease.

Though the symptoms of the three forms are so similar it is to be noted that there is an essential difference between them, as it is found that the person who has had one attack of quinsy will in the event of a second attack of tonsillitis again have a quinsy, and the same holds good for follicular tonsillitis, so that one cannot regard the latter as being a milder form of parenchymatous tonsillitis. It is important to remember that obscure attacks of fever in children frequently depend upon a tonsillitis otherwise running a latent course, hence it is advisable to examine the throat in all cases of feverishness.

Complications and Sequelæ.—The following complications have been met with, though fortunately only rarely, in connection with an attack of tonsillitis, viz., otitis media, cardiac disease (either endo- or peri-carditis), and acute rheumatism. Orchitis and ovaritis of infectious origin (as

in typhus and mumps) are also rare complications. Albuminuria is occasionally present in cases where the temperature is high.

In very exceptional cases of suppurative tonsillitis the pus has passed along the deep fascia into the mediastinum, setting up pleurisy and causing death. Infective phlebitis, peritonitis and general septic infection have been noted as sequels of follicular tonsillitis.

In chronic cases of follicular tonsillitis the little caseous plugs in the lacunæ may cause the breath to be foul. As a result of a past tonsillitis, a chronic abscess may form in the tonsil, similar to the chronic abscesses occurring in scrofulous patients after inflammation of the lymphatic glands. Cases have been recorded in which paralysis has followed what appeared to be follicular tonsillitis; the probability that these were really cases of diphtheria must always be borne in mind.

Diagnosis.—This is easily made as regards quinsy; the suddenness of the onset, the rapid enlargement of one tonsil, and the great pain are quite characteristic. It is possible that a gumma may form so quickly in the tonsil as to mislead at first, but the more chronic nature of the affection will soon awaken suspicion. There is frequently considerable difficulty in distinguishing between follicular tonsillitis and diphtheria; in fact there are transition forms in which differentiation is impossible. Diphtheria may commence with the appearance of tonsillitis, and only later on manifest the clear signs of its real nature, just as, when cholera is epidemic, it is difficult to distinguish simple diarrhœa from choleraic diarrhœa. In diphtheria the patches are of a whitish or ashy-grey colour, cover a larger area, are not dotted about as in follicular tonsillitis, and leave a bleeding surface on attempts at removal. The patches of false membrane are also seen on different mucous

surfaces at the same time, *e.g.*, tonsils and soft palate, pharynx, larynx or nose, or they may gradually extend from one to the other. Moreover, the onset of diphtheria is more insidious, there is a greater tendency to asthenia, as shown by the frequent pulse and occasional death by heart failure, the temperature as a rule is not so high, albuminuria is generally present, paralytic sequelæ are frequent, and the disease is very infectious. The deposits on the tonsils due to mycosis may be mistaken for follicular tonsillitis; a microscopical examination will solve the difficulty.

Prognosis.—Recovery is almost the invariable result in follicular tonsillitis, and it is difficult to see how death can be brought about by it in the absence of any grave complication. In quinsy also recovery may be confidently expected; death has however occurred in a few cases from the bursting of the abscess and the entrance of the pus into the larynx causing suffocation. T. Gann records a striking example.* As has already been mentioned, the pus may burrow down the fascia, and entering the mediastina may give origin to a fatal pleuritis. Death from hæmorrhage due to sloughing has been recorded, but this has only been noticed when the tonsillitis was of a gangrenous nature. Very rarely tonsillitis may set up œdema of the larynx, and death may occur with startling rapidity.†

Treatment.—Regarding follicular tonsillitis as very frequently a manifestation of the rheumatic diathesis, a combination of 10 or 15 grains of the salicylate of sodium with 10 grains of the bicarbonate of sodium in cinnamon water or some other suitable vehicle is what I now generally order, and it is as useful as any other drug. In considering the effect of treatment it must be borne in

* *Lancet* 1893, vol. i., p. 1515.

† I have recently seen an example of this in a patient under Dr. Sturges at the Westminster Hospital.

mind that follicular tonsillitis runs a pretty well defined course of three or four days, and hitherto no specific has been found which will materially shorten this period. Salol in doses of 10 grains every two hours during the day has recently been highly recommended. Not less than 60 grains should be given in the twenty-four hours, nor more than 120. As a rule about 90 grains will suffice for an adult. As the drug is insoluble it may be given in powder form or as an emulsion. Salol may also be employed in parenchymatous tonsillitis, but it is not so efficacious in this disease. Benzoate of sodium in 5- to 15-grain doses every one or two hours is said to cure acute follicular tonsillitis in from twelve to thirty-six hours.* Guaiacum is a remedy which has long enjoyed a reputation in the treatment of acute pharyngeal affections, and I have known people subject to quinsy, who were confident that they had averted threatened attacks by the prompt use of this remedy. It may be given in doses of 5 grains mixed with black-currant jam every two hours, or the trochisci guaiaci of the Throat Hospital Pharmacopœia may be ordered. If the temperature range high, minim doses of tincture of aconite every half-hour for two or three doses, and then at less frequent intervals, will have a good effect. Phenacetin or antipyrin in 5- to 10-grain doses every two or three hours for three or four doses may be given. These drugs both relieve pain and also bring down the temperature. In gouty cases colchicum and alkalies answer best.

In hospital sore-throat a stimulating plan of treatment is required from the beginning. Medicinally, acid and bark or full doses of the tincture of the perchloride of iron, with or without quinine, are indicated. If, as is generally the case, the tongue is furred and the breath foul it is advisable to commence treatment by giving three grains of calomel, followed by a saline aperient.

* *Sajous' Annual* 1889, vol. iv., E. 9.

As regards the local treatment of acute tonsillitis, the first thing to be said is that gargles are useless. Any one who has himself suffered from tonsillitis would certainly not order a gargle after having had personal experience. Small pieces of ice may be sucked and will often give relief. Moistening the index finger, then dipping it into bicarbonate of sodium and rubbing it over the inflamed tonsils, has been highly recommended and is certainly worth a trial. The application should be made every five minutes for half an hour, and then once every hour for the rest of the day; afterwards two or three times a day are sufficient until the inflammation has subsided. In quinsy I have found the application of a 20 per cent. solution of cocaine most serviceable; in some cases it appears to arrest suppuration, and in all it relieves pain and enables the patient to take nourishment.* The solution should be swabbed over the fauces two or three times a day as long as swallowing causes pain, and advantage should be taken of its local anæsthetic action to give the patient, about five minutes after the application, a meal of bread and milk, or egg beaten up with milk or brandy. The question of incising the inflamed tonsil has been much discussed. Since I have employed cocaine as just mentioned, I have not seen occasion to make an early incision into the tonsil. At one time scarification was much employed in acute tonsillitis; if the tonsil be very tense, puncturing in two or three places often gives considerable relief, even though no pus be evacuated. When it is clear that suppuration is present the patient should not be left in pain. Immediate relief in these cases may generally be effected by incising the tonsil, using for this purpose a bistoury protected by strapping except for an inch at the end, and taking care to cut upwards and inwards. The previous employment of

* *Clinical Society's Transactions* 1888, p. 234.

cocaine will diminish the pain of the incision and facilitate the operation. If suppuration has occurred in the peritonsillar tissue in front of the tonsil, Rice recommends that the anterior pillar should be punctured to the depth of one-fourth of an inch with a narrow-bladed tenotomy knife, and that a large-sized probe should then be passed into the connective tissue lying at the anterior external angle of the tonsil.* Poultices externally and the inhalation of steam will hasten suppuration. After the acute stage has passed, tonics, such as tincture of the perchloride of iron, quinine, acid and bark, are usually required.

In chronic follicular tonsillitis the crypts must be cleared out and their bases cauterised; a saturated solution of chloride of zinc answers best, or the galvano-cautery may be used. To prevent the formation of the cheesy concretions, the lacunæ in the tonsil may be torn with a strabismus hook, so as to convert them into open channels, and these are to be disinfected with a 10 per cent. carbolic solution.

18. CHRONIC ENLARGEMENT OF THE TONSILS.

Ætiology.—Nothing can be definitely said on this point except that there is a strong hereditary tendency to enlargement of the tonsils; by some authorities it is attributed to struma; not infrequently it seems to follow upon repeated slight attacks of tonsillitis. The zymotic diseases, especially scarlet fever, diphtheria and measles, exercise considerable influence in the production of this condition. Enlarged tonsils may be regarded as partly congenital, partly the product of preceding inflammation, and partly the result of a disproportionate growth of the tonsil in comparison with other glandular organs. The enlargement may date from infancy or develop during childhood or at puberty. As a

* *Journal of Laryngology*, vol. v., p. 205.

rule the enlarged tonsils shrink in adult life, and this atrophy is completed much earlier in the female than in the male. Enlarged tonsils have been known to disappear suddenly and completely after attacks of scarlet fever and diphtheria.

Morbid Anatomy and Pathology. — Two chief varieties of hypertrophied tonsils are met with. In the first variety the tonsil is hard, the hardness being due to an excessive growth of the fibrous elements; this is said to be associated with the arthritic diathesis. In the second variety it is soft, and in it the growth of adenoid tissue is most marked; this form occurs in lymphatic children. The tonsils vary much in size and shape; they may be as large as chestnuts or even larger; they may project into the mouth so as to touch one another, or they may be flat and chiefly enlarged in the vertical direction. They may be smooth on the surface or have a sponge-like appearance, and the surface scarred by follicular inflammation. In some cases the lacunæ are occupied by caseous masses; or concretions of a calcareous nature may form in the tonsils (*see* p. 248).

Symptoms.—The child—for it is in children that the symptoms are most marked—breathes with the mouth open, and has consequently a vacant expression, which is increased if, as is often the case, deafness be also present. The deafness is usually due to catarrhal thickening of the mucous membrane of the Eustachian tube. The breathing is laboured, and when asleep the child snores. Owing to the difficulty in breathing the chest is frequently pigeon-breasted; this is especially apt to be the case if the child be also rickety. Bosworth,* however, writes, "That a case of enlarged tonsils ever gave rise to chest deformity can scarcely be accepted." The face is long and the nose narrow and contracted. The mouth is generally

* *Diseases of the Nose and Throat*, vol. ii., p. 138.

open, and in consequence of breathing being carried on through it, there is much faucial irritation. The lips are swollen and the lower one everted. The voice is thick and has a nasal twang and speaking soon tires the patient. Food is insufficiently masticated; swallowing is performed with difficulty and in a clumsy fashion. In some cases impairment of the senses of smell and of taste has been noted. As a rule there is some fulness of the neck about the angle of the jaw, and the cervical glands are almost invariably enlarged. The patient is generally ill-developed, delicate, and listless, and he has an unhealthy aspect. Night terrors and screaming have been found associated with enlarged tonsils, and have disappeared after their removal. The tonsils may be the starting-point for various reflex phenomena, *e.g.*, pains in the ear, cough, vomiting, and pains in the epigastrium, with or without cramp in the stomach. Ruault mentions cases of nervous deafness, tinnitus aurium and pain in the ears cured by destruction of the tonsils with the galvano-cautery.

Diphtheria readily attacks enlarged tonsils, and there is reason to believe that other septic poisons may find entrance into the system through erosions, etc., on the tonsils.

Treatment.—The only satisfactory method of treating enlarged tonsils is to remove them, and the indications for the operation are the following: (1) Repeated attacks of tonsillitis; (2) Frequent blocking of the lacunæ with cheesy material which rapidly decomposes, and affords a culture medium for various pathogenic germs; (3) Inability to breathe sufficiently through the nose, with snoring during sleep; (4) Nasal voice and defective articulation; (5) Deafness and attacks of earache; (6) Tendency to pigeon-breast.

In advising the removal of the tonsils, it is well not to give too certain a prognosis as to the effect of the operation,

on account of the possibility of the co-existence of adenoid vegetations in the naso-pharynx; if this be the case, the removal of the tonsils will not suffice to cure the patient of his symptoms, as the naso-pharynx will require to be cleared ere the patient can breathe freely. With this proviso there is, in the writer's experience, hardly any operation which yields more certain and satisfactory results than the removal of greatly enlarged tonsils, and all ideas as to possible injury of the voice or interference with the sexual function may be dismissed as groundless.* In recommending the removal of tonsils, the surgeon should point out to the parents the risk children suffering from enlarged tonsils run, in the event of their being attacked by scarlet fever or diphtheria. The whole question as to the indications for and method of removal of the tonsils has been exhaustively treated by Semon.†

As regards the risk of hæmorrhage this has certainly been over-estimated by some authors. Wright‡ has collected all the published cases of alarming hæmorrhage after tonsillotomy, which have occurred in the last twenty years. They number thirty-one, with two fatal cases: of these one occurred in an adult, the other in a boy of eight and a half. The cause of death in the latter case was a wound of the internal carotid, which had an abnormal distribution.

In a series of cases collected by Désiré "probably aggregating 20,000 tonsillotomies, but 9 instances are recorded in which bleeding took place. In none of these cases was it fatal, and in several it was not serious."§

* *British Medical Journal* 1881, vol. ii., p. 193.

† *St. Thomas's Hospital Reports*, vol. xiii.

‡ *New York Medical Journal*, August 30th, 1890, p. 234. See also De Santi, *Lancet*, 1894, vol. i., p. 83.

§ *Sajous' Annual* 1891, vol. iv., E. 10.

The hæmorrhage may be of arterial origin, either from the division of one or two large branches, or of a large number of small vessels; of venous origin from division of the plexus of veins lying below and outside the tonsil; or of capillary or general origin as in cases of hæmorrhagic diathesis.* It must be remembered that the blood supply of the tonsils is almost exclusively derived from the external carotid through the ascending pharyngeal artery, and the tonsillar branches of the facial. Lefferts † lays stress on the ascending pharyngeal artery as being "one of the most, if not the most, prolific sources of severe bleeding after tonsillotomy."

Under the age of fifteen a dangerous hæmorrhage is not to be feared except in cases of hæmophilia. After twenty the liability to hæmorrhage is much increased. Therefore for patients under twenty, and still more for those under fifteen, the radical treatment by excision is to be strongly recommended in cases where the tonsil or tonsils project well beyond the arch of the palate. If the patient be above twenty and the case otherwise suitable for excision, he should have the option of this operation or of treatment by the galvano-cautery, after having had explained to him the respective advantages and drawbacks of the two methods of procedure. In the case of large, flat tonsils, extending low down in the pharynx and partly concealed by the pillars of the fauces, the galvano-caustic method seems the best. Tonsillotomy should if possible be performed without an anæsthetic; occasionally however in very obstreperous children it may be necessary to give them a little chloroform. The application of a 10 or 20 per cent. solution of cocaine to the throat undoubtedly facilitates the operation, by diminishing the sensibility of the part and lessening the

* Delavan, *Sajous' Annual* 1889, vol. iv., E. 12.
† *Archives of Laryngology*, vol. iii., p. 43.

immediate hæmorrhage, though it seems to increase the amount of subsequent bleeding. In performing the operation it is advisable to have an assistant standing behind the patient, to steady the head and to make the tonsil more prominent in the throat by pressure outside. If both tonsils are enlarged, the excision of the second should follow immediately upon the removal of the first, without

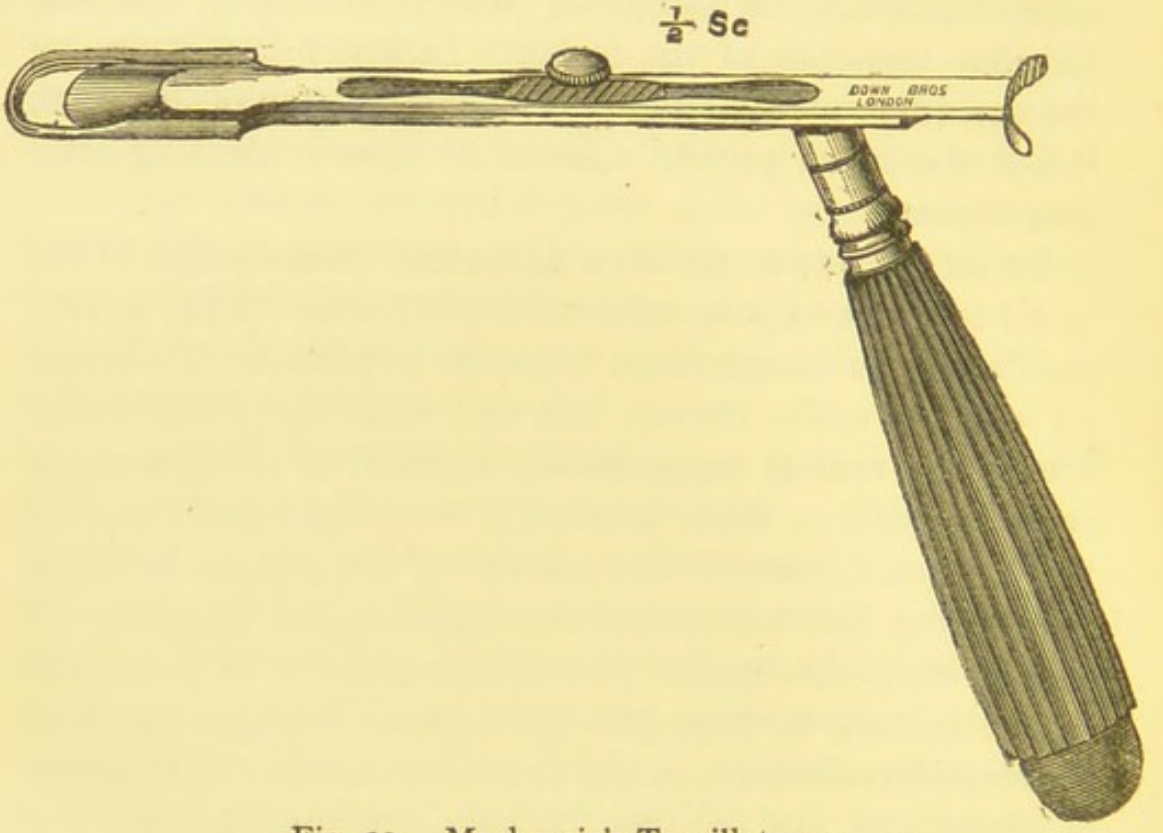


Fig. 39.—Mackenzie's Tonsillotome.

giving the patient time to think about it. The best instrument for the removal of tonsils is undoubtedly Morell Mackenzie's modification of Physick's guillotine (Fig. 39). Some surgeons however prefer Fahnestock's guillotine (Fig. 40); this is a more complicated instrument than Mackenzie's, and is liable to break, and the detached part may be swallowed. For the removal of enlarged tonsils in adults Bosworth * prefers a modification of the ordinary polypus

* *Diseases of the Throat and Nose*, vol. ii., p. 160.

snare. In some cases the tonsil is most easily removed with the bistoury; there are surgeons indeed who prefer the knife to the guillotine for all cases. Whatever instrument is used, great care must be taken not to incise the anterior pillar of the fauces, since a large twig of the tonsillar artery runs in this fold of mucous membrane. If the tonsil be adherent to the fold it must first be set free by the galvano-caustic knife.

The hæmorrhage which follows tonsillotomy seldom requires treatment; should it persist the patient may suck pellets of ice; if this is not sufficient Mackenzie recommended that he should slowly sip a mixture of tannic and gallic acids (formula No. 4). If this is not sufficient the most

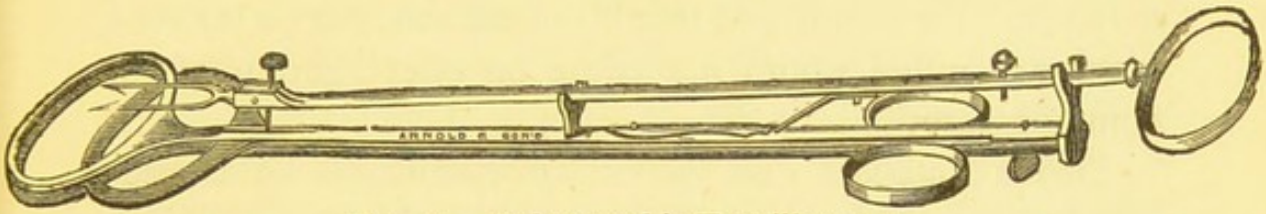


Fig. 40.—Fahnestock's Tonsillotome.

efficacious plan of treatment is direct pressure. A pad of cotton-wool charged with some astringent, such as the tincture of the perchloride of iron, and firmly fixed on a suitable holder, should be applied steadily to the bleeding-point, the patient should be kept in the erect position, and constriction of the extremities may be practised in order to favour syncope; or as suggested by Hulke, pressure may be applied by means of a pair of long-bladed forceps padded with lint, one limb being passed inside the mouth and the other resting opposite to it outside the neck. "If the patient will allow of it, however, direct seizure of the artery—where it can be seen—is preferable, and the safest means." * Amongst other methods, which have been found successful,

* Lefferts, *Archives of Laryngology*, vol. iii., p. 46.

may be mentioned seizing the root of the tonsil with a pair of ordinary dressing-forceps and giving a twist to the instrument; the application of a ligature to the stump; or the loop of the cold wire snare may be applied, possibly with the aid of a transfixion needle, as recommended by C. H. Knight.* Should the bleeding persist in spite of treatment, and the patient be in danger of dying from loss of blood, it has been recommended that either the external or the common carotid should be tied. In a recent discussion at the Clinical Society, Harrison Cripps † said that the external carotid should be tied between the superior thyroid and lingual arteries. Arbuthnot Lane in the case under consideration tied the common carotid, having previously injected between three and four pints of salt solution. He maintained that if the salt solution be injected, cerebral trouble would not come on after ligation of the common carotid.

Treves ‡ advises that the carotid circulation be arrested without the artery being permanently closed. "This is effected by exposing the artery in the usual way and passing around it a thick piece of soft catgut. This is tied in a very loose loop. By pulling upon the loop the circulation through the vessel is at once arrested, but is, however, at once restored when the tension upon the loop is relaxed." In his cases, Treves has allowed the loop to remain from four to seven days. After tonsillotomy the wounded parts will be sore for some days, and the patient should be fed on soft food; the marsh-mallow lozenge will be found to have a soothing and demulcent effect. If there be recurrence of the tonsil after tonsillotomy, this is to be attributed to insufficient removal. Most surgeons advise that the tonsils

* *New York Medical Journal* 1889, vol. ii., p. 399.
† *Lancet* 1892, vol. i., p. 976.
‡ *Medical Society's Transactions*, vol. xi., p. 117.

should not be removed while they are in a condition of inflammation, and this sound advice should be followed, notwithstanding the assertion of those who maintain that they have had no ill effects from operating under such circumstances. If children with enlarged tonsils should unfortunately be attacked with diphtheria, the surgeon may be compelled to excise the tonsils, and though this should only be done under urgent necessity, the operation has had excellent results. The plan of destroying the tonsil by the galvano-cautery is a tedious one, but, thanks to the introduction of cocaine, it is hardly painful. Three punctures may be made in each tonsil at one sitting, and as a rule eight or ten sittings are required, though in exceptional cases twelve to fifteen may be necessary. At first the punctures may be made freely, but as the tonsils shrink greater caution must be used. The sittings should take place at intervals of a week or ten days, unless excessive inflammatory reaction is set up in the tonsil. Between the applications a carbolised alkaline spray may be used (formula No. 54). This plan of treatment is not applicable to children under twelve. Severe hæmorrhage has occurred after treatment of a hypertrophied tonsil with the thermo-cautery, hence it is possible with the galvano-cautery.

The galvano-caustic loop has been highly recommended; the pain appears to be only slightly greater than with the guillotine, but the taste of the burnt flesh is very unpleasant. If the tonsil be slowly burnt through, the risk of hæmorrhage is very small, but it cannot be entirely excluded. Wright * has invented an ingenious galvano-cautery amygdalatome, an adaptation of an ordinary Mackenzie amygdalatome to galvano-cautery purposes.

In tonsils too small to require removal, painting with astringents may be tried. The writer's favourite application

* *New York Medical Journal*, August 30th, 1890, p. 236.

(formula No. 45) should be freely swabbed over the tonsils night and morning, or the glycerine of tannic acid may be employed. Rubbing in powdered alum has also been found efficacious. A concentrated solution of the chloride of zinc, introduced by means of cotton-wool on a holder into the lacunæ of the tonsil, will cause the gland to shrink.

19. MALIGNANT GROWTHS OF THE TONSILS.

It will be convenient and save repetition if we consider the malignant diseases of the tonsil under one heading.

The tonsil is subject both to sarcoma and carcinoma. According to Butlin * the former is "the most common of the malignant tumours which affect the tonsil." Whereas Bosworth† says, "If, however, the number of cases reported in current literature is any indication of the frequency of the disease, we find that carcinoma is by far the more common form, outnumbering the cases of sarcoma more than twofold."

Of the sarcomata, lympho- or round-celled sarcoma is the form which usually if not always attacks the tonsil, and of the carcinomata it is chiefly epithelioma.‡

In some cases of so-called primary sarcoma of the tonsil, it is a question whether the tumours are not portions of disseminated lympho-sarcoma, the first large tumours appearing in the tonsils.§ In recent years a large number of cases of malignant disease of the tonsils have been reported, so that the opinion formerly held as to the

* *Sarcoma and Carcinoma*, p. 188, London, 1882.

† *Diseases of the Nose and Throat*, vol. ii., p. 375.

‡ Butlin, *Operative Surgery of Malignant Disease*, p. 173. See paper by F. Donaldson, *New York Medical Recorder*, March 7th, 1885, abstracted by *Centralblatt*, vol. ii., p. 259.

§ Butlin, *British Medical Journal* 1885, vol. ii., p. 793.

comparative rarity of the disease is no longer tenable. Tonsillar cancer is almost exclusively met with in persons of middle life and upwards, and males are chiefly affected. Sarcoma on the other hand occurs in younger subjects, and has been met with in persons under twenty.

Symptoms.—At first the symptoms are ill-defined, and they may simulate those of simple hypertrophy. Later on the symptoms become more pronounced. Swallowing becomes difficult, the patient complains of pain in the throat, of neuralgic pains in the ear, back of the neck and pharynx, caused by pressure of the infiltrated lymphatic glands on the fibres of the cervical plexus. The tonsil is tender, and as it enlarges it gives rise to the sensation of a foreign body in the throat, the voice becomes nasal, and there may be deafness.

Epithelioma * attains the greatest size, next in size comes lympho-sarcoma, and scirrhus is usually the smallest. The increase in colour and consistence of the tonsil are most marked in epithelioma and least marked in lympho-sarcoma.

Epithelioma breaks down more rapidly than sarcoma, forming an excavated irregular cavity. Sarcoma may present itself as a smooth regular tumour. When ulceration takes place, the appearance of the tumour, the fœtor of the breath, and the hæmorrhage which frequently occurs, simplify the diagnosis.

Though as a rule in all forms of malignant disease of the tonsil the lymphatic glands are affected at a very early period,† nevertheless exceptional cases are met with; thus Newman ‡ records a case of encapsuled spindle-celled sarcoma of the left tonsil in which the lymphatic glands

* *Centralblatt*, vol. i., p. 245.

† Butlin, *The Operative Surgery of Malignant Disease*, p. 173.

‡ *Malignant Disease of the Throat and Nose*, p. 158.

were not involved, and Dor * records a case of epithelioma of the tonsil in which swelling of the glands was absent, so that at first the idea of a gumma was entertained. The glandular swelling comes on earliest and is most pronounced in encephaloid and epithelioma; in scirrhus it occurs late and is less developed. There is frequently pain on pressure at the angle of the jaw; and in advanced cases the cancerous cachexia is well marked.

Prognosis.—Death may take place partly from inability to take nourishment, and partly from constitutional contamination. In some cases the fatal termination is accelerated and occasionally even directly brought about by hæmorrhage. Butlin states that the disease proves fatal in very many instances within a year, or even six months of its first appearance; indeed, few persons survive more than three-quarters of a year. Epithelioma usually kills the quickest.

Diagnosis.—The diagnosis of sarcoma of the tonsil at an early stage is a matter of great difficulty. It may simulate a simple hypertrophy of the tonsil. An enlargement of one tonsil, gradually increasing in size, firm to the touch, should suggest the suspicion of sarcoma. As contrasted with carcinoma it has but little tendency to ulcerate, though hæmorrhages from erosions are not infrequent.† Syphilitic affections of the tonsil are most likely to be confounded with malignant disease. The writer has seen a case of chancre of the tonsil which was considered to be malignant until a secondary rash made its appearance. Again, a gumma in an old person may closely simulate malignant disease. Hence the graver view should never be taken until the possibility of syphilitic disease has been excluded, and in all cases where there is any doubt, the patient should be put on a thorough anti-syphilitic course. It must, however, be

* *Centralblatt*, vol. vi., p. 61.

† Bosworth, *Diseases of the Nose and Throat*, vol. ii., p. 387.

borne in mind that full doses of iodide of potassium have sometimes a most remarkable effect in improving the condition of malignant ulceration; the writer showed such a case at the Clinical Society; another case recently exhibited by him at the Laryngological Society was regarded by some members as malignant, and by others as of syphilitic origin; the former proved to be the correct diagnosis.

In the absence of a clear history the irregular cavity left by the bursting of a tonsillar abscess in an old person may simulate malignant disease. Primary sarcoma of the tonsil may be mistaken for quinsy.

Treatment.—If the case is seen and diagnosed early, *i.e.*, before the glands are affected, the question of an operation will have to be considered. Though a cure is not to be expected, still the relief that the patient will experience, by the removal of a growth interfering with deglutition and otherwise causing him trouble, warrants the surgeon in recommending an operation. Sarcomata are sometimes more or less encapsulated, and if an incision is made into the capsule they may readily be shelled out with the finger or director. If a more radical procedure has to be adopted, the growth may be removed through the mouth by means of the benzine cautery, the galvano-caustic loop, or by the knife. The hæmorrhage which accompanies the operation is not much more than is met with in cases of tonsillotomy. Some operators advise that the growth be removed externally, by pharyngotomy. This operation is adapted to cases where the glands are affected. Butlin * has fully described the methods and results of the various operations, and the reader is referred for details to his work. Should the case not admit of radical operative

* *The Operative Surgery of Malignant Disease*, p. 174. *See also* Newman, *Malignant Diseases of Nose and Throat*, pp. 177-96, and *Lancet* 1893, vol. i., pp. 591 and 1367.

interference, tracheotomy may nevertheless be required to prevent death from suffocation, and gastrotomy where there is inability to swallow nourishment. If there be an ulcerated surface various antiseptic sprays and gargles may be ordered; of these the best are formulæ Nos. 53 and 54. Iodoform or iodol may be used as an insufflation if the ulcer be very foul. Painting the surface with a 20 per cent. solution of cocaine will facilitate deglutition. Morphia, preferably in the form of the hypodermic injection, will almost certainly be required to assuage the intolerable pain.

20. CALCULI OF THE TONSILS.

The secretions are occasionally retained in the lacunæ on the surface of the tonsil, and becoming calcified give rise to tonsillar calculi.

They vary in size from mere specks up to masses as big as a pigeon's egg, or even larger. They may be soft and crumbling or as hard as stone. Sometimes the surface which is imbedded in the tonsil is smooth and the free surface rough and knobby, or the free surface may be polished as though by the passage of food, and the surface towards the tonsil be granular. It has been suggested that these calculi are identical with the tartar that forms about teeth.

Gruening * states that all tonsillar concretions contain leptothrix elements, and that the presence of this parasite determines the precipitation of the lime in the form of a carbonate.

In a case reported by Pargamin † the stone, which weighed upwards of a drachm, consisted of 20 per cent. organic matter, chiefly squamous epithelium and leptothrix;

* *Archives of Laryngology*, vol. iii., p. 136.

† *Centralblatt*, vol. ii., p. 496.

the inorganic part was carbonate of calcium. According to Mackenzie * tonsillar calculi "consist principally of phosphate and carbonate of lime."

Symptoms.—Occasionally the calculi give rise to no symptoms and are only accidentally discovered. In three cases Mackenzie noted prolonged suppuration determined by the presence of a calculus, which ceased after the removal of the offending substance. They may cause pain or difficulty in swallowing. In Pargamin's case a calculus, imbedded in the right tonsil, gave rise to pain in the corresponding temporo-maxillary articulation.

Terillon † reports a case of a stone the size of a hazel-nut, which had for two years caused sometimes acute, sometimes sub-acute inflammatory conditions, which led to the suspicion of carcinoma of the tonsil. Other cases of a similar character have been recorded.‡

Treatment.—Tonsillar calculi, if small or soft, may easily be removed by the forceps or with a scoop after painting the tonsil with cocaine; the large and hard calculi are best shelled out with the finger; it may sometimes be necessary to incise the margin of the tonsil surrounding the stone in order to liberate it. After the removal of the concretion, the cavity which contained it should be cauterised with the galvano-cautery or some caustic, in order to get it to close. If, as is frequently the case, the tonsil be hypertrophied, recurrence of the stone formation is effectually prevented by excision of the tonsil.

21. HYPERTROPHY OF LINGUAL TONSIL.

The term "lingual tonsil" has been applied to the lymphoid tissue at the base of the tongue.

* *Diseases of Throat and Nose*, vol. i., p. 75.
† *Centralblatt*, vol. ii., p. 496.
‡ *Medical Press*, November 1st, 1893, p. 447.

Ætiology.—The causes of enlargement of the lingual tonsil are those which give rise to repeated slight hyperæmia of the part, *e.g.*, spices, pickles, and other irritating articles of diet, alcohol, too hot or too cold drinks, especially if the one rapidly alternates with the other. Diathetic diseases, such as rheumatism and gout, are said to cause enlargement of the lingual tonsil.* It occurs more frequently in women than in men, or at all events women more often complain of symptoms referable to this condition. Adults are more commonly affected than children, unlike what takes place in the case of the faucial tonsils.

Morbid Anatomy and Pathology.—There is a simple increase of the lymphoid tissue of the part. In well-pronounced cases the sulcus, which normally exists between the root of the tongue and the epiglottis, may be almost completely obliterated. Thrasher † has reported a case in which the growth was the size of a walnut, and in shape and structure like a child's tonsil.

Lennox Browne ‡ has directed attention to a varicose condition of the veins at the base of the tongue, and regards them, like enlargement of the lingual tonsil, as a cause of some of the paræsthesiæ met with in the pharynx.

Symptoms.—These consist of various paræsthesiæ and hyperæsthesiæ. Patients frequently complain of fulness in the throat with the sensation of a foreign body; hence it is possible that in some of the cases of "globus hystericus" there may really be something objective to explain the symptom. Tickling in the throat, an irritable cough, and fatigue in speaking are not infrequently observed. Dysphagia is rare. Boylan § relates a case in which dyspnœa was

* Scanes Spicer, *Lancet* 1888, vol. ii., p. 807.
† *Journal of Laryngology*, vol. iv., p. 310.
‡ *The Throat and Nose and their Diseases*, 4th edition, p. 223.
§ *Journal of Laryngology*, vol. iv., p. 310.

a prominent symptom; the swelling in this case was so great that the epiglottis was quite invisible, and nothing could be seen of the larynx except the tips of the arytenoids. In Thrasher's case there was indistinctness of speech and choking on deglutition. In some cases the tip of the epiglottis gets caught in the hypertrophied tissues, and fits of coughing and laryngeal spasm are produced; setting free the epiglottis by means of the laryngeal probe will usually give temporary relief in these cases, but a permanent cure is only to be effected by reducing the size of the lingual tonsil.*

Diagnosis.—The recognition of enlargement of the lingual tonsil is readily effected by means of the laryngoscope. Under normal conditions there is a distinct interval between the anterior surface of the epiglottis and the root of the tongue; if this space be filled up with a soft irregular growth, which is reduced in bulk by the application of a solution of cocaine, hypertrophy of the lingual tonsil may be diagnosed.

Prognosis.—One case has been recorded in which the growth was so great as to cause dyspnœa, but this is quite exceptional. In the vast majority of cases, apart from the local discomfort produced by the enlargement, the condition is quite harmless, though it is conceivable that the constant cough, which is sometimes a symptom, may give rise to emphysema of the lungs.

Treatment.—In cases of slight enlargement, the daily application of preparations of iodine (formulæ Nos. 44 and 45) may be tried, but where there is marked hypertrophy, nothing equals the destruction of the growth by means of the galvano-cautery. If the part be previously painted with a 20 per cent. solution of cocaine, but little discomfort

* Michael. Quoted by P McBride, *Edinburgh Medical Journal*, September 1887, p. 213.

will be experienced. If the hypertrophy be very great it may be necessary to use the galvano-caustic loop. Boylan freely scarified the growth in his case and used the galvano-cautery a few days later. Bosworth * prefers his nasal polypus snare, "the tube of which, being of flexible metal, can easily be bent to the proper curve, viz., to about the sixth of a circle." Chromic acid is sometimes used, but it does not answer so well as the galvano-cautery, and its employment is not unattended with danger. Any defects in the general health should be attended to, and if there be symptoms of nervous erethism, bromide of potassium, or the asafœtida and zinc pill (formula No. 46) will accelerate the cure. Sajous † has found the administration of small doses of mercury combined with iodide of potassium gives excellent results, even when a specific history is absent. McBride's ‡ note of warning should always be borne in mind: "It is only when the neurotic state, which leads to the production of symptoms, has been remedied or has been proved irremediable, that the use of the electric cautery is justified in cases where the hyperplasia is of small extent."

22. DISEASES OF UVULA.

From its position the uvula naturally suffers when the soft palate and fauces are affected; hence it is liable to inflammation, and to be the seat of the local manifestations of measles, scarlet fever, diphtheria, syphilis, etc. A case has been recorded in which, as the result of diphtheria, the uvula was destroyed by sloughing. Occasionally the uvula, instead of being affected by extension from the soft palate,

* *Diseases of the Nose and Throat,* vol. ii., p. 200.
† *Sajous' Annual* 1888, vol. iii., p. 287.
‡ *Diseases of the Throat, Nose, and Ear,* p. 173.

is the starting-point of the inflammation, and very rarely the mischief is limited to the uvula, the term uvulitis being applied to this condition. Cold seems to be the most common cause of uvulitis. In some cases the engorgement of the uvula may proceed to such a degree, that it may attain the size of the thumb, or even form a sausage-shaped tumour concealing the arches of the palate and the tonsils. Suffocative attacks have been known to occur in cases of great œdema of the uvula, and an irritating cough is usually present, even when there is only moderate enlargement.

Treatment.—When the uvula is acutely inflamed, the application of a 20 per cent. solution of cocaine, by the spray or laryngeal brush, will often suffice to give relief, and pellets of ice in the mouth will assist. Should these measures fail, astringent applications such as the glycerine of tannin or the glycerine of alum may be employed. In severe cases puncture or scarification will be required, and even amputation of the uvula may be necessary, if scarification fails to give relief, and there are suffocative attacks.

Elongation of Uvula.

By repeated inflammatory attacks, particularly in persons of lax fibre, the uvula may become permanently elongated. In one instance the uvula was so long that the patient could take it between his teeth; on removal, it was found to be four inches in length, its lower extremity terminating in a knob. An elongated uvula frequently gives rise to an irritating cough, especially when the patient is in the recumbent position; this fact should be borne in mind in investigating cases of nocturnal coughing. It may also produce the sensation of a foreign body in the throat, or cause an inclination to vomit. Schech states that elongation

of the uvula may produce spasm of the glottis, and Mantle * has described a case of laryngismus in a child cured by removal of the uvula.

Treatment.—In the first place it is necessary to improve the general health. If there be constipation, a mixture containing the sulphates of iron and magnesium (formula No. 18) will usually diminish the relaxed condition of the uvula. Then astringents locally may be tried. A combination of the extract of krameria and cocaine made up into a pastille is often very effectual. Or astringent gargles, such as alum or tannic acid, may be ordered. The application of nitrate of silver fused on an aluminium probe usually gives at all events temporary relief. Should these measures fail, the elongated organ must be amputated.

Though many appliances have been devised for the amputation of the uvula, this is best effected by seizing the tip of the uvula with a pair of forceps (mouse-toothed forceps answer well) held in the left hand, while the end of the uvula is cut off with ordinary curved scissors. Care should be taken not to exert too much traction on the uvula, otherwise the mucous membrane is drawn down and cut off, leaving a raw stump which is slow to heal. It is not desirable to remove the organ level with the palate, but to remove only the redundant portion. Bosworth † estimates the normal length of the uvula in the adult at about three-eighths of an inch. The removal of the uvula is much facilitated by previously painting the uvula and soft palate with a 20 per cent. solution of cocaine; in doing this the action of this drug in causing contraction of mucous membranes must be remembered.

The galvano-caustic loop may be employed for removing the uvula if there be fear of hæmorrhage or the patient

* *British Medical Journal* 1890, vol. i., p. 286.

† *Diseases of the Nose and Throat*, vol. ii., p. 96.

object to a cutting instrument. The indications for this operation as laid down by Semon * are as follows: "(1) Elongation to such a degree that the uvula, especially during sleep, is sucked into the larynx and produces attacks of suffocation; (2) The co-existence of a long, thick uvula, with a persistent feeling of irritation in the throat, and a constant tickling cough; but it must be distinctly understood that this indication is valid only after careful examination of the pharynx, larynx, and thorax, and after exclusion of all other possible causes; (3) The hindrance offered by a very long uvula to the performance of delicate endolaryngeal operations; (4) Malignant disease starting from the uvula." There can be no doubt that the uvula is frequently removed unnecessarily, as the reasons for its removal are but rarely met with. It should be borne in mind that the pain on swallowing, which sometimes follows the operation, is severe and persistent, and occasionally the hæmorrhage is excessive. In one or two cases the hæmorrhage, which was very trifling at the time of the operation, recurred with great violence some hours later. The most effectual way to arrest the hæmorrhage is to sip slowly a mixture of tannic and gallic acids (formula No. 4), as recommended by Mackenzie.

E. C. Morgan,† from inquiries addressed to the leading laryngologists throughout the world, has arrived at the following conclusions:—

"1. A fatal or uncontrollable hæmorrhage has, in one instance, followed a uvulotomy.

"2. A persistent, obstinate, or alarming hæmorrhage is only encountered in the rarest instances.

"3. A moderate bleeding, ceasing spontaneously or by the use of mild styptics, occasionally happens.

"4. The loss of a few drops of blood at the time of

* *St. Thomas's Hospital Reports*, vol. xii.

† *Journal of Laryngology*, vol. i., p. 140.

operating, followed by slight oozing, is of common occurrence.

"5. The most reliable surgical methods for controlling uvular hæmorrhage are the ligature, compression by the clamp or forceps, or the use of the galvano- or actual cautery.

"6. The most reliable styptics are, in the order named, solid silver nitrate, or iron persulphate, directly applied to the bleeding stump, and solutions of gallo-tannic acid, or alum. To these may be added the local use of ice, ice-water and vinegar.

"7. The most reliable systemic means are opium, lead acetate, sulphuric acid, and ergot."

Notwithstanding the apparently trivial nature of the operation, sudden death followed it in the case of a negro thirty years of age, suffering from heart disease.*

Malformations of Uvula.

The uvula may be cleft, giving rise to a bifid condition; or there may be two uvulas, and these may be situated side by side, or one may be in front of the other.

Apparent absence of the uvula is generally to be accounted for by destruction of this body through tertiary syphilitic ulceration.

Growths of the Uvula.

Mucous polypus, papilloma, cavernous angioma, epithelioma, etc., have been recorded as taking their origin from the uvula.

The benign growths may be snipped off with scissors or removed with the galvano-caustic loop. In the case of malignant disease of the uvula, it is desirable not only to remove the growth, but also the greater part of the uvula

* *Centralblatt*, vol. iii., p. 172.

itself, so as to make certain that the incision is made through healthy tissues. The removal of the diseased uvula is effected in the same manner as for simple enlargement.

Paralysis of the Uvula is often observed as a result of diphtheria.

23. DIPHTHERIA.

By diphtheria is understood a disease which is characterised by the formation of a false membrane on the tonsil, or some abraded portion of the mucous membrane or skin, the local lesion being followed by symptoms of general infection. At one time "membranous croup" was considered to be a disease *sui generis*, and distinct from diphtheria, but the opinion seems to be gaining ground that the great majority of the cases of so-called membranous croup owe their origin to diphtheria. Booker * is of opinion that the membranous affections of the throat that sometimes occur in the course of scarlet fever, measles, and other infectious diseases, often closely resemble clinically the features of diphtheria, but that they differ in nature and ætiology.

Ætiology.† — The evidence as to the causation of diphtheria, notwithstanding the attention which has been devoted to it of late years, is still too inconclusive to allow more than the enumeration of certain facts, without our being able to estimate their full value in all cases. As regards the question of *age*, statistics show that the greatest proportion of deaths from diphtheria takes place between the years of three and fifteen, but that the greatest incidence is experienced between the ages of two and five years. This question of age will have to be referred to

* *Lancet* 1893, vol, i., p. 434.

† Most of the information on ætiology is derived from Thorne Thorne's *Milroy Lectures on Diphtheria.*

again in speaking of school life. At all ages the female *sex* is more liable to the disease than the male. In school children this is to be explained by girls kissing each other, and by their being generally more thrown into contact than boys. In women the danger of infection is usually greater than in men, as on the former falls the responsibility of nursing, and even if not actually engaged in looking after the sick, they are more confined to the house than their male relatives. The risk of infection by nurses is much intensified if they fondle, kiss, or carry their patients about. Downes is inclined to think that over and above these considerations there is also some physiological proclivity amongst females to take the disease, beyond that which attaches to males. There is a distinct *family predisposition* for the disease; this is generally due to the fact that the tonsils and the adenoid tissue of the naso-pharynx are enlarged in several members of the same family, and this affords an easy mode of entrance to the virus. *Occupation* exercises a considerable influence, certainly as regards two classes—nurses, to whom reference has already been made, and the medical profession. Nearly every hospital has had to lament, at one time or another, the death of surgeon or student, and not infrequently the life has been sacrificed in the immediate attempt to save that of the patient.

Recent investigations have conclusively proved, that one of the most potent factors in the diffusion of diphtheria is *aggregation*, and this is especially the case when the crowding together occurs just at the very period of life when the incidence of diphtheria is the greatest, *i.e.*, at the school age, three to fifteen. It really appears as though aggregation acts like a hothouse, and that cases of sore-throat, which otherwise might have run a mild course, under the favouring influence of overcrowding develop into true diphtheria. Doubtless many an epidemic has been started by children

returning to school while they were still in an infectious state.* If we are to accept the evidence in favour of recrudescence, by which is meant, that the disease may become chronic in the individual, like glanders in the horse or gleet in relation to gonorrhœa, we shall be landed in still greater difficulties.

Diphtheria has been spread by persons visiting the bodies of those who have died of the disease,† but not only the body but also the house, and especially the room in which the patient lived during his illness, are to be regarded as infective,‡ and the infection is preserved indefinitely in clothing, bedding, and the like.§ The poison is however only diffusible in the air to a very limited extent.

Locality.—Of late years there has been a curious change in the incidence of the disease.

Formerly it was twice as common in country districts as in towns, now there is an increase in the prevalence of diphtheria in the more dense communities, as compared with the less dense. A damp bleak locality, with conditions favouring vegetable decomposition, affords the most suitable soil for diphtheria. There seems also to be some kind of relationship between diphtheria and variations in the level of the subsoil water.‖

Damp cellars and general dampness of houses favour the propagation of diphtheria. In connection with dampness must be mentioned mould-fungi, as it has been suggested that they aid the development of diphtheria.¶

* *British Medical Journal* 1888, vol. i., p. 1191.

† *Lancet* 1888, vol. i., p. 131.

‡ *Transactions of the Seventh International Congress of Hygiene*, vol. i., p. 138.

§ *Ibid.*, p. 110.

‖ Adams, *Ibid.*, p. 146.

¶ *British Medical Journal* 1887, vol. i., p. 938.

The *influence of season* is shown by the circumstance that there is a marked rise in diphtheria mortality in October and nearly as much in November, but after December it begins to return to the average, though the death-rate in January is swollen by the cases originating in the previous month.

There is no evidence to show that the prevalence of diphtheria can be attributed to *polluted water*. It is more difficult to speak of the influence of *sewerage and drainage*. The extension of late years of diphtheria in well-drained towns, which has corresponded with a marked diminution in the general death-rate, including that from typhoid fever, is a matter which requires much thought. Sanitary defects, by impairing the general health and leading to sore-throats, prepare a suitable soil for the implantation of the diphtheria organism.

The part which *milk* plays in the diffusion of diphtheria has been recognised for some years, but it is only comparatively recently that the blame has been laid at the right quarter, viz., on the cows themselves. They suffer from a "trivial" ailment affecting the udders and teats, from which the diphtheria germ finds entrance into the milk.* Klein has further shown that the true diphtheria bacillus has the property of multiplying in milk at the ordinary temperature of the air, hence the danger of storing milk or setting it aside for cream to collect.

Other *animals*, such as cats and poultry,† may be the vehicles for conveying diphtheria to man.

As regards its relation to *other diseases*, any affection of the throat, and especially scarlet fever, may produce a state

* *Lancet* 1888, vol. ii., p. 223 ; and *British Medical Journal* 1893, vol. i., p. 20.

† *British Medical Journal* 1888, vol. i., p. 931 ; *Ibid.*, 1887, vol. ii., p. 416.

of affairs which is favourable for the growth and development of the diphtheria bacillus. Hence cases which apparently begin as simple tonsillitis may by implantation be converted into true diphtheria. There can be no doubt that enlarged honeycombed tonsils predispose the individual to diphtheria, by affording the bacillus an easy mode of ingress into the system.

Morbid Anatomy and Pathology.—From the evidence we have at present before us it is clear that diphtheria is due to a specific contagium, the Klebs-Loeffler bacillus, and that it is not a disease which originates *de novo*, though doubtless cases occur in which it is difficult, or even impossible, to explain how they became infected.*

The Klebs-Loeffler diphtheria bacilli vary in length, but the average is much the same as the tubercle bacillus. One or both ends may be swollen, so that the bacillus may take a distinct club-like form; with methylene blue they readily become deeply stained.† The contagium, whether inhaled or taken in milk, etc., usually affects the fauces in the first instance, the fissures in the tonsils affording an easy mode of ingress.

Other parts of the body, such as the nasal‡ and conjunctival mucous membranes, the labia, a blistered surface, a patch of eczema, etc.,§ are occasionally the primary seats of invasion. Some abrasion of the epithelium is necessary in order to admit the virus. At its onset diphtheria is a local disease. The constitutional effects are due to the absorption of poisonous material—ptomaines—from the local lesion, and the changes produced in the various organs of the body, including the later nervous changes,

* *British Medical Journal*, 1888, vol. ii., p. 167.
† *Journal of Laryngology*, vol. v., p. 225.
‡ *Memoirs on Diphtheria, New Sydenham Society*, p. 181.
§ *Ibid.*, p. 254.

result from the action of these ptomaines.* According to Oertel,† the earliest changes due to diphtheria consist in the epithelial cells becoming infiltrated with leucocytes, as well as markedly proliferated; associated with this is degeneration of the cells, and abnormal cleavage and chemical alteration of the cell nuclei. Eventually areas of necrobiosis with a hyaline network are developed. The infiltration of leucocytes extends deeply down into the mucous membrane, producing a similar necrobiotic change there. The epithelial cells become detached in places, and a false membrane, composed partly of necrobiotic epithelium and partly of leucocytes and fibrinous exudation from the blood-vessels, is formed. Micro-organisms are found in this membrane; they are practically of two chief kinds, chain-forming cocci (streptococci) and rod-shaped bacteria with rounded ends (bacilli). Associated with the changes in the pharynx is found enlargement of the cervical and sub-maxillary glands, with hæmorrhages and areas of necrobiosis. Later on similar but less intense changes may be seen in other lymphatic glands, the spleen, and the intestines. In the lungs evidences of an inflammatory infective process and of mechanical obstruction of the air-passages are to be found, but they present no specific appearances. The heart is generally affected late in the disease, often when the pharynx has become quite free of false membrane. Small sub-pericardial hæmorrhages and more rarely sub-endocardial hæmorrhages have been observed. There is infiltration of leucocytes below the peri- and endo-cardium and between the muscular fibres, and the nuclei both of the leucocytes and also of the muscular fibres have undergone degenerative changes. The nuclei of the muscular element of the arterial coats are enlarged,

* *Journal of Laryngology*, vol. iii., p. 408.

† *Lancet* 1888, vol. i., p. 439.

the adventitia is infiltrated with round cells, and there is proliferation and slight desquamation of the endothelium. The kidneys may be found quite normal, even when albuminuria has been present, or there may be signs of parenchymatous inflammation. Sub-capsular hæmorrhage is frequent, and there may be extravasations between the tubules, as well as cell infiltration around vessels. The albuminuria occurring during the course of diphtheria may depend on cardiac failure, obstruction in the lungs, pyrexia, as well as on the direct effect of the poison upon the kidneys. Secondary inflammatory and degenerative processes are also met with in the nervous system, both central and peripheral.

As regards the *post-mortem* appearances Schrakamp * found, in 54 autopsies, diphtheria of the mouth in 2 cases, of the pharynx in 41, of the nose in 11, of the œsophagus in 3, of the stomach and intestines in one, of the larynx and trachea in 51 (39 membranous and 12 catarrhal). In 40 cases there was bronchitis (in 31 also pneumonia), 19 were complicated with emphysema and 9 with collapse of the lungs. There was pleurisy in 19, pericarditis in 14, endocarditis in 2, thrombosis in 2, and myocarditic degeneration in 17 cases. Acute infectious desquamative nephritis existed in 22 cases, lymphadenitis in 40 cases. Diphtheria of skin and genital organs in one case, cutaneous hæmorrhage in 4 cases. In nearly all the cases death was caused by affections of the respiratory organs.

Symptoms.—According to the report of the Clinical Society's committee † the period of incubation is most commonly two days; it is not infrequently three or four days, and it is sometimes extended to six or seven. The mode of onset of diphtheria varies very much. The most characteristic is that in which, after one or two days of in-

* *Journal of Laryngology*, vol. ii., p. 152.

† *Clinical Society's Transactions*, supplement to vol. xxv., p. 3.

definite malaise, the deposit appears upon the tonsils, pillars of the fauces, or the soft palate. Occasionally the disease comes on quite suddenly, the exudation on the fauces being the earliest symptom, or the disease may attack the larynx in the first instance, constituting primary laryngeal diphtheria. The disease occasionally begins in the nose, and then constitutes nasal diphtheria. In the insidious variety there may be chilliness, fever, enlargement of sub-maxillary and parotid glands, followed after some days by exudation on the fauces. In malignant diphtheria the patient is at once struck down as though by a powerful poison.

The usual course of the disease in a case of moderate severity is as follows: After one or two days of lassitude, malaise, and pains in the limbs, the patient complains of sore-throat and difficulty in swallowing; the acute pain which is so frequent a symptom of tonsillitis is generally absent in diphtheria. In some cases there may be little or no pain, and the disease is only recognised by discovering on the tonsils the characteristic yellowish-white or grey patches, which are preceded by hyperæmia of the mucous membrane. Extension of the exudation to the soft palate and uvula is pathognomonic of diphtheria as contrasted with follicular tonsillitis. The glands at the angle of the jaw are enlarged. The pulse is increased in frequency, there is moderate pyrexia though the temperature occasionally ranges high; in some cases I have noticed a normal or even sub-normal temperature for the first day or so; these cases often turn out unfavourably. In the course of a day or two the spots coalesce, and the membrane may spread in various directions; if to the larynx, causing hoarseness and dyspnœa; if to the nose, giving rise to an ichorous discharge; or up the Eustachian tube to the ear. The breath becomes offensive, the glands at the angle of the jaw become more enlarged and tender. As a rule the

mind is clear, but delirium may occur, and it may even be of a maniacal character. In cases going on to a fatal termination, symptoms of a typhoid nature now make their appearance. The tongue becomes dry and tremulous, the pulse very rapid and feeble, and the patient dies of syncope or some pulmonary complication, such as œdema or pneumonia.

Albuminuria is a pretty constant feature of the disease; as its occurrence is often quite transitory, the urine must be tested regularly in order to detect it in some cases. Unlike the albuminuria of scarlet fever it occurs at the commencement of the disease; anasarca is rare, and chronic nephritis is an uncommon sequel.

Rashes of an erythematous or roseolous type are occasionally seen in cases of diphtheria.

In the primary laryngeal form the earliest symptoms are those indicative of laryngeal obstruction, the *croup* of older authors. When the larynx is affected by extension from the pharynx, hoarseness and cough are noticed, and after a time there may be dyspnœa, the latter being almost constantly associated with implication of the larynx in children. When diphtheria affects the larynx by extension from the pharynx, this usually occurs from three to six days after the commencement of the disease.

During an epidemic of diphtheria the occurrence of frequent small hæmorrhages, or discharge of mucus mixed with blood from the nostrils of a child, should raise the suspicion of nasal diphtheria, especially if there be any glandular swelling.* If the diphtheritic membrane be limited, as it not infrequently is, to the naso-pharynx, the diagnosis, especially in the case of young children, is exceedingly difficult. I have recently seen a case in an adult in whom the membrane was only visible by posterior

* *Centralblatt*, vol. vii., p. 445.

rhinoscopy. Apart from the situation of the membrane there was nothing unusual in the course the disease ran.

Diphtheria may kill from heart failure, at the very outset, if a large dose of the poison be absorbed. In the laryngeal form death is due to the mechanical obstruction to the entrance of air, or to extension of the disease into the bronchi with collapse of lobules of the lungs. Septicæmia is not uncommonly a cause of death, especially in the nasal variety. Hæmorrhage is only rarely fatal; it may result from sloughing extending into one of the branches of the external carotid, or even into the internal carotid. Death may also be brought about by vomiting, due to neuritis of the vagus or to uræmia. Finally, during convalescence death may take place suddenly from syncope or from paralysis of the diaphragm.

Sequelæ.—Unlike the nephritis of scarlet fever, which is so frequently followed by chronic renal disease, the nephritis of diphtheria usually clears up as the acute stage passes by; in very exceptional cases, however, a chronic nephritis has been noticed as a consequence of diphtheria.

The important sequela of diphtheria is paralysis. This usually manifests itself during the period of convalescence, *i.e.*, about two or three weeks from the commencement of the attack, and not infrequently it comes on after attacks which have been so slight as almost to have escaped notice. The soft palate is commonly the part first attacked, the paralysis being evinced by the nasal twang of the voice and the regurgitation of fluids through the nose. Then there may follow signs of paralysis in any part of the body, viz., numbness of the fingers and feet, loss of power in the extremities, especially the legs. Loss of knee-jerk is an early phenomenon, and often persists after all other signs of paralysis have disappeared. The disappearance of the

reflexes is almost invariably preceded by a period of excessive response, lasting several days. There may be paralysis of the ciliary muscle, with consequent loss of the power of accommodation; the ocular muscles may be paralysed, causing the patient to see double and to squint; the laryngeal muscles may be affected, giving rise to difficulty of breathing and loss of voice; there may be paralysis of the intercostal muscles and diaphragm, with dyspnœa and inability to expel bronchial mucus; if the heart be affected sudden death may occur from syncope. The occurrence of dyspnœa, vomiting and abdominal pain, in connection with the heart failure, suggest that the pneumogastric is the nerve implicated.* In rare cases paralysis may be limited to the soft palate for a time, then all of a sudden dyspnœa, slowly followed by acceleration of the heart and cyanosis, may come on and death take place within an hour.† In exceptional cases nearly the whole of the muscular system is implicated, so that the patient lies absolutely unable to effect any movement. There may be anæsthesia of the laryngeal mucous membrane, so that liquids enter the larynx and may set up pneumonia. Anæsthesia may occur on any part of the cutaneous surface; it may be limited to the region of certain nerves, or it may be of general distribution. There may be impairment or loss of the senses of taste and smell.

Diagnosis.—The disease with which diphtheria is most frequently confounded is follicular tonsillitis. At the outset it is best to state frankly that the differential diagnosis between these diseases is at times quite impossible; the transitional forms elude the diagnostic acumen of the ablest physician. It may even be that in a given case, the attack

* *Lancet* 1888, vol. i., p. 1146.

† De Gassicourt, *Maladies de L'Enfance.* Quoted by Morrice, *St. Bartholomew's Hospital Reports*, vol. xxviii., p. 194.

really was one of follicular tonsillitis at the commencement, and that the diphtheritic condition was secondary. There is a marked contrast between a typical case of follicular tonsillitis, having a sudden onset with high temperature, and the lacunæ on the surface of the tonsil being blocked with an exudation of a yellow colour and a creamy consistence, which can be squeezed out without causing hæmorrhage, and the more gradual onset of diphtheria, with its membranous deposit of a yellowish-white or grey colour, which, even if at first occurring in spots, soon becomes confluent, and may spread from the tonsil to the soft palate and uvula. Moreover on attempting to remove the membrane a bleeding surface is left. The occurrence of suppuration has been said to exclude diphtheria. This is not quite true; undoubtedly suppuration occurs much more frequently in connection with tonsillitis, but it is occasionally met with as a result of diphtheria. The presence of albumen in the urine is in favour of diphtheria, and that is all that can be said about it, as diphtheria may occur without albuminuria, and on the other hand tonsillitis may be accompanied by it.

Mycosis of the pharynx may occasionally be confounded with diphtheria. I have seen one or two cases in which the parasitic growth closely simulated a diphtheritic membrane (*see* p. 218). Mucous patches on the soft palate due to secondary syphilis, and the later manifestations of inherited syphilis, may deceive the unwary (*see* p. 210).

Prognosis.—One of the most important elements in the prognosis of diphtheria is the prevailing character of the epidemic. At times the disease rages with great virulence, and the percentage of mortality is very high, whereas on other occasions the disease may be of a mild type. The effect of age is shown by the fact that the greatest number

of deaths occur between two and three years. The existence of enlarged tonsils and of adenoid vegetations greatly increases the risk. The environment of the patient exercises a marked influence on the course of the disease; badly drained, imperfectly ventilated and overcrowded dwellings naturally increase the risk of the disease. The mode of onset gives some indication as to prognosis—*i.e.*, if the disease be ushered in with rigors, vomiting and great depression, after a short stage of incubation, it must be regarded as unfavourable. A thick and extensive deposit of membrane, which spreads over the soft palate and pharynx, is of unfavourable omen, as is also great swelling of the sub-maxillary glands, more especially if both sides be affected. Diphtheria attacking primarily the nasal fossæ usually runs a severe course, and profuse epistaxis is a symptom of evil omen; laryngeal diphtheria is naturally a grave form. A sub-normal temperature during the early stage of the disease, especially if accompanied with weak action of the heart, is of unfavourable augury. "Repeated vomiting is a very unfavourable prognostic sign in diphtheria," according to Gee.* Of the 9 cases he records only one survived. In connection with vomiting must be mentioned partial suppression of urine. The decrease in the amount of urine may be due to the vomiting, or the latter may be of uræmic origin. When death occurs in these cases, vomiting begins about twenty-four hours before death, and there is a great diminution in the amount of urine, only a few drachms being secreted. In the fatal cases there is a steady fall in the frequency of the pulse, followed by rapid acceleration and extreme irregularity, and death.† The presence of albuminuria is so common a feature of the disease, that it is of no prognostic signification, nor is there

* *St. Bartholomew's Hospital Reports*, vol. xxv., p. 69.

† Morrice, *St. Bartholomew's Hospital Reports*, vol. xxviii., p. 194.

any very close connection between the amount of albumen and the gravity of the attack.

The outlook of paralysis occurring after mild cases of diphtheria is good, but the risk to life is much greater if paralysis follows a severe attack.

The condition of the knee-jerk is of importance from a prognostic point of view, because so long as the knee-jerk is absent the patient cannot be considered free from the risks of paralysis and cardiac failure.* It must be borne in mind that in some cases of paralysis recovery is very tedious, and it may be many months before the patient is restored to perfect health. Bristowe† has never known a case of diphtheritic paralysis in which (if the patient do not die of it) ultimate recovery was not attained. One attack of diphtheria gives temporary immunity, but if the throat be left sore and irritable the patient may be predisposed to fresh infection. According to Eustace Smith‡ second attacks are not uncommon, and they are usually more severe than the first. Diphtheria occurring during the course of the exanthemata, especially measles, is very fatal.

Treatment.—Inasmuch as the disease at the commencement is a purely local process, many attempts have been made to prevent its development by active treatment of the surface first attacked; but attention to the pathological conditions obtaining at the seat of invasion shows that it is as hopeless to expect success in this direction, as to prevent syphilis by the removal of the seat of inoculation. But though the disease cannot be arrested by local treatment, much may be done to diminish its severity. Originally caustics, and especially nitrate of silver, were used in the hope of destroying the poison, but almost all physicians are

* Haddon, *Lancet* 1889, vol. i., p. 12.

† *British Medical Journal* 1888, vol. i., p. 227.

‡ Fagge's *Medicine*, 3rd edition, vol. i., p. 264.

now agreed that caustic applications do more harm than good. The local remedies which are generally employed may be divided into antiseptics and solvents. Among the former may be mentioned boric acid and boroglyceride, resorcin, carbolic acid, creolin, salicylic acid, sulphur and sulphurous acid, corrosive sublimate and other mercurial compounds, preparations of chlorine, permanganate of potassium, and peroxide of hydrogen. Papain, zymine, lactic acid and lime-water have been found the most efficacious solvents. The plan of local treatment the author advises is spraying out the nose and throat with a saturated solution of boric acid, or boroglyceride (one part to seven of water), using the same solution for the nose and throat, but diluting that for the nose with an equal quantity of hot water. The spraying should be done at least every hour, and especially before food is taken. In the case of young children, in whom the use of the spray is attended with difficulties, it is a convenient plan to attach a No. 10 gum-elastic catheter to a Higginson's syringe, and, holding the child's mouth over a basin, to irrigate the nostrils and throat. After the pharynx has been cleansed, a mixture of 2 grains of papain rubbed up with 2 minims of lactic acid and 30 minims of water (formula No. 41) should be applied every two hours. It is important that the papain should only be mixed as required. The combination of papain with hydronaphthol (formula No. 40) is said to answer well. Whatever antiseptic is chosen, the secret of success consists in the frequency with which it is employed; hence the importance of selecting one which is not unpleasant to the patient, more especially if the patient be a child. There is no difficulty in carrying out the treatment above described.

A brief account of remedies employed by others must suffice.

Resorcin is used as an application or spray in a 5 or 10 per cent. solution. Carbolic acid is used in a solution of 1 to 40 (or as in formula No. 60), but its unpleasant taste renders it objectionable; the same may be said of a 2 per cent. solution of creolin. A solution of salicylic acid* (1 in 1000), has been used as a spray to the nose and throat. Sulphur has long enjoyed a reputation in the treatment of diphtheria; it is used in the form of sublimed sulphur† freely blown by an insufflator over the affected parts. Some medical men prefer sulphurous acid; one part of the B. P. acid is mixed with two of water and used as a spray.‡ An increasing number of practitioners are employing solutions of corrosive sublimate and the other compounds of mercury. The author is inclined to believe that the mercury compounds are the most reliable antiseptics, but their poisonous property is a drawback to their general employment. Escherich § uses a solution of corrosive sublimate (1 in 1000) in the form of spray at first every hour and then every two or three hours, and also washes the mouth out with a mild antiseptic lotion (boric acid or thymol solution). Illingworth recommends a solution of biniodide of mercury in sodium iodide (1 in 2000).‖ Chlorine water, or one part of the liq. sodæ chloratæ (B. P.) with three of water,¶ or a solution of chlorine, (made by placing a drachm of chlorate of potassium in a six-ounce bottle with half a drachm of hydrochloric acid, and then filling up the bottle with water), may all be used as a gargle; the last solution has been especially praised. Permanganate of potassium may

* *British Medical Journal* 1889, vol. i., p. 802.
† *Ibid.*, 1887, vol. ii., p. 431.
‡ *Ibid.*, p. 881.
§ *Ibid.*, 1893, vol. i., epitome No. 359.
‖ *Ibid.*, 1889, vol. i., p. 983.
¶ *Ibid.*, 1887, vol. ii., p. 881.

be used as a gargle or spray in the strength of 1 part of the official solution in 40 of water. A 25 per cent. solution of the peroxide of hydrogen in the form of a coarse spray has been highly praised.

As a solvent, in addition to papain, zymine has been employed.*

In the treatment of nasal diphtheria a 10 per cent. solution of menthol in almond or olive oil, applied with a camel-hair brush or with the cotton-wool holder, has been found very efficacious.

Internally the tincture of the perchloride of iron (formula No. 17) still holds the first place. It should be given in large doses at frequent intervals, *i.e.*, 15 to 20 minims every second or third hour. The doses for children should be in proportion to their age; they generally bear full doses very well. It is best given in combination with glycerine. Chlorate of potassium has a useful local action, but its toxic properties must not be forgotten.

A dry, brown tongue with typhoid symptoms suggests carbonate of ammonium, tincture of cinchona and nux vomica; Warburg's tincture may be used in this condition. Some authorities would assign the first place to alcohol in the list of remedial agents, and recommend that it should be always used from the commencement. Except in mild cases, its use is generally advisable; at times it may be necessary to give large doses. In addition to its action as a diffusible stimulant, it is also a valuable antiseptic agent.† In cases in which the taste of brandy is disliked, I have followed a suggestion of Samuel West's and given absolute alcohol. Should symptoms of heart failure arise, digitalis or strophanthus must be given in combination with strychnia, and in urgent cases the latter drug may be

* *Second Session Intercolonial Medical Congress of Australasia*, p. 812.

† *Lancet* 1888, vol. ii., p. 1302.

administered hypodermically. As a temporary stimulant, musk is said to be the best. It can be given from a bottle in which it is simply shaken up with thin mucilage. Camphor may be given in 2- to 10-grain doses with the same object.

Pilocarpine has been used, and it certainly helps in the removal of the diphtheritic exudation, but its depressing action is so great that it is not a safe remedy.

Mercury, which in the form of small doses of calomel used to be the staple remedy for "croup," is now being largely used in the treatment of diphtheria, and Jacobi* says that since he has employed the perchloride, his conviction of the utter uselessness of internal medication in laryngeal diphtheria is thoroughly shaken. He advises the administration of a dose every hour. The smallest *daily* dose he has ever given at the beginning was $\frac{1}{4}$ grain to a baby of four months; this was continued a few days and the dose then somewhat diminished. Half a grain *daily* can be given to children of from three to five years, for four to eight days or even longer. If freely diluted, gastric and intestinal irritation is rare; the dilution should amount to 1 in 6000 to 10,000—*i.e.*, 20 minims of the liq. hydr. perchlor. should be given in an ounce of water or milk. In this opinion of the efficacy of perchloride of mercury Jacobi is in accord with many physicians, and this plan of treatment deserves to be thoroughly tried. Instead of the perchloride, the biniodide is recommended by Illingworth and others (formula No. 23).

The general management of the patient is, if possible, even more important in diphtheria than in other diseases. The temperature of the room should be maintained between 60° and 65° Fahr., and there should be ample ventilation. Except in very hot weather a fire is therefore desirable. The

* *British Medical Journal* 1888, vol. ii., p. 653.

patient should be absolutely confined to bed, and the bed-pan should be used to prevent his having any occasion to get out. As keeping the patient at absolute rest in bed is a matter of cardinal importance, the applications made to the throat should not, in the case of children, be such as to cause a struggle; it is better, in fact, to substitute some milder method of disinfection rather than upset the patient. For a similar reason medicines should be made as agreeable as possible.

The necessity for rest in bed does not cease with the acute stage; the occurrence of paralysis in mild cases points to the possibility of this complication being due to the patient getting about too soon. It is therefore advisable to keep the patient in bed for a week or two after all symptoms are over.

The diet should be light and nutritious, consisting of milk, eggs beaten up, beef-tea, chicken, and other broths. Liebig's essence (formula No. 71) is a convenient method of administering easily digested nourishment.

Should dysphagia be a marked symptom, after cleansing the throat with an antiseptic spray, a 10 per cent. solution of cocaine may be painted over the pharynx. Deglutition is much facilitated by this means, and if care be taken not to apply the solution too freely, no harm need be feared from the cocaine. In some cases it may be necessary to feed the patient through the nose. This is effected by attaching a funnel to a gum-elastic catheter by means of a piece of india-rubber tubing, and then passing the catheter through the nostril into the œsophagus. Ice to suck will relieve thirst, and it has also a beneficial local action.

If the patient's temperature keeps high, *i.e.*, above 102° Fahr., he should be sponged, and if the temperature continues to rise, an ice-cap may be used, or the patient may be packed.

When signs of deficient aeration of the blood exist inhalations of oxygen should be employed; Massei * also recommends its use in adynamic conditions, and in threatened paralysis of the vagus or phrenic nerves.

If symptoms indicative of laryngeal diphtheria come on, the patient should be placed in a tent and a steam spray apparatus should be started. The water should contain some antiseptic, such as carbolic acid 1 in 40, eucalyptus ten drops of the oil to half a pint of water, or sanitas. The throat may be sprayed out with lime-water or with a solution of papain and lactic acid (formula No. 61), and the patient should be instructed to make sharp, short inspirations in the hope of the spray passing into the larynx. Solis Cohen speaks very highly of the inhalation of the vapours arising from lime in the process of slaking. Pieces of lime the size of an orange should be placed in a bucket and hot water poured on them, and the vapour directed by a funnel, made of stout paper, towards the patient's mouth. In the meantime the general treatment should be kept up.

The relative advantages of intubation and tracheotomy are discussed in Part. III. section 19; for the present I will write as though it had been settled that tracheotomy should be performed in the event of stenosis of the larynx requiring it. What then are the indications for tracheotomy in diphtheria? The symptom that commonly demands this operation is dyspnœa; if the difficulty of breathing is steadily increasing, especially if there has been a suffocative attack, and if expiration is as laboured as inspiration, then no time should be lost in opening the trachea. Accompanying the dyspnœa will be found hoarseness or suppression of the voice, retraction of the supra-sternal, supra-clavicular, and epigastric regions and of the intercostal spaces, with more or less lividity. Experience has

* *Centralblatt*, vol. i., p. 17.

shown that the chances of recovery are much greater if the operation be performed early, than if it be reserved as a last resource, and the younger the child the greater is the risk in waiting. If the operation be delayed too long the engorgement of the lungs, which always accompanies sudden stenosis of larynx or trachea, leads to bronchitis and catarrhal pneumonia, and thereby brings about a fatal result. Watson Cheyne * is of opinion that "tracheotomy ought to be performed in cases of diphtheria as soon as it is certain that the larynx is affected, chiefly with the view of preventing the spread of the membrane downwards." The operation itself is so fully described in all manuals of surgery that I do not think it necessary to give the details of it. Parker † strongly advises the high operation, and recommends that the patient should be anæsthetised. In favour of the low operation it may be urged that the trachea can be exposed more freely, that the opening is at a considerable distance from the larynx, and that granulations are less likely to develop in the trachea than in the high operation.‡ It cannot be too forcibly impressed on the surgeon that "tracheotomy is not a curative measure at all, but only a mechanical expedient to prolong life while therapeutic measures can be adequately applied."§ Hence local and constitutional treatment require to be continued with the same earnestness as before the operation. Though there is some difference of opinion as to whether steam is useful after tracheotomy, there seems to be more evidence in favour of it than against it, so that most surgeons place the patient in a croup-bed, with a temperature of 65° to 70° Fahr. In enclosing a patient in a tent, there

* *British Medical Journal* 1887, vol. i., p. 505.
† *Ibid.*, 1888, vol. ii., p. 655.
‡ *Journal of Laryngology*, vol. iv., p. 205.
§ *British Medical Journal* 1888, vol. ii., p. 655.

is always some risk that he does not get a sufficient supply of pure air; this requires quite as much, if not more, attention than keeping the air warm and moist. If steam be not employed, a sponge, wrung out in hot water and frequently changed, should be placed over the opening of the tube for the first twenty-four hours, after which if the atmosphere be kept warm a piece of gauze laid over the opening is all that is required.*

As regards the prospects of recovery after tracheotomy, several points have to be taken into consideration. In the first place comes the character of the epidemic, hence the impossibility of arriving at any definite conclusions from a few operations. The time of the year has a great influence, the operation naturally being more successful in the warmer months, June taking the first place. The surroundings of the patient, if of an insanitary nature, and the absence of skilled attendance will of course have a most deleterious effect. Solis Cohen remarks that "comparatively few children under two years of age are saved, not many over eight or nine, and adults only as the exception," inasmuch as tracheotomy is rarely required in the adult, except in cases where there is marked toxæmia.

If there be any symptoms of paralysis, the patient must be kept in the recumbent position until they have disappeared, or at all events until the pulse is regular, of normal frequency, of good volume, and the heart-sounds clear and strong. The tendency to sudden failure of the heart in diphtheritic paralysis is so marked, that in the early stage of the disease the greatest possible care is demanded. The patient requires the same diet as was recommended for the acute stage of diphtheria. Should the fluid return by the nostrils, the patient must be fed by an œsophageal

* Holden, *St. Bartholomew's Hospital Reports*, vol. xxviii., p. 160.

tube, by a catheter passed down the nostril, or by nutritive enemata. Medicinally strychnine has given the best results. It may be given by the mouth or still better hypodermically. Clifford Beale* has recorded a remarkable case of recovery after the subcutaneous injection of strychnine. The patient was in a complete state of prostration; nutritive enemata could not be retained. As he was unable to rid himself of bronchial mucus, it was necessary to invert the upper part of the body over the bed to allow the mucus to trickle out. The heart's action was very rapid and feeble, and a fatal termination appeared imminent. Under the influence of subcutaneous injections of liquor strychninæ, at first 3 minims and afterwards 5 minims every four hours, steady improvement took place, and the patient recovered. In addition to the administration of strychnine, massage and the use of electricity (both faradisation and galvanism) have a beneficial action. A change to the seaside will generally accelerate complete recovery.

Bearing in mind the great fatality of diphtheria, the question of the means to be taken to prevent its spread is a most important one. In the event of an epidemic of diphtheria occurring in a district previously free from it, the day-schools in the neighbourhood should be closed, and all other aggregations of children prevented, as far as possible. If there be only isolated cases, it may suffice if children who complain of sore-throat be prevented from attending school, and in order to detect the earliest signs of the disease the throats of all school-children should be regularly inspected. No child who has had a sore-throat should be allowed to return to school without a medical certificate, and in view of the length of time the secretions of the mouth remain infectious, the Paris Congress of Hygiene decided that a child ought not to be allowed to

* *British Medical Journal* 1891, vol. i., p. 1175.

return to school, after an attack, until forty days from its commencement.*

If it has been considered advisable to break up a boarding-school, a clear fortnight ought to elapse before the pupils are allowed to return; in this interval the sanitary arrangements of the school-buildings should be thoroughly overhauled. On the re-opening of the school, a daily medical examination of all the pupils should be carried out for another fortnight, in order to nip in the bud any fresh attack.

If it be decided to treat the patient at home, he should be placed on the top floor of the house, if possible. The room should contain only furniture which is absolutely necessary, carpets, curtains, hangings, etc., being removed. A sheet saturated with a solution of carbolic acid (1 in 40) should be hung outside the patient's room. A separate set of spoons, cups, etc., should be reserved for his use. The discharges from the nostril and mouth should be received on pieces of soft linen, and burnt in the sick-room. All linen and other articles of clothing should be disinfected, by being placed in a solution of corrosive sublimate (1 in 1000), before being sent to the laundress.

Nurses and others in charge of patients should be warned of the danger of coming into unnecessary contact with them, as by kissing, fondling, or carrying them about. Open sores on those in attendance on diphtheritic patients should be carefully protected from infection. Loeffler † recommends that as a prophylactic measure a gargle should be used of a solution of corrosive sublimate or of cyanide of mercury—1 in 10,000 of either salt. This should be employed every four hours for five to ten seconds. The nurses should mix as little as possible with the other

* *Journal of Laryngology*, vol. v., p. 519.

† *Lancet* 1891, vol. i., p. 1268.

inmates, and only those in actual attendance should be allowed on the same floor with the patient.

The dead should at once be placed in coffins, screwed down and buried with all convenient despatch, and the bodies should not be exposed to view, much less kissed or touched.

After the recovery or death of the patient, the room should be thoroughly disinfected by stripping the walls of paper, and re-papering, whitewashing the ceiling, and scrubbing the woodwork and floor, and finally disinfecting the room with sulphurous acid.

A factor in the diffusion of diphtheria is undoubtedly milk. Now that we recognise the fact that the milk may be infected as it flows from the udder of the cow, dairies should be under systematic inspection, and the local authorities should have full power to regulate the milk trade. Until this desirable object is attained, no uncooked milk should be consumed.

The part played in the spread of diphtheria by domestic animals, especially cats, should also be remembered.*

24. THE THROAT AFFECTIONS OF THE SPECIFIC INFECTIOUS DISEASES.

Smallpox.

Accompanying the eruption on the skin, there may be a similar condition in the pharynx and larynx; pustules have even been noticed as low down as the bronchia of the second or third order. The eruption may affect chiefly the mucous membrane of the lips and cheeks, or the tonsils and the hard and soft palate may be attacked; in the latter

* *See* articles in *British Medical Journal* 1892, vol. ii., pp. 1119 and 1307; 1893, vol. i., pp. 20 and 28.

case there is usually much inflammatory swelling, sometimes going on to the formation of an abscess. Owing to the moisture of the mouth it is seldom that the pocks appear as well-marked pustules. They occur at first as whitish-grey slightly elevated spots, which soon soften and form superficial ulcerations. In the larynx the pustules give rise to the symptoms of a laryngitis about the sixth day, usually however not of a severe character. Later on in the disease, *i.e.*, about the ninth to the twelfth day, when the swelling of the face has reached its maximum, an acute laryngitis with great œdema of the epiglottis and ary-epiglottic folds may occur. The progress of the inflammatory mischief is sometimes so rapid, that death may take place before relief can be obtained. Another form of laryngeal inflammation is that which is accompanied by the formation of a false membrane. It usually begins about the tenth day, runs a rapid and very fatal course. In some cases deep ulceration of the larynx with necrosis of the cartilages occurs. If recovery take place cicatrisation may give rise to so high a degree of stenosis, that tracheotomy may be required.

Treatment.—Where the eruption is limited to the mouth, antiseptic or slightly astringent gargles, such as formulæ 1, 3, 6 and 7, may be used, or effervescing lozenges containing 3 grains of chlorate of potassium and $\frac{1}{6}$ grain of cocaine may be given. Œdema of the larynx should be treated by scarification, or if necessary by tracheotomy.

Varicella.

Vesicles, having slightly reddened bases, may be observed on the palate, and often persist for some time, but on the lips, tongue, and cheek, only excoriations or small superficial ulcers are to be seen.*

* Fagge and Pye-Smith's *Medicine*, 3rd edition, vol. i., p. 216

Measles.

Almost invariably on the second or third day of the disease, an eruption of small red points or patches appears on the roof of the mouth and the velum of the palate, giving a stippled redness to the parts. The term "endanthem" has been applied to it. The presence of this eruption is of diagnostic importance before the rash on the skin has appeared, especially if the invasion be prolonged, and it may be of value in enabling measles to be recognised among the dark races of mankind, in whom the cutaneous rash is invisible.*

Laryngeal catarrh may be met with at all stages of the disease. The hoarseness and cough, which are such frequent accompaniments of the first stage, point to the early implication of the larynx. This may commence during the eruptive stage, or its onset may be delayed until the rash is fading away. In severe cases of laryngitis ulceration of the mucous membrane and even an abscess may occur.

Membranous laryngitis is a rare but very dangerous complication of measles. According to Mackenzie † it is even more fatal than the corresponding scarlatinal affection, eighty per cent. of the cases proving fatal.

Treatment.—If the laryngeal catarrh be troublesome and severe, the vapor benzoini (formula No. 67) can be inhaled three times a day, and a sponge wrung out of boiling water may be applied over the larynx. For the irritable cough which accompanies this condition painting a little blistering fluid ‡ over the trachea just below the larynx will be found useful. The application should be made over a space not exceeding the size of a shilling, and it is

* Fagge and Pye-Smith's *Medicine*, 3rd edition, vol. i., p. 178.

† *Diseases of the Throat and Nose*, vol. i., p. 190.

‡ Charles West, *Diseases of Infancy and Childhood*, 5th edition, p. 776.

advisable not to use too much of the fluid at first, as it is better to have to make a second application, rather than run the risk of setting up extensive vesication. If the cough becomes croupy Goodhart* recommends that the throat and fauces should be painted energetically with a solution of boric acid, or borax and glycerine, every hour or two.

The treatment of the membranous laryngitis of measles is the same as that for diphtheria.

Rötheln (German Measles).

The soft palate and fauces are usually injected and swollen, but there is never sloughing.†

Scarlet Fever.

In scarlatina simplex the soft palate and fauces are reddened and often slightly swollen; the uvula may become swollen and club-shaped from œdema.‡ Secretions may accumulate in the lacunæ of the tonsils, giving rise to the appearance of ulceration. A certain number of persons who enjoy immunity from scarlet fever may, nevertheless, suffer from pharyngitis of greater or less severity when exposed to its contagion.§ In the anginose variety the fauces are at first a deep purple red. When the fauces are affected the tissues externally, and especially the glands at the angle of the jaw, become swollen and brawny. In the course of two or three days superficial ulceration may occur in the tonsils, and the surface is covered with a yellowish exudation. Occasionally deep ulceration may

* *Diseases of Children*, 4th edition, p. 156.

† Fagge and Pye-Smith's *Medicine*, vol. i., p. 196.

‡ Gee. Reynold's *System of Medicine*, 2nd edition, vol. i., p. 153.

§ Lincoln. Burnett's *System*, vol. ii., p. 622.

occur, and death may result from hæmorrhage. In scarlatina maligna the patient often dies so soon after the onset of the disease, that there is not time for any marked change to take place in the throat. If the patient, however, survives the first onset of the fever, the fauces may become gangrenous and emit a horrible stench, and in these cases death from hæmorrhage is not uncommon. Scarlet fever is sometimes accompanied by the formation of a false membrane over the palate and fauces. At one time there was some doubt as to the exact nature of this condition, but it is now held by the best authorities to be true diphtheria, and not a mere complication of scarlet fever. From an analysis of the reports of the fever-hospitals of the Metropolitan Asylums Board, it appears that this condition usually occurs at a late period of convalescence, in more than half the cases after the lapse of four weeks from admission.* Thorne Thorne† "believed errors in administration to be the whole explanation." The poison of diphtheria is conveyed to the scarlet-fever patient, when the soil is in a most suitable state to receive it.

Even in mild cases of scarlet fever there is a great tendency for the inflammation to extend up the Eustachian tube, and as scarlatinous pharyngitis gives rise to serious trouble in the middle ear, deafness is a very common result.

Treatment.—In the mild form of scarlet fever, the only local treatment required may be some simple gargle, such as black-currant jam in water acidulated with dilute hydrochloric acid. In the anginose form, spraying out the throat and nose with antiseptic solutions (formulæ Nos. 54, 55 and 59) will be found useful. If sloughing and gangrene take place, the mouth should be sprayed or washed out with

* *Lancet* 1893, vol. i., p. 531.
† *Ibid.*

a mixture of iodine and carbolic acid (formula No. 60). Small children must be treated as directed at page 271. If diphtheria be a complication the treatment must be as for primary diphtheria.

Influenza.

Inasmuch as influenza is evidently a specific catarrh of the various mucous surfaces, especially the respiratory, it might be expected that the pharynx and larynx would not escape. Indeed, some amount of catarrh is present either in one or both of these organs in almost all cases. The more severe affections occur either during the height of the disease, or perhaps rather more frequently during convalescence. In many instances the affection appears to start from the naso-pharyngeal space; at all events the inflammation is here very intense and persistent.* Usually marked swelling of the mucous membrane is noted, but occasionally there is a follicular inflammation of Luschka's tonsil. In the pharynx there occurs acute pharyngeal catarrh, the mucous membrane being of a purplish colour and œdematous, and in consequence of the swelling and infiltration of the muscles beneath, there is dysphagia; follicular tonsillitis with or without peri-tonsillitis is also met with. Shelley† has called attention to the existence of a vesicular eruption on the palate as a sign of influenza. The vesicles resemble tiny well-boiled grains of sago. In the present epidemic (December 1893) the author saw three cases of influenza with serious pharyngeal mischief; in all three high temperature and albuminuria existed. The first was evidently of the nature of phlegmonous pharyngitis, as there was great swelling of the pharynx followed by suppuration. This case recovered. In the other two a thin false membrane

* Koch (Luxemburg), *Centralblatt*, vol. vii., p. 450.

† *British Medical Journal* 1893, vol. i., p. 791.

formed on the soft palate, resembling in some respects a diphtheritic exudation. Both these patients died.

In the larynx the conditions met with are very varied. In the milder cases, slight catarrhal laryngitis is observed, giving rise to hoarseness and aphonia, if, as is sometimes the case, the adductors are paralysed. In the more severe cases there is congestion of the cords, varying in degree. Occasionally they are of a bright red colour, and the expectoration is tinged with blood, the so-called hæmorrhagic laryngitis. Œdema of the larynx has been observed as a sequel of influenza.* Fraenkel † describes the occurrence of white spots on the congested vocal cords, followed by superficial loss of epithelium; he ascribes these to fibrinous infiltration. In influenza ulceration of the cords, apart from any suspicion of fibrinous exudation, has been described. In some cases, swelling of the mucous membrane is a marked feature, the inter-arytenoid folds being particularly affected. In cases of greater severity œdema and even abscess of the larynx have been met with as complications or sequelæ.

Fraenkel is of opinion that the duration of influenzal laryngitis is more protracted than the ordinary affection.

Treatment.—Apart from the treatment of the influenza there is nothing peculiar in the local conditions of the pharynx and larynx demanding any special attention. The various complications affecting these parts must be treated on the same lines as in similar affections produced by other causes.

Enteric Fever.

At the commencement of the disease there may be some erythema of the pharynx, and the tonsils may be swollen,

* Wolfenden, *British Medical Journal* 1890, vol. i., p. 541.

† *Centralblatt*, vol. vii., p. 38.

but there is nothing characteristic. Occasionally in typhoid fever a few small shallow ulcers, sharply limited, varying in size from a pin's head to a linseed, with a greyish coating and surrounded by a reddened zone, appear on the soft palate. The glands are not enlarged, there is no pain, and typhoid bacilli are not present. This condition is peculiar to typhoid fever, and lasts less than a fortnight. As it only occurs in cases of a severe type, it is of some prognostic importance.*

As in other acute specific diseases, a secondary diphtheritic deposit may occur on the fauces of patients suffering from typhoid fever; the prognosis is very grave in these cases.

In some instances enteric fever may commence as a laryngitis, that is to say, the symptoms of the local affection may, up to the end of the first week, so mask the general febrile condition, that it is not until the occurrence of the eruption and other characteristic symptoms of typhoid, that the diagnosis can be made with any certainty. Gerhardt† describes a very striking example of this. In his patient the disease from the beginning took the form of ulcerative laryngitis. Schuster‡ has twice observed enteric fever commencing with laryngeal affections. In the case of a boy aged twelve, who had been ill for eight days, and who was feverish and had cough and dysphagia, laryngoscopic examination showed an inflammatory condition of the laryngeal mucous membrane with a large ulcer on the posterior wall. The next day there were clear symptoms of typhoid. Hyperæmia of the larynx (erythematous laryngitis) is not an uncommon symptom of typhoid fever, the hyperæmia being most marked on the ary-epiglottic folds. In severe cases ulceration may supervene, and is

* Vouwiller, *Centralblatt*, vol. vii., p. 13.
† *Archives of Laryngology*, vol. i., p. 121.
‡ *Journal of Laryngology*, vol. v., p. 211.

of much prognostic gravity, as it is often the first stage of the severe affection, to which the term "laryngo-typhus" has been applied by German writers. There are two chief forms of laryngitis in connection with enteric fever. The acute form comes on during the third week with hoarseness, dyspnœa (chiefly affecting inspiration, expiration being easy), pain and difficulty in swallowing. Tracheotomy is generally required on account of the increasing dyspnœa. At the *post mortem*, œdema of the larynx or purulent infiltration of the mucosa may be found, together with chondritis. The chronic form generally shows itself after convalescence has begun, and sometimes not until recovery is apparently complete. There are all the usual symptoms of laryngeal stenosis, and œdema of the larynx, or impaction in the glottis of a piece of necrosed cartilage may cause sudden death. Should recovery take place, there may later on be trouble in connection with the voice and breathing, as a result of the cicatrisation of the ulcerated part.

Post mortem the larynx is not infrequently found ulcerated, when there were no symptoms indicative of this condition during life. Hoffman * has met with 28 cases of laryngeal ulceration in 250 cases of typhoid fever. Generally a well-defined ulcer is seen over one or both arytenoid cartilages, and as already mentioned the ulceration may extend down to the cartilages, setting up chondritis and eventually necrosis. Louis,† who in 1828 first directed attention to this condition, stated that if, at an autopsy, extensive laryngeal ulceration were found and tuberculosis could be excluded, then typhoid lesions should be looked for. Wilks has pointed out that typhoid ulceration of the larynx may lead to subcutaneous emphysema.

In some cases a thin membranous film has been found

* Fagge and Pye-Smith's *Medicine*, 3rd edit., vol. i., p. 158.

† *Lancet* 1891, vol. i., p. 792.

lining the interior of the larynx; whether this is of diphtheritic origin or not has yet to be decided.

Treatment.—In the simple inflammatory cases soothing and antiseptic inhalations (formula No. 67 and the vapor olei pini sylvestris B. P.) may be ordered. In the more severe forms counter-irritation to the larynx by applying blisters externally has been advised. If laryngeal stenosis occurs tracheotomy will be required; even if recovery takes place the canula can but rarely be dispensed with, as in consequence of the extensive ulceration and necrosis which occur, the larynx has a tendency to collapse.

Typhus Fever.

Changes similar to those seen in enteric fever are also met with in typhus fever.

Whooping-Cough.

There is considerable difference of opinion, as to whether there are any constant changes to be recognised in the larynx during life. Von Herff* while suffering from an attack made a series of examinations upon his own larynx. He noted in the first stage a slight catarrh of the larynx, which became very intense during the spasmodic stage; the vocal cords however were not affected. The hyperæmia extended into the trachea. During every paroxysm a pellet of mucus could be seen on the posterior wall of the larynx, on a level with the glottis; when this was expelled the attack ceased. Irritation of the mucous membrane of the arytenoid region seems to be connected with the characteristic spasms of whooping-cough.

* *Medical Record*, March 5th, 1887.

Glanders.

The mucous membranes of the pharynx and larynx may be affected in glanders. In the former, nodules followed by ulceration may occur, or it may be covered by a false membrane.

In the larynx catarrh and ulceration, giving rise to hoarseness, may be met with, and the larynx may even be attacked when the nose is free.* In some cases œdema of the larynx necessitates the performance of tracheotomy.

25. ERYSIPELAS OF THE PHARYNX AND LARYNX.

It will be convenient to consider erysipelas of these organs together, as clinically they are generally found united, though the latter organ may be primarily affected while the pharynx remains healthy, and *vice versa*. It will also simplify matters if we include the so-called phlegmonous pharyngitis under the same heading.

Ætiology and Pathology.—Erysipelas of the pharynx and larynx may be primary or it may occur secondarily by extension from the face *viâ* the mouth, nose, or ear. As regards the ætiology of phlegmonous pharyngitis there is still considerable difference of opinion; Virchow and Guttman regard it as an erysipelatous inflammation of the pharynx and larynx, whereas Senator and others† consider it an independent affection. In favour of its being of an erysipelatous nature is the circumstance, that it has attacked patients who were lying in rooms, in which an outbreak of typical erysipelas of the pharynx and face had occurred at the same time.

* *Centralblatt*, vol. v., p. 602.

† *Sajous' Annual* 1891, vol. iv., F. 1.

In a case of suddenly developed suppurative inflammation of the epiglottis recorded by Chiari,* traumatism from a fish-bone was apparently the cause of the trouble, and it is possible that phlegmon of the pharynx may sometimes have a similar origin.

Some observers do not hesitate to assert that non-traumatic œdema of the larynx is always the result of erysipelas. Gerhardt points out that erysipelas of the pharynx arises on account of the possibility of infection through a physiological wound. That fissures in the epithelium do exist has been proved, especially where lymph follicles abound, as is the case in the tonsils. Hence enlarged tonsils may afford entrance to the septic infection of erysipelas, as they do to that of diphtheria, scarlet fever, and other poisons. Massei says that the direct causes are small lesions on the base of the tongue, the epiglottis, and ary-epiglottic folds, which favour the immigration of the erysipelas cocci. In cases of recurrent erysipelas of the face, the pharyngeal tonsil has apparently been the starting-point of the erysipelas, and it is well known that the nose, especially when affected with chronic scrofulous rhinitis, frequently gives rise to facial erysipelas. These facts should emphasize the importance of the careful examination of the nose and naso-pharynx in cases of recurrent erysipelas of the face, and they would also suggest a possible mode of origin of pharyngeal and laryngeal erysipelas, as, if the disease can spread externally, there is no reason why it should not spread internally. Extension of the disease sometimes takes place from the larynx into the lungs through the lymphatics ; or the larynx and lungs may be simultaneously affected.

Erysipelas of the pharynx and larynx, when secondary, usually extends by continuity, but cases have been recorded

* *Sajous' Annual* 1891, vol. iv., F. 1.

in which erysipelas of a remote part has been accompanied by erysipelas of the larynx.

In a discussion at the International Medical Congress at Berlin, Semon expressed the view that erysipelas, phlegmonous pharyngitis, angina Ludovici, and similar conditions, are only modifications of the same process, differing in their virulence or place of development. Durham * evidently had the same idea in his mind when, writing about diffuse cellular laryngitis, he says: "It is probably closely allied in nature to erysipelatous inflammation, from which, however, it differs in the fact that in it the submucous tissue is primarily attacked and the mucous surface is left free, or only becomes secondarily affected. In erysipelas, on the other hand, the mucous surface is first affected, and the submucous tissue is only secondarily or concomitantly involved."

The course of these diseases, and the circumstances under which they arise, are so similar that the slight difference in their starting-point is not sufficient to make a separate classification of them necessary.

Morbid Anatomy and Pathology.—In acute phlegmonous pharyngitis a diffuse purulent inflammation is found in the pharyngeal submucosa and the tissues beneath, which extends to the larynx and glands; as a secondary effect other organs are implicated. Senator lays great stress on the disease being a primary phlegmon, the mucous membrane not being previously injured or diseased. The *post-mortem* appearances in a case recorded by Porter † of St. Louis are as follows; they will serve as an example of the conditions met with in this disease: "The larynx gave evidence of acute change; the mucous membrane covering the epiglottis and arytenoid cartilages was swollen and

* Holmes's *System of Surgery*, 3rd edition, vol. ii., p. 686.

† *Archives of Laryngology*, vol. i., p. 355.

ulcerated; while throughout the whole extent of the larynx and trachea, extending far down the bronchi, the mucous membrane was of a bright red colour. On the outer side of the larynx there were several small abscesses and great infiltration. These abscesses did not communicate either with the interior of the larynx or with the surface of the neck; the lungs in their whole extent were dark and œdematous, a sero-purulent liquid exuding freely when section was made." In cases of erysipelas of pharynx and larynx, the presence of the streptococcus erysipelatosus of Fehleisen has been demonstrated.

Symptoms.—The disease is generally ushered in by chilliness or rigors, there is usually marked fever, and the temperature may reach 106° Fahr. or even higher. The pulse is frequent and generally feeble, and there is a great tendency to adynamia and delirium. The urine is frequently albuminous. If the pharynx be primarily affected, pain in the throat and dysphagia are prominent symptoms, but the swelling of the mucous membrane, which takes place with great rapidity, soon leads to difficulty of breathing, even though the larynx be not affected. If the larynx be primarily attacked, hoarseness very speedily followed by urgent dyspnœa are the characteristic symptoms. Infiltration of the epiglottis causes the sensation of a foreign body in the throat. Two forms of the disease have been described; in the one the general symptoms attract most attention, in the other the local changes take the first place, or are at least of equal grade with the general infection. In either case the disease is characterised by its atypical course, depending upon the wandering character of the affection, and resembling in this effect the fever of cutaneous erysipelas. If extension to the lung occur, cough with abundant watery, sometimes bloody, expectoration comes on, together with the usual physical signs of œdema of the lungs.

In the pharyngeal variety, the tissues of the neck may become infiltrated and brawny, or, as already pointed out, the disease may apparently start in the deeper structures and spread to the mucous membrane. On inspection the pharynx will be found swollen, of a purple-red colour, with a glistening, varnished aspect; the uvula is frequently greatly enlarged. With the aid of the laryngoscope the epiglottis will be seen to be enormously swollen, as are also the ary-epiglottic folds, and the glottis is reduced to a mere chink; a view of the interior of the larynx is consequently quite out of the question.

Diagnosis.—The sudden onset of the disease, the rapid manner in which the affection spreads from one part of the mucous membrane to another, the gorged and dark-red colour of the affected surface, the adynamic state of the patient, and the frequent presence of albuminuria will usually enable the diagnosis to be made. The extension of the disease to the skin and the discovery of the erysipelas cocci in the diseased tissues will of course put the diagnosis beyond doubt.

Prognosis.—The prognosis is always grave, not only on account of the local troubles which may, with the most unexpected rapidity, cause death, but also on account of the general conditions brought about by the disease. The most common cause of death is failure of the heart; œdema of the larynx may come on so rapidly that death may occur before there is time for the performance of tracheotomy; extension of the disease to the lungs may set up a low form of pneumonia or pulmonary œdema; or lastly, the patient may die from general infection or cerebral complications. Modern observation has corroborated the truth of the Hippocratic aphorism, "When erysipelas extends from within outwards it is a favourable symptom, but when it removes to the internal surfaces it is a deadly one."

Treatment.—The patient should be kept in bed in a room with a temperature of about 60° Fahr., an ice-collar should be applied to the neck, and he should have pellets of ice to suck. If the patient be seen early a calomel purge is useful. When the disease is confined to the pharynx, tincture of the perchloride of iron (formula No. 17) should be given every three or four hours; if however the larynx be implicated, and there be any spasmodic attacks of dyspnœa, 10 to 20 grains of bromide of potassium should be administered, instead of the iron mixture, to diminish the tendency to spasm of the glottis. Bedford Brown * recommends the salicylate of sodium in erysipelatous affections attended with great rise of temperature, with delirium and a tendency to cerebral complications; more recently and with still better effect, he has given the salicylate of ammonium in doses of 20 grains every three hours, and he regards its action as being eminently antiseptic.

If, in spite of treatment, the symptoms of laryngeal stenosis increase, the pharynx and larynx may be painted with a 20 per cent. solution of the hydrochlorate of cocaine. The first effect of the cocaine is usually to cause a profuse secretion of mucus and saliva, and then there is a notable diminution in the bulk of the swollen parts. In two or three cases of œdema of the larynx as a result of erysipelatous inflammation, in which scarification or tracheotomy seemed inevitable, I have found that painting the swollen parts with cocaine has caused such a diminution in the swelling, that respiration has been rendered comparatively easy. If, however, after waiting for half an hour or an hour there be no marked improvement in the symptoms, the parts should be freely scarified, and for this purpose Mackenzie's guarded laryngeal lancet is the best.

Energetic counter-irritation by means of sinapisms to the

* *Journal of American Medical Association*, July 2nd, 1887.

throat, chest, back, and shoulder-blades with the object of determining the erysipelas to the surface has been found most successful, and should certainly be tried. Helbing of Nüremberg advocates a similar plan of treatment in phlegmonous pharyngitis. He applies three or four drops of croton oil over the skin, between the angle of the jaw and the larynx. The production of eczema is the only drawback to this procedure. The question of tracheotomy will, of course, have to be considered, and if death threatens from obstruction to the respiration, it is clearly the duty of the surgeon to obviate this tendency by opening the windpipe. Though tracheotomy in these cases has been condemned by some of the older authorities, the experience of modern surgeons is more favourable to it. Durham,* for instance, records 5 recoveries out of 15 tracheotomies, performed on account of erysipelatous laryngitis, in cases known to him. According to Carrington† tracheotomy is useless in cases of phlegmonous pharyngitis, the general and not the local condition appearing to lead to the fatal issue. In view of the somewhat unsatisfactory results of tracheotomy, the adherents of intubation have put forward a claim for it in the relief of the dyspnœa. It is only, however, in a very limited number of cases of laryngeal erysipelas that intubation can be attempted with any chance of success. In the great majority of cases the œdema comes on so rapidly, that it is impossible to introduce a tube into the larynx. In all the cases I have seen, the glottis has been almost entirely obscured by the greatly swollen epiglottis. Sajous‡ however claims that in this class of cases brilliant results have been obtained in America by the use of the O'Dwyer tubes. Food should be given in

* Holmes's *System of Surgery*, 3rd edition, vol. ii., p. 685.
† *British Medical Journal* 1885, vol. i., p. 382.
‡ *Annual of Medical Sciences* 1891, vol. iv., E. 2.

a liquid form, *e.g.*, strong beef-tea, beef essence (formula No. 71), raw eggs beaten up, and milk. If the dysphagia be great the patient must be fed *per rectum*. Stimulants are usually necessary.*

26. LEPROSY OF THE PHARYNX, LARYNX, AND NOSE.

Inasmuch as these parts are usually affected in the same patient, it will be convenient to discuss leprosy under the one heading. It will be out of place in such a book as this to enter upon the ætiology and pathology of leprosy in general; I will therefore confine myself to the symptoms and appearances of the disease as they affect the organs mentioned in the heading of this section.

In *Nerve Leprosy* (anæsthetic leprosy) according to Hillis † the throat is not affected until the disease has existed for more than five years. Anæsthesia of the palate and pharynx may occur, together with a certain degree of motor paralysis; absorption of the nasal bones has been described.

Tuberculated Leprosy usually begins with repeated attacks of fever, and epistaxis is a common symptom. The throat is almost always, sooner or later, affected.‡ The throat symptoms first appear during one of the attacks of fever, about two or more years after the real commencement of the disease, and they are always secondary to the skin affection. Three stages may be recognised. In the first or erythematous stage the mucous membrane appears as though it were acutely congested. The pharynx exhibits

* For further particulars and cases see papers by the author in vols. ii. and iv. of the *Westminster Hospital Reports* and *British Medical Journal* 1892, vol. i., p. 434.

† *Centralblatt*, vol. vii., p. 439.

‡ Morell Mackenzie, *Ibid.*, vol. vi., p. 153.

signs of acute pharyngitis; in the larynx the mucous membrane, especially that covering the epiglottis, the ary-epiglottic folds and the edges of the vocal cords, is irregularly reddened. After a time this hyperæmia gives place to a distinct pallor, not unlike what is seen in phthisis. The mucous membrane has a varnished appearance, and it increases in thickness, especially over the epiglottis and the entrance to the larynx. There is marked diminution of sensibility over the affected surfaces.

The next stage begins with the formation of tubercles in the root or tip of the tongue, in the pillars of the fauces, the uvula, the buccal mucous membrane and in the nose and naso-pharynx. They vary in size and quickness of growth; from a pin's head up to a hen's egg. The pillars of the fauces, especially the posterior, are usually much thickened and prominent. The tonsils are large and frequently fissured. Owing to progressive thickening of the mucous membrane, the lumen of the larynx becomes greatly diminished and the outline of the various parts is much altered, especially the epiglottis, which may resemble an œdematous prepuce. Tubercles may appear on the vocal cords, whereby their mobility is interfered with. These changes occupy weeks and months for their accomplishment before the stage of ulceration begins.

The ulcers, resulting from the breaking down of the tubercles, are at first small and round, but they extend until the deeper parts are affected. The uvula is often ulcerated and frequently destroyed. There is loss of substance in the soft palate and fauces followed by cicatricial contraction. The posterior wall is usually much ulcerated, and the ulcers are nearly circular. The epiglottis may be knobby, scarred, and drawn to one side. In the larynx ulceration penetrates to the cartilages, which finally become necrosed and may be expelled with the

secretion. The disease, however, rarely attains this stage, because the patients usually die earlier.

The tuberculated form of leprosy manifests itself most frequently in the face. The nose becomes early implicated by extension from the alæ nasi. At first the nasal mucous membrane is red and velvet-like, then tubercles form, these ulcerate, the septum becomes perforated and the turbinals atrophy—similarly to what takes place in atrophic rhinitis. Owing to the destruction of its cartilaginous and bony framework, the nose may collapse.

The local affection comes on with dryness in the throat and fatigue in speaking.* The voice gradually becomes hoarse and nasal, then shrill, and finally is reduced to a whisper, but complete aphonia only rarely occurs. At first there is no difficulty in breathing or swallowing. As stenosis of the larynx comes on very gradually and is seldom very severe, tracheotomy is only exceptionally required; occasionally, however, sudden œdema may occur and necessitate this operation.

The swelling of the nasal mucous membrane may give rise to interference with nasal respiration, the sense of smell is usually abolished and there is a fœtid discharge.

Diagnosis.—Leprosy affecting the mucous membrane of the upper air-passages requires to be distinguished from tuberculosis, lupus, cancer, and syphilis. The diagnosis is based partly on the characteristic differences of the appearances presented on inspection, but chiefly on the primary presence of the skin affection. In a case of leprosy recently shown by J. B. Ball at the Laryngological Society it would have been difficult to have excluded syphilis merely from an examination of the pharynx, as the appearances seen in that part closely resembled those met with in tertiary syphilis.

* Masini, *Centralblatt*, vol. ii., p. 456.

Prognosis.—As leprosy is practically an incurable disease, though Ramon de la Sota * claims to have completely cured one patient, only temporary amelioration of the symptoms can be expected from treatment of the local lesions.

Treatment.—The nose, pharynx, and larynx should be sprayed with alkaline and antiseptic solutions (formulæ Nos. 52, 53, and 54.) If ulceration occur sprays of carbolic acid or insufflation of iodoform should be employed. Ramon de la Sota † recommends a 1 per cent. solution of resorcin as a local application to ulcerated surfaces. Antiseptic gargles should be freely used, and the swallowing of infective material prevented.‡

Tracheotomy or intubation may be required in some cases.

27. GOUTY AFFECTIONS OF THE THROAT.

The frequency with which inflammatory and other conditions of the throat are attributed to gout, not only by the patients themselves, but also by their medical advisers, would lead one to expect that abundant evidence of the connection between these conditions and gout would be forthcoming. Careful pathological and clinical observation furnishes, however, but little evidence of this sort. Norman Moore § has noted the *post-mortem* appearances in 80 cases of gout, and as one of his conclusions states that "the articulations of the larynx rarely contain deposit," *i.e.*, of urate of sodium. On analysing these 80 cases, it will be found that in 58 cases the larynx was normal (except one case where there was tubercular ulceration),

* Burnett's *System*, vol. ii , p. 452.

† *Ibid.*, p. 453.

‡ Colcott Fox, Fowler's *Dictionary of Medicine*, p. 439.

§ *St. Bartholomew's Hospital Reports*, vol. xxiii. p. 289.

in 16 cases the condition of the larynx is not distinctly indicated, and in only 6 were there any noteworthy changes. In 3 calcification of the cartilages is mentioned as being present, and in 3 others gritty deposits, small thickening of white colour, and œdema of the larynx respectively were noted. In no case is urate of sodium stated to have been found. Duckworth * states that Garrod has met with encrustation of the arytenoid cartilages in one case, and that Virchow has detected a "tophulus" in the posterior part of the right vocal cord. Uratic deposits have been found in the crico-arytenoid ligaments.

Turning to the clinical aspect of the case, Morell Mackenzie † does not admit a case to be gout unless there have been distinct proofs of its existence. "The only absolute proof which I admit, is that the sufferer has some other distinct signs of gout." He gives the following examples: (1) Acute œdema of the uvula disappearing upon sudden development of gouty inflammation of big toe; (2) Chronic inflammation of posterior pillars of the fauces occurring in a patient, suffering from long-standing gouty disease of several joints of the fingers of both hands; no relief until treated with colchicum, mild purgatives, and alkalies; (3) Gouty deposit around the crico-arytenoid joints on both sides, causing permanent dysphonia; deposit in lobule of left ear; (4) Gouty inflammation producing fungous ulceration of the left ventricular band, resembling cancer; cured by a course at Wiesbaden.

Watson ‡ mentions the occurrence of "gout in the throat," but gives no particulars. Gibb § describes a case

* *A Treatise on Gout*, p. 85.
† *Journal of Laryngology*, vol. iii., p. 313.
‡ *Principles and Practice of Physic*, 4th edition, vol. ii., p. 758.
§ *Diseases of Throat and Windpipe*, p. 268.

in which the symptoms were those of "intense laryngitis, commingled with general faucial inflammation."

Duckworth * speaks of laryngitis of gouty origin as being rare but not unknown; he also gives no particulars. He quotes Sir H. Halford in support of the view that there is a very painful but not suppurating form of angina tonsillaris which may, in the gouty, suddenly yield to an acute articular attack.†

Harrison Allen ‡ takes a broad view of the question, and describes as gouty a variety of sore-throat which, while independent of metastasis, is found in gouty subjects, and which yields only to remedies for gout. It generally occurs in middle-aged subjects, and heredity is usually to be traced. It occurs among those subject to neuralgic forms of irregular gout, especially in the viscera; or in persons of gouty habit who are careless in their diet, hence dyspeptic disturbances are common. It is not wont to occur during an acute attack. Thorner § regards pain in the throat and intense hyperæmia as the principal symptoms of the gouty sore-throat. "The gouty throat" described by Duckworth ‖ is a gorged condition of the pharyngeal mucous membrane; this kind of throat is seen in people who eat and drink too much and who take too little exercise. It frequently co-exists with hæmorrhoids. The patient may also be gouty, but the throat affection and the gout may be regarded as the result of a common cause.

Treatment.—If the gouty nature of the attack be clearly made out, the combination of colchicum and alkalies internally, with sedative inhalations (formula No. 67 and the

* *A Treatise on Gout*, p. 85.
† *Ibid.*, p. 88.
‡ *Sajous' Annual* 1889, vol. iv., E. 10.
§ Burnett's *System*, vol. ii., p. 273.
‖ *A Treatise on Gout*, p. 88.

vapor olei pini sylvestris), or alkaline sprays with carbolic acid (formula No. 54), or painting the pharynx with menthol dissolved in almond oil (formula No. 42),* and a light diet will commonly give speedy relief. If the breath be foul, tongue furred, and bowels confined, 2 to 5 grains of calomel should be given at once.

28. HERPES, URTICARIA, AND PEMPHIGUS OF THE PHARYNX.

Occasionally an eruption of vesicles, resembling those seen on the skin in cases of herpes, is observed on the pharynx. Accompanying the eruption there are shiverings and feverish symptoms. The patients complain of sore-throat, and on inspection small vesicles are seen on the palate and fauces; these speedily burst and form round ulcers.

Treatment.—The administration of quinine, and a gargle of chlorate of potassium or borax (formulæ Nos. 5 and 7) will usually suffice to effect a cure.

Laveran † has described the case of a patient, thirty years of age, who was awakened with a severe attack of dysphagia. The uvula was enormously swollen, red, and œdematous, the tonsils somewhat swollen, and there was a large patch of urticaria on the tongue. For three years previous to this illness the patient had frequent severe attacks of urticaria affecting the face, hands, and limbs. Rendu, Montard-Martin and Sevestre have described similar cases.

Cases of pemphigus of the pharynx and larynx have also been reported.‡ Mandelstamm § has observed five cases

* *Centralblatt*, vol. viii., p. 86.

† *Bulletins de la Société Médicale des Hôpitaux de Paris*, July 9th, 1891.

‡ *Sajous' Annual* 1892, vol. iv., F. 24.

§ *Journal of Laryngology*, vol. v., p. 426.

in which the mouth, pharynx and larynx were affected. All the cases were very chronic and there were no bullæ on the skin. In the fifth case pemphigus of the skin occurred some months after the larynx was attacked. The mucous membrane is at first covered with bullæ, and, when these rupture, with a large amount of white epithelium, often looking like diphtheria, but differing from it by the chronicity of the affection and by the absence of fever.

PART III.

DISEASES OF THE LARYNX.

---

1. THE EXAMINATION OF THE LARYNX.

Laryngoscopy.

For the purpose of making a laryngoscopic examination there are two essentials :—

(1) A source of light; (2) The laryngeal mirror.

The light may be thrown directly into the throat; more commonly, however, a mirror is used to reflect it. When obtainable the rays of the sun may be employed; in this country, however, we usually have to rely on artificial light. The oxy-hydrogen limelight is the best means of illuminating the interior of the larynx. I have described * a very simple and convenient arrangement, which answers well. It consists of an upright standard, which is fixed in the floor below and to the wall above. Sliding on this, and adjustable at any height by a screw, is the bracket for the lamp. Lateral movement is obtained by the rotation of the standard on its pedestal. The upward and downward movement of the lamp is effected by means of a counterpoise, contained in the hollow tube constituting the standard. The balance is so true, that the lamp can be readily moved with one hand, and remains in any position without having to be

* *Lancet* 1890, vol. ii., p. 1034.

fixed. Oxygen and coal-gas are conveyed to the lamp by flexible tubes connected with a cylinder containing oxygen and a gas-pipe respectively. The metal tube for the oxygen is in the centre of the gas-jet, and the flame is directed against a cylinder of lime. The chimney of the lamp is provided with a bull's-eye lens to concentrate the light.* Though the limelight is perhaps the best light for viewing the interior of the larynx, still the daily trouble of fixing the lime in the lamp, and the frequent need of refilling the oxygen cylinders, have led me to abandon this form of light, and to have an electric lamp† adapted to my old apparatus, so that it is possible at any time to remove the lamp and use the limelight. At present I am using a 32-candle-power lamp, and I am very well satisfied with the light.

Mackenzie's rack-movement gas-lamp is a very convenient arrangement, but in its absence an ordinary duplex lamp with crystal oil will answer all ordinary requirements.

The reflector is a circular mirror of three and a half inches in diameter, with a small oval hole, half an inch in length, in the centre. It is slightly concave and has a focal distance of fourteen inches. The reflector may be attached either to a band which encircles the head, or it can be fixed in a spectacle frame; the latter is the more convenient plan. The reflector may be worn on the forehead, in front of the nose, or opposite one of the eyes, preferably the left; the latter is the position I recommend.

The laryngeal mirrors are made of glass backed with amalgam and mounted in German silver. They are fixed to the handle at an angle of 120 degrees. It is convenient to have mirrors of three different sizes, three-quarters of an inch, one inch, and an inch and a quarter in diameter respectively.

* The apparatus is made by Messrs. Arnold of West Smithfield.

† Messrs. Miller & Woods of Gray's Inn Road made the lamp.

In making a laryngoscopic examination it is sufficient, in most cases, to have the patient sitting on a chair of about the same height as the observer's, but occasionally it may be necessary to elevate or lower the former, for which purpose a suitable chair has been contrived ; it is however not often required, and can be dispensed with. The light should be on the right side of the patient, just behind him, and on a level with his ear, and he should sit upright, with the head slightly thrown back. The first step in the examination is so to adjust the reflector on the forehead, as to throw a cone of light directly upon the posterior wall of the pharynx. A few seconds should now be devoted to explaining to the patient the co-operation expected from him. He should be told to breathe quietly during the examination, and to say "ah" or "eh" when requested. The laryngeal mirror is to be held like a pen, and cautiously warmed over the lamp, taking care to keep the reflecting surface towards the flame. A few seconds will usually suffice to warm the mirror ; an intimation is given that it is warm, when the faint cloud of moisture on its surface clears off; to make certain that the mirror is not too hot, the physician should try it by applying it to his own cheek. The object of warming the mirror is to prevent its being dulled by the deposition on it of the watery vapour contained in the breath. The patient is now to be told to open his mouth, and to protrude his tongue to the fullest extent ; it is far better that he should thrust it out himself than that it should be dragged out (Fig. 41). The physician then grasps the tongue between the thumb and fingers of the left hand, the thumb being above and the tongue covered by a piece of linen. In holding the tongue, care must be taken not to injure it by dragging it too far forward, or by pulling it down too much over the teeth. In the effort to open the mouth sufficiently widely

the jaw has been dislocated, an accident which happened while the author was examining a patient. The laryngeal

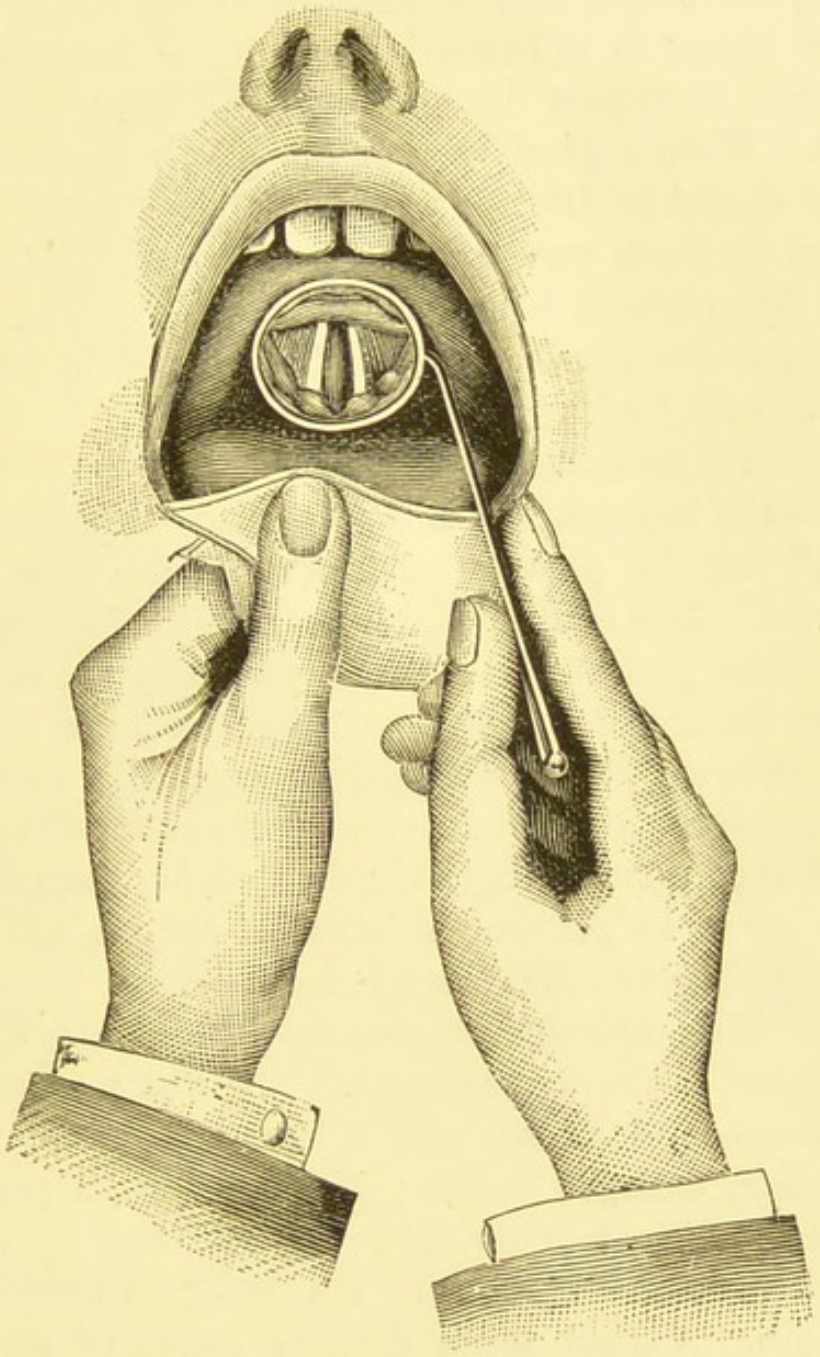


Fig. 41.—Method of Making a Laryngoscopic Examination.

mirror should be passed rapidly backwards towards the soft palate, care being taken to avoid touching the dorsum of the tongue, or the roof of the mouth. The mirror should

be placed under the uvula, and the soft palate pressed backwards and upwards; by a slight movement of the handle, the mirror may be adjusted to the varied position of the larynx in different individuals, or according as it is desired to inspect the anterior or posterior part of the larynx. When a good view of the glottis is obtained, the patient should be directed to say "ah" or "eh" in order to see that the cords move properly during phonation; in cases where the epiglottis is unusually overhanging, a momentary glance into the glottis may often be obtained by telling the patient to say "*e*."

One of the greatest difficulties experienced by the beginner in the art of laryngoscopy is the so-called "irritability of the fauces," but by patience and perseverance this will be overcome. It is much better to make several examinations of the same patient, rather than by keeping the mirror too long in the throat to excite retching, for when once this has commenced, it is hopeless to expect to succeed in making a satisfactory examination at the sitting in question. Should the throat be very irritable, spraying the soft palate with a 10 or 20 per cent. solution of cocaine will usually suffice to allow of a good view being obtained.

Three other difficulties in making a satisfactory examination are not so readily overcome. The first is a fleshy and thick tongue co-existing with a low vault to the mouth; the second, enlarged tonsils; and the third, a pendulous epiglottis. The first difficulty may be met by using a tongue-depressor, the tongue not being protruded from the mouth. A small mirror must be employed where the tonsils are large. Various ingenious instruments have been devised to obviate the difficulty presented by an overhanging epiglottis, but they are hardly ever necessary; raising the patient's head and getting him to say "*e*" will usually allow of a momentary glance into the glottis.

Having obtained a good view of the larynx (Fig. 42), it must be remembered that the only alteration, in the position of the parts seen, is that the image in the mirror is reversed,

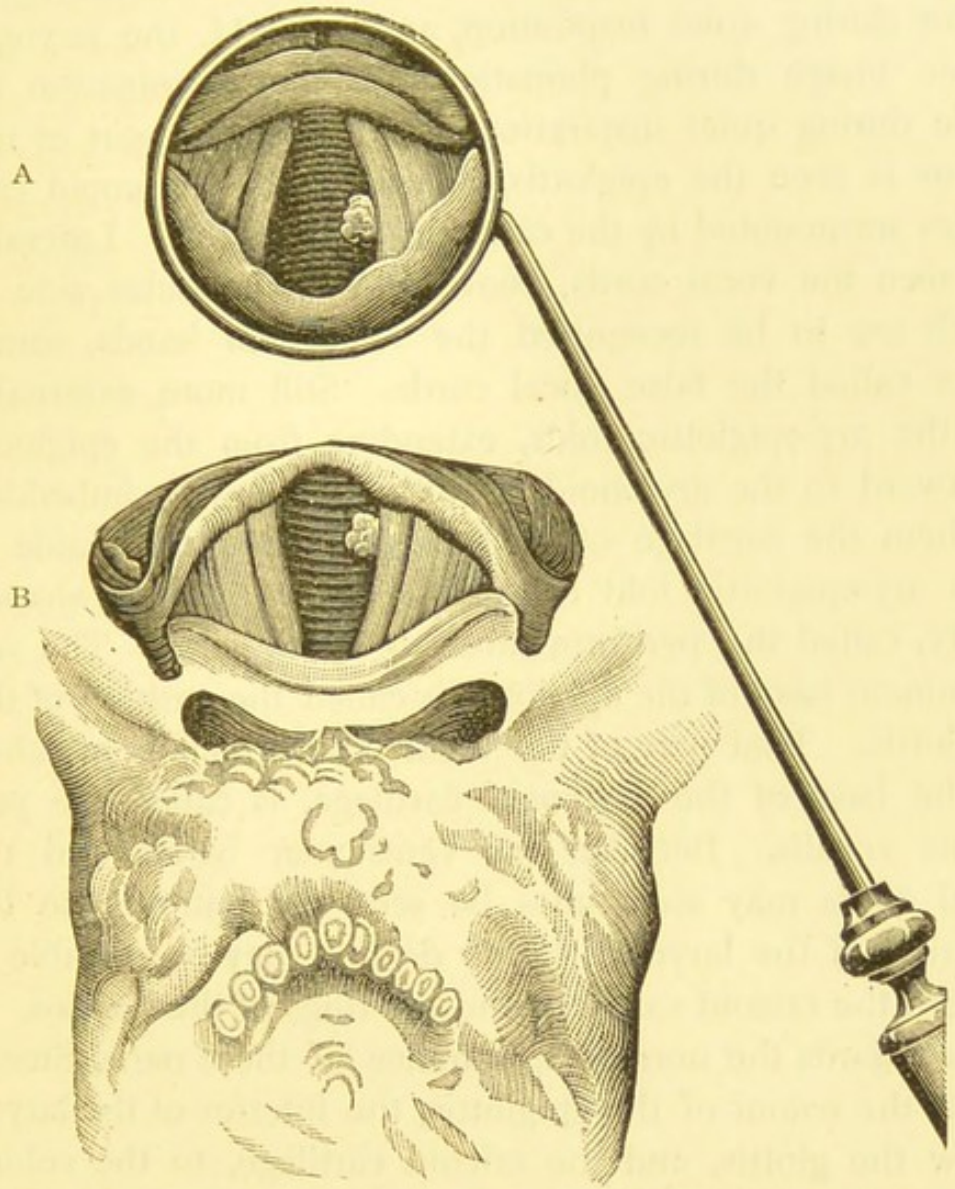


Fig. 42.—Drawing showing the Relation of Parts in the Mirror (A) and the Larynx (B).*

i.e., the epiglottis which is really in front of the glottis appears to be at the back, and the arytenoid cartilages appear to be the most anterior part of the glottis; the position

* From Schroetter's *Vorlesungen ueber die Krankheiten des Kehlkopfes.*

(laterally) of the vocal cords is not altered, that is to say, the patient's left vocal cord will be seen to the observer's right, and *vice versa*.

Plate I. shows the image which is visible in the laryngeal mirror during quiet inspiration, and Plate II. the laryngoscopic image during phonation. If the examination be made during quiet inspiration, at the posterior part of the mirror is seen the epiglottis, anteriorly the arytenoid cartilages surmounted by the cartilages of Santorini. Laterally are seen the vocal cords, above and to the outer side of which are to be recognised the ventricular bands, sometimes called the false vocal cords. Still more externally are the ary-epiglottic folds, extending from the epiglottis backward to the arytenoid cartilage, and having imbedded in them the cartilage of Wrisberg. To the outer side of each ary-epiglottic fold is to be seen a pyramidal-shaped cavity, called the pyriform sinus, or hyoid fossa. The soft prominent base of the epiglottis is called the cushion of the epiglottis. That part of the vocal cord, which is attached to the base of the arytenoid cartilage, is called the processus vocalis. Between the ventricular bands and the vocal cords may sometimes be seen the entrance to the ventricle of the larynx. Lower down it may be possible to discern the cricoid cartilage and the rings of the trachea.

As regards the normal appearance of these parts, Stoerk likens the colour of the epiglottis, the interior of the larynx below the glottis, and the cricoid cartilage, to the coloration of the eyelid; and the hue of the ary-epiglottic folds and the prominences of the arytenoid cartilages to that of the gums. The mucous membrane of the trachea between the rings is of a pale pink colour; the vocal cords have a white glistening look.

It is desirable that a laryngoscopic examination should be made methodically. The first glance should be directed

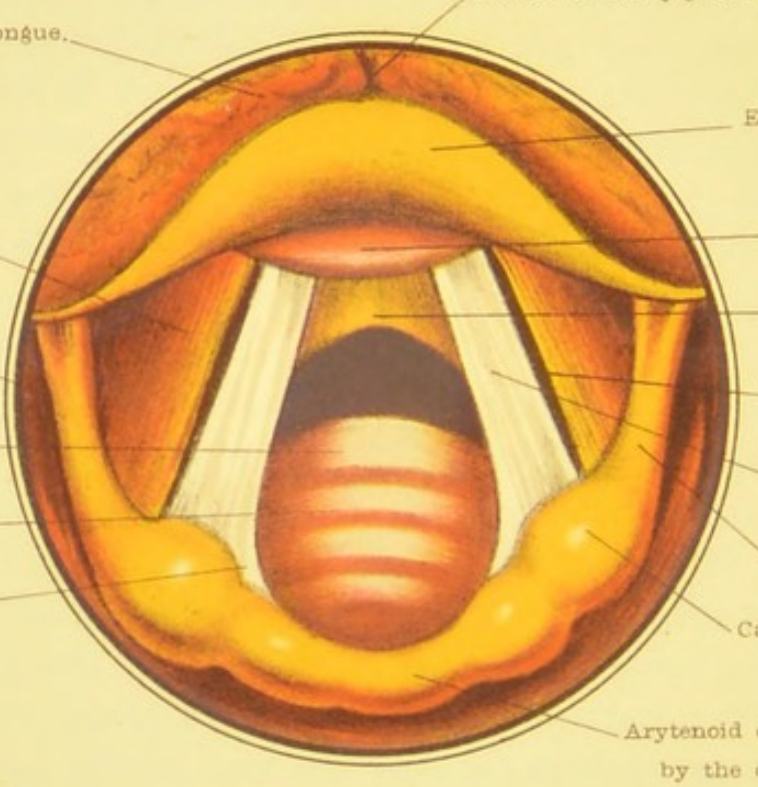
UNIVERSITY OF BRISTOL
MEDICAL
LIBRARY

PLATE I

LARYNX WITH THE VOCAL CORDS OPEN.

Shewing the position of the various parts above and below the Glottis during quiet inspiration.

(Twice the natural size.)



London: H. K. Lewis, 136 Gower Street, W C.

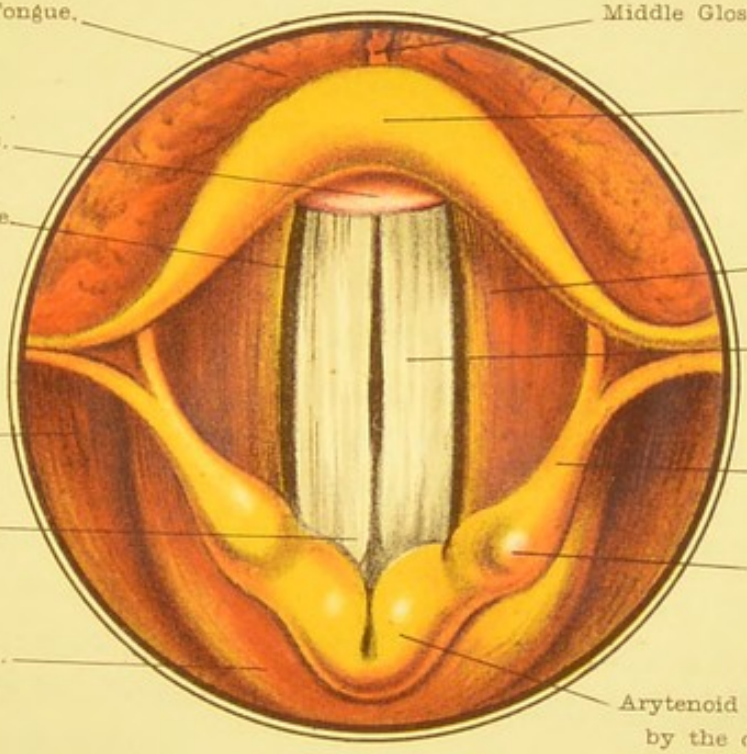
From drawing by Dr Dobell.

PLATE II.

LARYNX WITH THE VOCAL CORDS CLOSED.

As during the phonation of the French é.

(Twice the natural size.)



London: H. K. Lewis, 136 Gower Street, W.C.

From drawing by Dr Dobell

UNIVERSITY OF BRISTOL
MEDICAL
LIBRARY

to the colour of the mucous membrane, as the mere presence of the mirror sometimes sets up congestion. Having satisfied one's self as to the colour of the larynx, attention should now be paid to the motility of the cords; and, finally, note should be taken of the presence of new growths, ulcers, or other morbid appearances.

2. ACUTE LARYNGITIS.

Acute Laryngeal Catarrh.

This is an acute inflammation of the mucous membrane of the larynx.

Ætiology.—Of all the causes of acute laryngitis "catching cold" is the most common: its effect varies according to the idiosyncrasy of the individual; in one person a simple cold in the head will be the result, in another tonsillitis, and in a third laryngitis, and so on. A previous attack of laryngeal catarrh predisposes to a return of the complaint. The tendency to laryngeal catarrh is much increased by coddling and wearing an unnecessary amount of clothing, so that the skin is kept in a constant state of perspiration. Bosworth * rightly lays stress on the fact that in a large majority of instances "there exists a mild chronic inflammation of the mucous membrane of the larynx, which, under the influence of an exposure, takes on an acute exacerbation."

Occupation exercises considerable influence on the production of the disease in question. Persons who lead sedentary, indoor lives are much more prone to catarrhal affections, than those whose avocations take them constantly into the open air. Sudden change of temperature, especially if accompanied with an excessive amount of moisture,

* *Diseases of the Nose and Throat*, vol. ii., p. 485.

is a potent cause of laryngeal catarrh; hence catarrhal affections are most common in the spring and autumn. Cold applied to particular parts of the body, varying with the individual, is liable to excite an attack of catarrh; thus in one individual a draught of cold air on the head will produce it, whilst in another, getting the feet wet will act in the same way.

Among other causes of acute laryngitis may be mentioned over-use of the voice, such as shouting and singing, especially in the open air.

The abuse of stimulants predisposes to laryngeal catarrh, as do also irritant fumes, as of tobacco, chlorine, bromine, etc. As Von Ziemssen * points out, if various causes co-operate the certainty of laryngitis being produced is greatly increased; consequently it is common with "loquacious frequenters of public-houses, who carry their drinking, talking, and singing to excess, and after leaving the heated room, filled with tobacco and smoke, often expose themselves for a long time to the cold night air."

Any interference with free nasal respiration increases the vulnerability of the laryngeal mucous membrane, and consequent tendency to catarrh, and one of the most common sequences of events is for the catarrh to start in the nose, or naso-pharynx, and thence extend to the larynx. Among the causes of severe attacks of laryngitis may be mentioned the exanthemata, especially smallpox and measles. The recent epidemic of influenza has afforded abundant opportunity of studying laryngitis, as it was one of the most common complications of that very complicated disease. Lastly, traumatism may be mentioned as a cause of laryngitis. Such injuries as result from inhaling steam, children drinking from the spout of a boiling kettle, corrosive poisons, the application of caustics to the interior of

* *Cyclopædia of the Practice of Medicine*, vol. iv., p. 197.

the larynx, or the presence of a foreign body, may give rise to violent inflammation of the larynx, hence the term traumatic laryngitis.

Morbid Anatomy and Pathology.—There is nothing in the pathology of acute laryngitis different from what occurs in acute inflammation of other mucous surfaces; in other words, there is the same swelling of the membrane with abnormal vascularity, accompanied by an increased production of epithelial and mucous elements. In the more intense forms of inflammation there is a rapid formation of cells, which are smaller and not so well developed; and this gives rise to a puriform secretion. After death, owing to the contraction which takes place, the mucous membrane may shrink and become paler than natural.

Symptoms.—When this disease occurs in the adult, the first symptom complained of is usually a sense of discomfort and irritation referred to the larynx, accompanied by a tickling cough, which is at first dry, but after a little time a small amount of clear mucous secretion may be expectorated. Occasionally the secretion is streaked with blood, and in very rare cases (*see* "Hæmorrhage of Larynx," page 324) blood is poured out in considerable quantity. As in inflammation of other mucous surfaces, the secretion becomes muco-purulent when resolution takes place. Should the expectoration be very abundant, the presumption is that there is also a catarrhal condition of the bronchial mucous membrane. The voice is invariably affected in acute laryngitis; indeed in mild cases this is the symptom which attracts most attention. In severe cases the hoarseness may pass on to almost complete aphonia. There may be pain on pressure over the larynx, and possibly some discomfort in swallowing; in very severe cases (*see* "Œdema of Larynx," page 348) dyspnœa may be present.

These symptoms are usually preceded by those of an

ordinary nasal or pharyngeal catarrh, and are ushered in by chilliness and rise of temperature; the pulse is frequent and full and the face flushed. If the disease advance unchecked, especially if serous infiltration (œdema of larynx) occur early, the countenance becomes anxious, pale or somewhat livid, the pulse feeble and irregular, and the usual signs of carbonic acid poisoning show themselves. The amount of obstruction to the entrance of air is indicated by the noisy, stridulous breathing, marked respiratory excursions of the larynx, and the great activity of the muscles of respiration. In children, owing partly to their tendency to laryngeal spasm, and partly to the narrowness of the glottis in childhood, dyspnœa is usually present, and comes on in paroxysms, so that a child who goes to bed with only slight catarrhal symptoms and a little hoarseness, may awake in the night with a start, in great terror and distress from difficulty of breathing. This condition constitutes one variety of the *croup* of the old authors. Brockbank * has drawn attention to the occurrence of pulsus paradoxus in children suffering from dyspnœa due to acute laryngitis, either simple or membranous. As the disease progresses, the symptom becomes more marked, so that the pulse may be almost imperceptible during inspiration. After tracheotomy the pulse resumes its regularity in volume and rhythm.

On laryngoscopic examination, in slight cases the vocal cords will be found of a rosy colour, either throughout their entire length, or in patches; in more severe cases the mucous membrane of the larynx, especially that covering the ary-epiglottic folds, is found to be thickened, forming in some cases pyriform swellings, which may reduce the rima glottidis to a mere chink; the epiglottis in such cases is found to be swollen and erect. If the vocal cords are visible they will be found swollen and much congested,

* *British Medical Journal* 1893, vol. i., p. 1314.

and usually their mobility is impaired, either from inflammatory infiltration of the muscles acting upon them, or from swelling of the soft parts. Percy Kidd* has recorded a remarkable case of complete bilateral paralysis of the vocal cords, the result of acute laryngitis. This view of the case he grounded on the following reasons: "In the first place the loss of motion was absolute and symmetrical on the two sides. Secondly, recovery was comparatively rapid, and the adductors regained their full action before the abductors." In some cases the inflammatory mischief may extend into the crico-arytenoid joints, and cause temporary or permanent interference with the movement of the cords.

If the inflammation be very intense, or of a septic nature, suppuration is a frequent result. In this case a more or less localised tumour will be detected, and the colouring of the pus which has formed may even be recognised through the mucous membrane. In traumatic laryngitis, especially that due to drinking boiling water, the symptoms come on with great rapidity, and œdema of the larynx may occur in the course of two or three hours, or even sooner.

Diagnosis.—In the adult the diagnosis of acute laryngitis is easily made, but in the child there may be considerable difficulty, as just in those cases, in which a laryngoscopic examination is most required, is there the greatest difficulty in making one with any degree of success.

Acute catarrhal laryngitis in the child has to be differentiated from spasmodic croup, or laryngismus stridulus; from membranous laryngitis; and from laryngeal diphtheria. From the former it is to be distinguished by the presence of fever and hoarseness, and by its onset being usually ushered in with coryza, and by the absence of carpo-pedal contractions. For the diagnosis from membranous laryngitis see p. 323. The diagnosis from laryngeal diphtheria is more difficult,

* *Clinical Society's Transactions*, vol. xxi., p. 238.

but in this affection there is generally some membranous deposit to be seen on the pharyngeal mucous membrane; there may be swelling of the lymphatic glands beneath the angle of the jaw, and albuminuria; the symptoms are of a more asthenic type; and the disease usually occurs in epidemics. It is well, however, not to be too eager to give a definite opinion at the commencement of a case.

Prognosis.—Simple catarrhal laryngitis almost invariably runs a favourable course in the adult; and even in the child, though the symptoms are more alarming and urgent, recovery takes place in a very large proportion of the cases. The fatal forms of acute laryngitis in the adult are those which are accompanied by œdema of the larynx, or depend upon the poison of erysipelas (*see* pp. 349 and 295).

Treatment.—The most important factor in the treatment of acute laryngitis is the attainment of functional rest. In endeavouring to fulfil this indication, the twofold function of the larynx (*i.e.*, phonatory and respiratory) must be borne in mind. Any reasonable patient will readily understand the necessity of abstaining from talking, so that one function of the larynx can be held, more or less, in abeyance. Only very partial rest can be obtained for the other function, but this is to be sought for by keeping the patient as quiet as possible; in severe cases he should be confined to bed, so as to diminish the frequency of the respirations. The temperature of the room should be 65° Fahr., and the air moistened by means of steam from a bronchitis kettle, and the addition of a teaspoonful of the compound tincture of benzoin to the water in the kettle has a sedative effect; or an inhaler may be used with the same quantity of the tincture in a pint of water. The chloride of ammonium inhaler will also be found extremely useful in these cases. The way to obtain the greatest benefit from it is to direct the patient to inhale by the mouth, and exhale through the

nostrils, for two or three minutes every hour or two. The diet should be of an unstimulating nature and semi-solid, so as not to cause trouble in swallowing—bread-and-milk, rice, sago, tapioca, beef-tea and mutton-broth are the best. Equal parts of hot milk and Ems or Seltzer water will be found an agreeable and beneficial drink, and will relieve the feeling of dryness in the throat.

If the bowels are confined a saline aperient is indicated. A diaphoretic such as formula No. 11 may be given every four hours, or pilocarpine $\frac{1}{10}$ to $\frac{1}{5}$ grain may be injected hypodermically. If the patient be very feverish 20 minims of antimonial wine, or 4 or 5 minims of the tincture of aconite, may be added to the mixture. If cough be a troublesome symptom formula No. 12 will generally give relief, or formulæ Nos. 14 and 15 may be ordered. Chloride of ammonium in the form of tabloids or pastilles, or the Soden mineral pastilles will usually be of considerable service; they should be slowly sucked every two or three hours while the acute symptoms last.

Externally a cold compress may be applied to the throat, or in severe cases an ice-collar or Leiter's tubes should be placed round the neck. The treatment to be adopted in cases of œdema of the larynx will be found at p. 349.

A difficult question frequently arises as to what should be done in the event of an actor or a professional singer being attacked with laryngitis during his engagement. In the first place, I would state emphatically that, just as there is no royal road to learning, so there is no special method of treating an attack of acute laryngitis in a professional. If the case be at all severe, at whatever cost he should rest, otherwise permanent damage may be done to the voice; in milder cases, sucking ice, keeping a cold compress to the neck, and the use of an astringent spray (Nos. 62 to 64) may suffice to enable the patient to get through his work.

Attempts to cut short the inflammation by the application with the brush of nitrate of silver or other strong astringents are not to be recommended. According to Sajous,* hoarseness in professional vocalists may be due to deficiency of lubrication of the vocal cords. This condition he treats by the administration, every two hours, of 10 grains of ammonium chloride in a tumblerful of water, and the topical use of warm sprays of a saturated solution of potassium chloride at the same intervals. In this kind of case benzoic acid lozenges are sometimes beneficial. Strychnine in full doses has also a good effect.

As regards the treatment of attacks of catarrhal laryngitis in children, a warm and moist atmosphere is essential. If the onset be sudden, a hot bath, followed by a dose of castor oil or calomel, will often succeed in relieving the patient. The child should be placed in a bed surrounded by a tent, into which the spout of a bronchitis-kettle projects. A teaspoonful of the compound tincture of benzoin should be placed in the water. A sponge, frequently wrung out in hot water, should be applied over the larynx, and some warm milk and water given to the child to drink. A diaphoretic, such as formula No. 11, in doses of one to four teaspoonfuls, according to the age of the child, should be given every three or four hours; if there be any tendency to spasm of the larynx, the addition of 2 to 5 grains of bromide of potassium to each dose will be found beneficial. Should the dyspnœa increase, a teaspoonful of ipecacuanha wine should be given every twenty minutes for three doses, unless emesis take place sooner, or $\frac{1}{35}$ to $\frac{1}{30}$ grain of apomorphia may be injected subcutaneously.† In the event of no relief being obtained, and in the presence of signs of deficient entry of air, *i.e.*, some cyanosis, recession

* *Annual of Medical Sciences* 1891, vol. iv., F. 2.

† Donkin, *The Diseases of Childhood*, p. 345.

of the episternal, supra-clavicular, and epigastric regions, the patient should be intubated, or, in the absence of the appliances for intubation, tracheotomy should be performed.

In traumatic laryngitis due to scald of the larynx, Morell Mackenzie * says that "scarification, fairly and fully carried out, ought to supersede all other treatment." Inasmuch, however, as children are the chief victims of this accident, it is not easy to carry out this plan of treatment. The application of iced packs to the throat, and iced milk and water by teaspoonfuls, or small pellets of ice given every few minutes, should be tried. Early tracheotomy is usually necessary, and Gough,† from an experience of 13 cases, advises that, for the first twenty-four or thirty-six hours after the operation, the patient should be fed with nutrient enemata.

3. ACUTE EPIGLOTTITIS.

This term has been applied to cases in which the acute inflammatory attack is limited to the epiglottis. As a rule pharyngitis or laryngitis is present, but occasionally the epiglottis may be almost exclusively affected; in this event there need be no symptoms referable to the larynx, *i.e.*, neither dyspnœa, cough, nor hoarseness, but the patient complains of the feeling of a foreign body in the throat, which causes an inclination to vomit, pain and difficulty in swallowing, and profuse secretion of mucus. There may be tenderness over the hyoid bone, and attempts at swallowing may cause laryngeal spasm.‡

* *Diseases of the Nose and Throat*, vol. i., p. 280.

† *Lancet* 1890, vol. ii., p. 126.

‡ See interesting case recorded by J. M. Hunt, *British Medical Journal* 1888, vol. ii., p. 618.

The treatment is the same as for acute laryngitis, with the addition that it may be necessary to scarify the epiglottis with the laryngeal lancet.*

4. MEMBRANOUS LARYNGITIS.

A variety of laryngitis accompanied by the formation of a false membrane.

Ætiology.—Nothing definite is known as to the causation of a membranous laryngitis apart from diphtheria, except that traumatism is capable of producing a membranous exudation upon the surface of the laryngeal mucous membrane. Numerous cases, for example, of membranous laryngitis from scalds of the throat have been recorded. The entrance of *eau-de-Cologne* into the larynx has also produced an exudation. Many distinguished authorities decline to accept the view that membranous laryngitis (excluding the traumatic variety) exists as an affection independent of diphtheria. That sporadic cases of membranous laryngitis occur, in which it is quite impossible to detect diphtheritic infection, most men who have had much experience in practice will admit. These cases are of a more sthenic character than the diphtheritic, no exudation is seen in the nares, naso-pharynx, or pharynx, and they are not followed by the diphtheritic sequelæ. Membranous laryngitis is essentially a disease of childhood, occurring most frequently about the sixth to the eighth year.

Morbid Anatomy and Pathology.—A fibrinous exudation takes place on the surface of the mucous membrane, entangling in its meshes leucocytes and epithelial elements. It was at one time taught that a croupous exudation could be distinguished from a diphtheritic by the fact that the former could be removed without leaving a bleeding surface,

* Gibb, *Diseases of the Throat and Windpipe*, p. 63.

but that on attempting to peel off a diphtheritic exudation a raw surface would be left. This view is, however, no longer tenable.

Symptoms.—In describing acute laryngitis, it was pointed out that, in childhood, dyspnœa is an early symptom, and that it tends to be paroxysmal. This is especially true of membranous laryngitis, as, after about twenty-four hours of feverishness, the voice becomes affected, and a croupy cough and evidences of laryngeal stenosis supervene. The breathing is hurried, the alæ nasi dilate, there are inspiratory and expiratory dyspnœa, recession of the supra-clavicular and epigastric regions, and cyanosis. The pulse becomes very frequent, and intermits during inspiration.

Diagnosis.—The chief difficulty is to distinguish simple membranous laryngitis from diphtheria. The chief diagnostic features have already been mentioned (*see* p. 322). I have only to add that in diphtheria early glandular enlargement and albuminuria usually occur, whilst in simple membranous laryngitis they are absent. In the absence of the expulsion of membranes by coughing, which is a rare event, the diagnosis of membranous from catarrhal laryngitis is a matter of difficulty.

Prognosis.—The outlook in membranous laryngitis, whatever be its cause, is undoubtedly grave. The patients die from laryngeal or tracheal stenosis, and unfortunately we know of no remedies which are capable of arresting the formation of false membranes.

Treatment.—The directions given for the treatment of catarrhal laryngitis in children will apply equally to the membranous form, except perhaps that more may be expected from the judicious use of emetics, and that intubation or tracheotomy is more likely to be required.

5. HÆMORRHAGIC LARYNGITIS.

The term "hæmorrhagic laryngitis" has been applied to cases in which hæmorrhage from the larynx, independent of grave organic disease or traumatism, is the prominent symptom. In cases belonging to this category, the hæmorrhage is not merely an extravasation into the mucous membrane, but a free escape of blood. The term has been retained as it is commonly employed, but "laryngeal hæmorrhage" would perhaps be a better expression, as there need not be any inflammatory mischief present in these cases.

Ætiology.—Hæmorrhagic laryngitis is a rare affection;* it occurs most frequently in women, and more especially in pregnant women or puerperal convalescents; it has also been met with at the catamenial period.† A case has been recorded in which the exciting cause was exposure to cold.

In persons with degenerate vessels, laryngeal irritation may give rise to violent fits of coughing, and thus lead to rupture of a small blood-vessel. A strain of the voice and violent retching have also been known to produce laryngeal hæmorrhage.

The most important point to be settled in regard to hæmorrhagic laryngitis is its relationship to pulmonary phthisis. Gleitsmann‡ made an attempt to settle this question, but was able to collect only 22 cases of hæmorrhagic laryngitis. Phthisis subsequently occurred in 3 of these cases. There is therefore no sufficient evidence to show, that hæmorrhage from the laryngeal mucous membrane necessarily indicates a phthisical tendency on the part of

* B. Fraenkel, *Berliner Klin. Wochenschrift* 1873, No. 2.
† *Journal of Laryngology*, vol. v., p. 244.
‡ *American Journal of Medical Sciences*, April 1885.

the patient, nor, on the other hand, are phthisical patients more prone than others to suffer from laryngeal hæmorrhage.

Morbid Anatomy and Pathology.—Catarrh seems to be the most potent factor in the production of hæmorrhagic laryngitis. It acts by producing increased permeability, or tendency to rupture of the vascular walls, the immediate cause being an over-straining of the larynx, as in crying, singing, or coughing. By some authorities, hæmorrhagic laryngitis is looked upon as a distinct affection, caused through disease of the walls of the vessels, and not merely an increase of an ordinary laryngeal catarrh in which the bleeding is produced by the detachment of dried secretion. This view is, however, hardly tenable, and hæmorrhagic laryngitis cannot therefore be regarded as an independent affection, similar appearances being observed on other mucous membranes. The blood may escape from the vessels by diapedesis or by rupture. In some rare cases the hæmorrhage results from the detachment of firmly adherent crusts. Laryngeal hæmorrhage may occur in purpura, leukæmia, chlorosis, and other affections due to an altered condition of the blood; but in these instances the laryngeal symptoms are completely thrown into the shade by the general symptoms.

Symptoms.—The symptoms of hæmorrhagic laryngitis are those of an ordinary laryngitis, with the addition of hæmoptysis, which is partly brought about without any definite cause, and is partly the result of attacks of coughing. The hæmorrhage is mostly insignificant, only streaks of blood being noticed in the sputa; sometimes, however, the bleeding is very considerable, amounting to a tablespoonful, or even a cupful. The blood may coagulate in small or large clots, which may temporarily block the larynx. After the cessation of the bleeding, the symptoms of the laryngitis persist for some time, as hæmorrhagic laryngitis represents a rather intractable form of the disease. In a case which was

under Fraenkel's * care, and which has been most carefully described by him, the characteristic feature was the following cycle of events—stridor, shortness of breath, expectoration of blood followed by free breathing. These symptoms were due, as Fraenkel was able to verify by the laryngoscope, to the alternate blocking of the larynx by blood-clots, followed by cough, which cleared the larynx and rendered the breathing free; the same series of events recurring from time to time. On making a laryngoscopic examination one sees, besides the characteristic appearances of catarrh, only small blood-clots. In some cases the bleeding-point can be distinctly recognised. A good example of this is presented by a case reported by Stockton.† The patient was a young lady, and an opera-singer by profession, who suddenly lost her voice while practising, and in a few minutes coughed up some bright, frothy blood. The larynx was found coated with blood, and when the clot was removed a small pulsating vessel was seen, and from it came the hæmorrhage, which was controlled by the galvano-cautery. Three interesting cases of hæmorrhage from the larynx are recorded by Porter.‡ In the first case a small perforating ulcer of the right ventricular band was the source of hæmorrhage. In a case I saw some years ago, with Dr. Viney, of Chertsey, the prominent symptom was a harsh, brassy cough, resembling the cough due to an aneurysm. Accompanying the cough there were occasional attacks of spitting of bright, arterial blood, amounting to about an ounce. During the attacks the larynx was intensely congested, but in the interval nothing abnormal was to be seen. Morphia and ice to suck were the only remedies that seemed to be of any avail. In the interval, alkalies

* *Berliner Klin. Wochenschrift* 1873, No. 2.

† Section of Laryngology, *Ninth International Congress.*

‡ *New York Medical Journal* 1889, vol. ii., p. 315.

and Friedrichshall water were ordered, as there were some gouty symptoms.

Diagnosis.—The outcome of the discussion on hæmorrhages from the pharynx and larynx at the annual meeting of the British Medical Association * at Glasgow was a general agreement that hæmorrhage from the throat is exceedingly uncommon, and that in the majority of cases thus described the blood comes either from the lungs, nose, or mouth. Hence, before arriving at the diagnosis of laryngeal hæmorrhage, all other possible sources of bleeding should be carefully excluded; and even then it would be hardly right to assign it to the larynx, unless the bleeding vessel or a patch of congestion was visible. As Hodgkinson† points out, the presence of blood in the larynx is of no diagnostic importance, as it may easily find its way there, not only from the lungs, but it may also trickle down into the larynx from the nose or pharynx.

Prognosis.—As already mentioned, the moot point is the connexion between hæmorrhagic laryngitis and pulmonary phthisis. In this connexion, we must bear in mind the possibility of the blood from a laryngeal hæmorrhage passing down into the pulmonary alveoli, and setting up inflammatory mischief and eventually phthisis, the so-called *phthisis ab hæmoptoë*. There can, however, be no sort of doubt that, in the great majority of cases in which it was assumed that the hæmorrhage proceeded from the throat, and that the phthisis only developed later, the lung was really the source of the hæmorrhage, the physical signs being absent, or only faintly marked.

If it be possible to exclude phthisis, and in the absence of ulceration and traumatism, which are the two causes of serious hæmorrhage, bleeding from the larynx need not

* *British Medical Journal* 1888, vol. ii., p. 609.

† *Ibid.*, p. 612.

be regarded as a serious malady. Where ulceration exists, death may result from loss of blood, from suffocation due to the blood entering the bronchi, or from the larynx being occluded by blood-clots.

Treatment.—In a case of bleeding from the larynx, the patient should be kept quiet in bed, ice should be applied over the larynx and to the nape of the neck, and ice-pellets should be given to suck. The best way of bringing astringents into contact with the mucous membrane is by means of spraying; for this purpose solutions Nos. 62, 63, 65, and 66 should be used with the hand-ball spray apparatus. Where the hæmorrhage is slight and is due to the detachment of dry crusts, the use of a solvent spray, such as No. 52, will often suffice to stop the bleeding.

Some authorities object to painting the larynx in cases of hæmorrhage, alleging that it is injurious, as it detaches the clots and gives rise to a fresh hæmorrhage. Heryng, however, approves of painting with a solution of nitrate of silver. As already mentioned, the galvano-cautery may be employed to control the hæmorrhage if the bleeding-point can be recognised.

The inhalation of turpentine and oil of eucalyptus has its advocates. If the cough be troublesome, narcotics may be required to check it. Should the patient be plethoric, saline aperients act beneficially by relieving portal congestion. The attacks of dyspnœa, almost amounting to suffocation, due to the blocking of the larynx by blood-clots may cause the question of tracheotomy to be discussed. It is quite conceivable that under certain circumstances this operation might be required, but the author has not come across the record of a case, in which the trachea has been opened on account of the glottis being blocked by clots from a laryngeal hæmorrhage.

6. CHRONIC LARYNGITIS.

Chronic Laryngeal Catarrh.

This is a chronic inflammatory condition of the mucous membrane of the larynx.

Ætiology.—The causes of chronic laryngitis are practically the same as those producing the acute form of the disease; in some cases, indeed, chronic laryngitis supervenes upon one or more attacks of acute catarrh of the larynx, but in the majority of cases its onset is more gradual.

As was to be expected, on account of their greater exposure to the various causes, males are more often affected than females. Adults are, for a similar reason, more often attacked than children. Over-use of the voice is a very common cause of the disease; hence clergymen, actors, singers, schoolmasters, etc., are prone to be affected. Using the voice in the open air is particularly injurious, as is shown by the frequency with which itinerant vendors of all kinds are attacked,—though, of course, other causes come into play in individuals of this sort: viz., exposure to changes of weather, the abuse of alcohol or of smoking. Occupations attended with the production of dust or irritant gases (stonemasons, potters, knife-grinders, chemical manufacturers, etc.), and trades in which work is carried on in badly ventilated rooms, or where there are sudden transitions from heat to cold (compositors, tailors, bakers, etc.), will induce attacks of chronic laryngitis. Possibly associated with changes of temperature may be mentioned Ingal's cases of chronic rheumatic laryngitis.* Anything which impairs the general health predisposes to attacks of chronic laryngeal catarrh on slight provocation. Some cases of chronic laryngitis do not yield to treatment, until attention

* *See* Part III., Section 53.

has been paid to the digestive system, showing the sympathy existing between different mucous surfaces. Over-feeding, leading to plethora, is frequently accompanied by a very characteristic form of laryngitis, in which the mucous membrane is much congested.

Chronic cardiac and pulmonary diseases give rise to passive congestion of the larynx. Too much stress cannot be laid on the great influence exercised by impeded nasal respiration in the production of chronic laryngitis. It is only of late years that attention has been directed to this connexion, but it is already recognised that the nose and naso-pharynx require to be carefully examined in every case of laryngeal catarrh. It is not only nasal stenosis which acts injuriously on the larynx, but any condition of the nose, which interferes with the air being properly warmed and moistened as it passes over the nasal mucous membrane; hence, atrophic rhinitis is frequently accompanied by a dry and glistening condition of the pharynx (pharyngitis sicca), and occasionally by a similar state of the larynx (laryngitis sicca). Luc* describes this condition under the term "laryngo-tracheal ozæna."† Lastly, all affections of the larynx of any standing, *e.g.*, tuberculosis, lupus, syphilis, benign and malignant new growths, etc., are usually accompanied by more or less chronic catarrh.

Morbid Anatomy and Pathology.—From an anatomical point of view there are three chief forms of chronic laryngitis. In the first variety, the mucous membrane of the larynx is hyperæmic and swollen, and there is a general increase in the thickness of the mucous membrane, chiefly due to cell proliferation in the sub-epithelial portion of the mucosa. Ulceration is rare in simple chronic laryngitis, but there may be superficial abrasions. In the second

* *Journal of Laryngology* 1889, vol. iii., p. 1.

† *See* p. 28.

variety, to which the term "atrophic laryngitis" has been applied, the mucous membrane is thinned and pale, and the glandular structures are atrophied. In the third variety, called glandular laryngitis* (or, improperly, follicular laryngitis), there is some thickening of the mucous membrane, but the chief characteristic is the enlargement of the racemose glands. The orifices of these glands may become occluded and their contents escape by ulceration. Morell Mackenzie† has applied the term "phlebectasis laryngea" to certain rare cases, in which there is a varicose state of the veins of the epiglottis, ventricular bands, vocal cords, and the arytenoids.

Symptoms.—The symptoms are all referable to the larynx. The patient experiences a sense of uneasiness and tickling in the throat, which causes a frequent desire to clear the throat, *i.e.*, the cough is of a voluntary character. Involuntary cough is rare in chronic laryngitis; if present to any marked degree, probably the trachea or bronchi are involved.‡ The expectoration is usually scanty, consisting chiefly of small pellets of mucus; if it be very abundant there is usually some concomitant tracheitis or bronchitis; occasionally, however, laryngitis is accompanied by a profuse secretion (laryngorrhœa). The voice is always more or less affected, varying from slight degrees of hoarseness up to complete loss of voice. The hoarseness is generally worse when the voice is first used, especially in the morning; after a little use it regains some amount of power, but fatigue is soon felt if talking be continued for any time.

On making a laryngoscopic examination, the cords will be found to have lost their normal whiteness, and to vary in colour from a pale pink to a bright red; but the colour is

* Gordon Holmes, *Lancet* 1884, vol. ii., p. 905.

† *Diseases of the Throat and Nose*, vol. i., p. 292.

‡ Gordon Holmes, *Lancet* 1884, vol. ii., p. 820.

never so intense as in acute laryngitis. Sometimes only one cord is affected; indeed, the congestion may be confined to a portion of the cord. The whole larynx has a dingy or smoked appearance, and its mottled colour contrasts with the delicate and uniform coloration of health.* Viscid mucus will usually be found adhering to the laryngeal mucous membrane, especially in the arytenoid commissure, and on phonation the cords may stick together momentarily. Accompanying the congestion there is occasionally loss of mobility, or defective tension in the cords, so that on phonation they do not come into apposition, but leave an oval gap between them. The foregoing describes the usual laryngoscopic appearances in the milder form of simple chronic laryngitis. In some cases there is so much increase in the mucous membrane, that the term "hypertrophic catarrh" has been applied to them; in others, the most noticeable feature is the thinning of the mucous membrane. In glandular laryngitis, the dilated orifices of the glands may be seen on the arytenoids, the epiglottis and posterior parts of the vocal cords looking, according to Mackenzie,† like "pale specks on the congested membrane, or as small red circles on the pale membrane." Superficial abrasions of the mucous membrane are not uncommon in chronic laryngitis, but anything like deep ulceration is extremely rare. As a result of long-continued inflammatory action, a hyperplastic condition may be set up and distinct outgrowths may occur from the ventricular bands, vocal cords, and other parts of the larynx. Fletcher Ingals‡ has drawn attention to a form of laryngitis which he terms chronic rheumatic laryngitis. He points out that almost all the patients have inherited or acquired the

* Gordon Holmes, *Lancet* 1884, vol. ii., p. 821.

† *Diseases of the Throat and Nose*, vol. i., p. 291.

‡ *Journal of Medical Sciences*, January 1888.

rheumatic diathesis, that the pain has the characteristic intermissions, remissions, and exacerbations, and that only rheumatic drugs are of use. There are no anatomical characteristics of the disease; the chief symptom is pain, radiating in various directions, but chiefly to the cornua of the hyoid bone, the pain being increased by pressure.

Diagnosis.—As laryngeal tuberculosis, in the early stages, usually presents the appearances of a chronic laryngeal catarrh, it is important that, in cases of any standing, the lungs should be carefully examined and the sputa submitted to microscopic examination for bacilli. The diagnosis from malignant disease is at times very difficult, but the occurrence of thickening and congestion of one cord, with defective mobility of the same, in persons over forty, should give rise to serious suspicion that the affection may be of a cancerous nature.

Prognosis.—Even under favourable circumstances, the course of chronic laryngitis is very uncertain, and there is great tendency to relapse. There is, of course, the danger of permanent damage to the voice, or of the inflammatory state giving rise to a new formation. That chronic laryngitis ever goes on to laryngeal phthisis is more than doubtful. In all probability there was a tubercular element from the outset in those cases, in which the transformation has apparently been observed. As regards risk to life, the only way in which this may occur is in the supervention of œdema, which is extremely rare, or in the occurrence of perichondritis, which is equally uncommon. The danger of the hyperplastic form will be treated under the head of Chronic Sub-Glottic Laryngitis.

Treatment.—The only treatment of any avail in chronic laryngitis is the direct application of astringent remedies to the larynx by means of the brush (Fig. 43). A solution of chloride of zinc (formula No. 39) is a good application

to commence with, and in the less severe cases it will suffice to effect a cure. The application should at first be made daily, and continued for some days until a reactive inflammation is set up; then the solution should be applied every other day, afterwards less frequently and gradually decreased in strength. In the event of spasm being excited by the application, the patient should be told to hold his breath and then to breathe gently through the nose; if this be not sufficient, sipping a little cold water will usually have the desired effect. If the chloride of zinc fails to cause im-

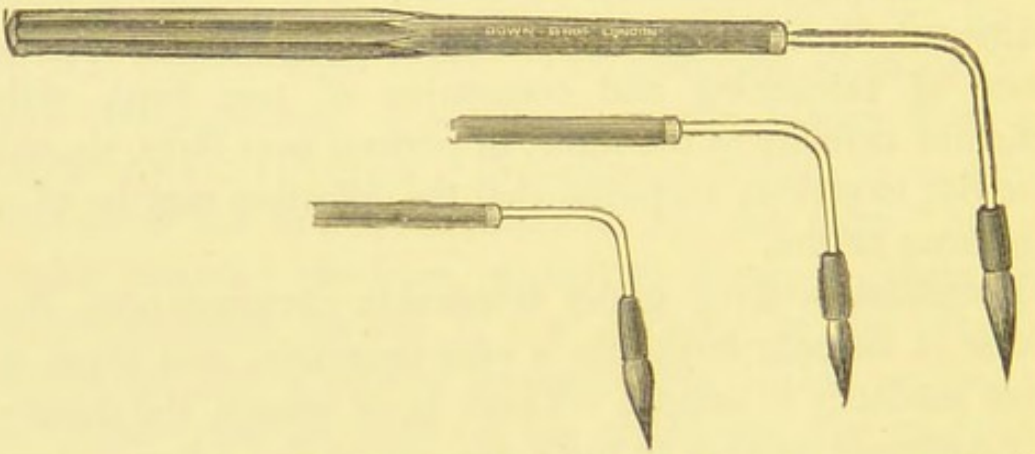


Fig. 43.—Laryngeal Brush.

provement, a stronger astringent must be tried; for this purpose there is nothing better than a solution of nitrate of silver. In cases of long standing, it is advisable to commence treatment with nitrate of silver and not to waste time in trying chloride of zinc. The plan of treatment that the author has found most successful is that laid down by Semon.* He recommends solutions of 16, 24, 48, 96, and 240 grains to the ounce, beginning with the milder solutions and only gradually passing on to the strength which is deemed necessary in the individual case. The applications are to be made in the same manner as described above for chloride

* *British Medical Journal*, January 24th, 1880.

of zinc. There is only one drawback to the employment of strong solutions of nitrate of silver for any length of time, and that is the possibility of argyria occurring. The author once saw this condition as the result of applying a solution of silver nitrate to the pharynx during some weeks.

Various astringent sprays (formulæ Nos. 62 to 66) will sometimes be found of use in the intervals between the application of astringents with the brush, but unfortunately sprays cannot replace the brush. Inhalations of creosote, or of the oil of the Scotch fir, may be ordered in addition to the painting of the larynx, but they are of only limited utility in the treatment of chronic laryngitis. When the laryngeal secretion is scanty and viscid, the chloride of ammonium inhaler is of use, and the same drug may be given internally in the form of compressed tabloids or pastilles.

If, after the removal of congestion, the voice remains feeble, the use of electricity, either in the form of the continuous or of the interrupted current, will be found very beneficial.

The dependence of chronic laryngitis on diseases of the nose and naso-pharynx should lead to these cavities being carefully examined in all cases, and any abnormal conditions being, as far as possible, rectified. Attention should be paid to any of the causal conditions, such as excessive smoking, drinking, or the over-use of the voice. With respect to the latter, Semon is right* when he says, "It is perfectly useless to attempt a cure if the same mischievous conditions, which have most likely produced the disease, *i.e.*, excessive use of the voice, is continued during the treatment."

As regards general treatment, the patient's health must be improved as much as possible; coddling undoubtedly increases the tendency to laryngeal catarrh, so that the neck

* *Op. cit.*

should not be wrapped up; at the same time, allowing the beard to grow has often a very beneficial result. Sponging the chest and neck with cold water, in cases where a cold bath is not taken, is of great service; regular exercise should be enjoined, and hot and crowded rooms are to be avoided.

The diet should be simple; spices, pickles, and highly seasoned articles of food should be eschewed; spirits, as a rule, are best abstained from, and if alcohol be taken at all it had better be in the form of a light wine. Excessive tea-drinking should be avoided. Any dyspeptic troubles should receive appropriate treatment, and if there be symptoms of plethora, a blue pill, followed by a course of mild saline aperients, or the daily use of some mineral water, will be found beneficial. After local treatment has been duly carried out, great benefit will often result from a course at Ems or Aix-les-Bains, followed by ten days or a fortnight at some bracing place.

In laryngitis sicca, the crusts must be softened by spraying out the larynx with a mild alkaline solution (formula No. 52). After the larynx has been thoroughly cleansed, astringent and alterative applications should be made with the brush (formulæ Nos. 34, 39).

7. CHRONIC SUB-GLOTTIC LARYNGITIS.

This term has been applied to one of the very rare results of chronic laryngeal catarrh. It consists of a hyperplasia of the connective tissue of the under surface of the vocal cords. This condition has also received the name of chorditis vocalis inferior hypertrophica.

Ætiology.—The same causes which give rise to the ordinary form of chronic laryngitis may also lead to the sub-glottic variety. Stress has been laid upon excessive cigarette-smoking as being a cause of this disease.

Zwillinger* is of opinion that the hypertrophy is sometimes a manifestation of rhinoscleroma. Vierordt† has noticed a combination of goitre and laryngitis hypoglottica in two cases, and that there was some relation between the two conditions is shown by the fact that if there was an exacerbation of the laryngitis, there was also an increased swelling of the goitre.

Symptoms.—The voice is affected very early. At first hoarseness occurs; after a time the voice may be almost completely lost. A barking, troublesome cough has been described. Gradually increasing dyspnœa is, however, the symptom which attracts most attention. As a result of the progressive narrowing of the glottis, the obstruction at last becomes so great that suffocation would take place unless tracheotomy were performed. Occasional inter-current attacks of a sub-acute nature may cause temporary aggravation of the symptoms, and even necessitate the immediate performance of tracheotomy. In some cases, attacks of suffocation are brought about by the vocal cords being stuck together by viscid mucus.

On laryngoscopic examination, the glottis will be seen to be narrowed by a tumefaction beneath the cords, which is sometimes of a pale red, at others of a dirty white colour. This swelling diminishes not only the transverse diameter of the glottis, but also the antero-posterior. The swelling is usually symmetrical on the two sides, the surface is smooth and free from nodules or excrescences, there is very little or no mucous secretion, and no glandular swelling.

Diagnosis.—The history of the gradual onset of the disease and the laryngoscopic appearances are generally sufficient to enable a diagnosis to be made. It requires to be distinguished from laryngoscleroma (rhinoscleroma). In the

* *Sajous' Annual* 1889, vol. iv., G. 5.

† *Journal of Laryngology*, vol. ii., p. 247.

case of the latter, there is usually a similar affection in the nose, and the detection of the characteristic rhinoscleroma bacilli will clinch the diagnosis. A case which was diagnosed as chronic sub-glottic laryngitis, during life, was found to be one of rhinoscleroma at the autopsy.*

Prognosis.—In almost all the cases of marked chronic sub-glottic laryngitis, a grave view must be taken, as the disease shows a decided tendency to advance and to threaten life by suffocation.

Treatment.—In the earliest stage of the disease, the treatment appropriate to the ordinary forms of chronic laryngitis should be tried. Before the disease has advanced beyond the stage of inflammatory hyperplasia, iodide of potassium will be found of great service. The galvano-cautery has been successfully employed in destroying the overgrowth of connective tissue. Sajous † recommends chromic acid for the same purpose; he applies it fused on the end of a covered probe. The topical application of lactic acid has also been found useful.

Labus ‡ has had good results from flaying the vocal cords when these participate in the hypertrophy. When the increasing growth begins to interfere with breathing, attempts should be made to dilate the narrowing glottis. For this purpose, intubation or Schroetter's tubes § should be tried. If dilatation does not succeed, thyrotomy can be performed, and the excess of tissue cut away or destroyed by the cautery, otherwise tracheotomy will have to be performed.

* *Centralblatt*, vol. vii., p. 567.
† *Sajous' Annual* 1889, vol. iv., G. 6.
‡ *Archives of Laryngology*, vol. i., p. 281.
§ See "Stenosis of Larynx," p. 415.

8. CHORDITIS TUBEROSA.

This term has been applied to the occurrence of small, round growths, about the size of a poppy-seed, on the vocal cords. Occasionally these growths are longer and more irregular. Mackenzie * describes this condition under the head of "Trachoma of the Vocal Cords"; he considers the growth as being due to a partial dermoid metamorphosis of the mucous membrane; in other words, it is an allied condition to pachydermia. Rice † regards chorditis tuberosa as a primary condition, and a cause rather than a result of chronic laryngitis. These small growths are chiefly met with in singers, public speakers, and those who have occasion to use the voice much; females are more commonly affected than males. This condition seems to be due to a faulty method of using the voice. The growth is usually situated rather more anteriorly than midway between the vocal processes and the anterior insertion of the cord, and it projects from the free margin of the cord. On the opposite cord there is at first a depression; later on a nodule may form. These growths occur more often on the left than on the right cord.‡ The only symptom due to their presence is impairment of the voice, sometimes amounting to hoarseness. Knight § saw a case of a large trachoma in a lady, who was put under general tonic treatment and a careful regimen. When seen two months later, the same condition existed; but six months afterwards the nodule had entirely disappeared.

Treatment.—Mackenzie recommends a prolonged course of astringents applied locally, or caustics (formulæ Nos. 34, 36, and 37).

* *Diseases of the Throat and Nose*, vol. i., p. 293.
† *Centralblatt*, vol. vii., p. 584.
‡ Rice, *Centralblatt*, vol. vii., p. 585.
§ *Archives of Laryngology*, vol. iv., p. 282.

Rice advises rest of the voice, removal of the nodule (preferably with a small snap guillotine), and subsequent cauterisation with chloride of zinc solution, and, of course, proper use of the voice after recovery.

9. PACHYDERMIA LARYNGIS.

This term was introduced by Virchow as the designation of a peculiar affection of the vocal cords in which the epithelium takes on an epidermal character, with a corresponding change in the sub-epithelial connective tissue.

Ætiology.—The first point which demands attention is the fact that the disease is one which almost exclusively attacks the male sex, occurring most frequently between the ages of thirty-five and fifty-five. The chief exciting cause is chronic laryngitis, due to occupation or some other condition. Tobacco, alcohol, and over-straining of the voice play an important *rôle* in the production of this disease. Virchow, on the *post-mortem* table, found pachydermia especially in drunkards. Apart from their action in causing laryngitis, syphilis and tuberculosis seem to have but little effect in setting up pachydermia; indeed, a syphilitic affection of the larynx may disappear under appropriate specific treatment, while a co-existing pachydermia may remain unaffected. A benign neoplasm, by causing a chronic laryngitis, may lead to the development of pachydermia. Sommerbrodt* lays great stress on living in a damp dwelling as a cause of the disease.

Morbid Anatomy and Pathology.—As Virchow† pointed out in his original communication on the subject, the essence of the disease consists in the fact that squamous epithelium extends from the pharynx over the inter-arytenoid

* *Berliner Klin. Wochenschrift* 1890, p. 429.

† *Ibid.* 1887, p. 585.

commissure and along the vocal cords to the anterior extremities. He also pointed out that the squamous epithelium covering these portions of the larynx, as also the epithelial covering of the mouth, pharynx, and œsophagus, possess a certain approximation to the epidermal covering of the external skin. These dermoid portions of the larynx being unprovided with glands are consequently relatively dry, and do not furnish the abundant secretion so freely poured out in their neighbourhood; in short, they represent a domain of their own. Here processes of a chronic inflammatory nature occur, leading to two kinds of changes. In both forms a large quantity of squamous epithelium is formed, but in one this represents the chief alteration, and the longer it continues, the more of an epidermal character does the epithelium assume. The change is limited to isolated, and for the most part very small, spots; this Virchow calls the warty form (*P. verrucosa*). It usually occurs at the anterior extremities of the vocal cords. In the other form (*P. diffusa*) the changes occur chiefly in the mucous membrane proper, and lead to a more diffuse swelling; hence he terms this the diffuse or smooth form. This variety is almost exclusively met with at the posterior extremities of the vocal cords, in the immediate neighbourhood of the vocal processes. The most characteristic appearance is a long, oval, tumid swelling, frequently from 5 to 8 millimètres long and from 3 to 4 broad, seated on the posterior extremity of the vocal cord, which is directed, as a rule, forward and downward from behind and above, so that its anterior end lies under the border of the vocal cord. This tumour may exist on one or both sides of the larynx. If bilateral, there is invariably a depression or pouch on one side, with a corresponding elevation on the other; according to Sommerbrodt,* the pouch is always on the left side,

* *Berliner Klin. Wochenschrift* 1890, p. 430.

but all authorities do not agree with him on this point.* The effect of this condition is, that owing to the pouch receiving the elevation, the vocal cords are able to approximate fairly on phonation. The view of the mode of production of the central depression now generally adopted is that first propounded by Fraenkel, who regards it merely as the result of the pressure exercised by the one tumour on the other, when the cords are approximated. Virchow maintains that this depression is due to the intimate connection of the mucous membrane and the cartilage, which exists at that spot.

Symptoms.—These will vary somewhat, depending on whether the diffuse or verrucose form exists. If the former, in addition to the ordinary symptoms of laryngeal and pharyngeal catarrh, the patients complain of a feeling of pressure in the throat, sometimes amounting to pain on swallowing. Hoarseness is not a marked symptom. The absence of hoarseness is partly owing to the fact that, in consequence of the pouch on the one side receiving the elevation on the other, there is not much interference with the approximation of the vocal cords. Meyer† has seen, in some cases, limitation of abduction in one or both cords; in one case there were nocturnal attacks of dyspnœa. In this observation he is supported by B. Fraenkel,‡ who says that this limitation in the outward movement of the vocal cords is no accidental appearance. The vocal cords are more or less congested.

In pachydermia verrucosa the chief symptoms are referable to the voice. On laryngoscopic examination, the warty-like growths will be seen on the anterior part of the cords.

As a result of pachydermia, secondary perichondritic pro-

* See Krieg, *Centralblatt*, vol. viii., p. 150.

† *Berliner Klin. Wochenschrift* 1890, p. 235.

‡ *Ibid.*, p. 236.

cesses may be set up in the arytenoid cartilages, and, on the other hand, Fraenkel saw a scale-like growth (pachydermia) follow upon perichondritis of the arytenoid cartilage.

Diagnosis.—At the commencement there may be some difficulty in distinguishing pachydermia from chronic catarrh of the larynx. Later on, the laryngoscopic picture is so characteristic that, once having been recognised, the diagnosis of a similar case is easy. The bilateral, peculiar change in the neighbourhood of the vocal process, the shell-like depression on one side, with the rounded swelling on the other, fitting into this depression on phonation, present a combination not met with in any other laryngeal affection. The induration of the posterior laryngeal wall, sometimes met with in pachydermia, might be confounded with tuberculosis. As against carcinoma the bilateral nature of the affection in pachydermia is of diagnostic value. If one finds only on the vocal process a growth, whose appearance does not negative pachydermia, Fraenkel says that this disease should be thought of rather than carcinoma.

Prognosis.—The outlook, as regards life, is almost invariably good. The disease, however, runs a very chronic course, but though complete resorption of the growth very seldom, if ever, takes place, the recovery of a fairly good voice may be expected.

Treatment.—The first thing to be done is to remove, if possible, the exciting causes of the disease; hence all sources of local irritation should be attended to. Amongst other things, rest of the voice should be enjoined. Internally, most authorities recommend the use of iodide of potassium in moderate doses; alkaline and sulphurous waters, such as those of Ems and Weilbach, are often beneficial. Inhalation of a 3 per cent. solution of acetic acid, and painting the affected part with the same fluid, have much

benefited the patient. Nitrate of silver in solution, applied by the brush, has been found of service. As regards operative interference there is considerable difference of opinion. Meyer and Fraenkel warn against active treatment, and say that relapses are liable to recur after operation, while Scheinmann * says that operative treatment is the only thing of much service, though it is available only for the removal of the larger growths. The galvano-cautery has been employed with advantage.

10. ŒDEMA OF THE LARYNX.

The term "œdema of the glottis" is a misnomer; the glottis is a *space*, and cannot, therefore, become œdematous.

By œdema of the larynx is meant a serous or sero-purulent infiltration of the connective tissue of the larynx in general and of the ary-epiglottic folds in particular.

Ætiology.—Two forms of the disease have been described, viz., primary and secondary.

Primary œdema may come on quite suddenly, and may occur in persons previously healthy. Among the causes which give rise to it are the following: A chill; the over-use of the voice; the local application of caustics, or use of the galvano-cautery; the presence of foreign bodies; injuries; swallowing boiling fluids; the entrance into the larynx of brandy, given during an attack of fainting; the administration of iodide of potassium; and septic poisoning, the result of defective drainage. Some observers assert that non-traumatic œdema is always the result of erysipelas. In reference to this point, Semon † writes: "Idiopathic, primary, acute œdema of the larynx is excessively rare. According to Sestier's excellent statistics on œdema of the

* *Centralblatt*, vol. viii., p. 314.

† *Lancet*, April 1st 1882.

larynx, simple inflammation was the cause of œdema in about only six per cent. of all his cases. And Dr. Morell Mackenzie believes that in nearly all these instances of so-called simple inflammation, the disease is due to blood-poisoning."

Struebing describes a form of œdema of the larynx co-existing with a similar condition of the pharynx and skin, which he, in the absence of any inflammatory cause, regards as being due to angio-neurosis. It commences with hyperæmia, which is quickly followed by an intense œdema; albuminuria does not occur. The action of iodide of potassium in producing œdema of the larynx must be attributed solely to the idiosyncrasy of the individual, as robust and delicate persons seem equally affected. The effect may come on after comparatively small doses, and after a short period of administration. Other symptoms of iodism, such as headache, are absent. The iodide has a purely local action, and does not give rise to a general œdema. The iodine, and not the potassium, is the active agent in causing this symptom, and it cannot be ascribed to any impurity in the drug. Numerous cases (Rosenberg has collected fourteen) have been reported of this untoward action of iodide of potassium, so that the possibility of its occurrence should be remembered. Poisoning by this drug is best avoided by beginning with small doses and gradually increasing; the combination of belladonna with the iodide is said to prevent its toxic action.

The causes of secondary œdema of the larynx are of an inflammatory, mechanical, or dyscrasic nature. It occurs as a complication of infectious diseases, such as erysipelas, smallpox, measles, scarlet-fever, diphtheria, typhus, and mumps. Several cases have been recorded as occurring in the recent epidemic of influenza; in one case the symptoms were so grave as to necessitate tracheotomy.

Even an apparently slight inflammatory attack may lead to œdema of the larynx. As an example of this may be cited the case* of a well-developed boy of three and a half years, who had a slight inflammation of the soft palate and uvula, without membrane or fever. Death occurred suddenly five hours later. At the autopsy, œdema of the larynx was found, but the cause of this condition could not be detected. Quinsy is also occasionally fatal through this complication. Œdema of the larynx is a very common complication of the chronic diseases of the larynx, such as tuberculosis, syphilis, and carcinoma; it may also be due to passive congestion, as in lung and heart affections; *e.g.*, emphysema, or the pressure of an aneurysm on the large venous trunks. It may accompany certain diseases of the skin, such as lupus, leprosy, or herpes.

The connection of œdema of the larynx with Bright's disease still remains a disputed point. Morell Mackenzie investigated two hundred cases of Bright's disease in the London Hospital, and did not find a single example of œdema of the larynx; and George Johnson, who speaks with authority on diseases of the larynx as well as on diseases of the kidneys, does not remember to have seen a case of œdema of the larynx as a direct result of Bright's disease.

On the other hand, Gibb‡ does not regard this complication as a rare one, and states that several examples have come under his own notice. He also gives a summary of Fauvel's observations, as follows: "The laryngeal mirror only can discover this affection, which is a white œdema, either chronic or intermittent, of the vestibule of the larynx and vocal cords, preceding or following albuminuria, and

* Demme, *Centralblatt*, vol. viii., p. 342.

† See p. 232.

‡ *Diseases of the Throat*, 2nd edition, p. 282.

more often present without any external manifestation to afford even a suspicion of the existence of Bright's disease." Loeri * says that œdema of the larynx is a frequent phenomenon in nephritis, and it usually has its seat in the posterior wall of the larynx. In the pages of the *Centralblatt für Laryngologie*, and other periodicals, numerous examples of œdema of the larynx associated with Bright's disease are to be found. What is the exact relation existing between these two conditions still remains uncertain. It is probable, however, that an irritation too slight to cause œdema of the larynx in a healthy individual, may suffice to bring it about in an albuminuric patient.

Acute œdema of the larynx has been met with in a diabetic patient; the urine should therefore be tested for sugar in these cases. Attention has recently been directed to the occurrence of œdema of the larynx in myxœdema.† Œdema of the larynx has been met with in the new-born infant, and has been known to cause death. Bayer ‡ has pointed out that attacks of œdema of the larynx may correspond with the catamenial period, and cites this fact as an example of the relationship existing between the female genital organs and the vocal apparatus.

Morbid Anatomy and Pathology.—The character of the effusion into the sub-mucous connective tissue varies much. It may be simply serous, or sero-fibrinous, with or without cell infiltration, or it may be sero-purulent or even bloody.§ The consistence of the swelling varies with the nature of the exudation, being softest in the serous variety. The more chronic the œdema, the greater is the cell proliferation. Gougenheim || describes two kinds

* *Centralblatt*, vol. ii., p. 464.
† *Lancet* 1893, vol. i., p. 524.
‡ *Revue de Laryngologie*, July 15th 1890, p. 473.
§ Schroetter, *Centralblatt*, vol. iv., p. 358.
|| *Centralblatt*, vol. i., p. 214.

of œdema, true and false. He points out that the infiltration of the ary-epiglottic folds in tuberculosis of the larynx is tubercular in nature, and not a true œdema, such as is met with in caries of the laryngeal cartilages. A true œdema of the larynx, viz., a purely serous exudation into the connective tissue of the larynx, is comparatively rare;* what is generally called œdema is of a more or less inflammatory nature.

The amount of swelling depends upon the amount of sub-mucous connective tissue, and upon the more or less firm adhesion of the mucous membrane to the underlying tissues.† Inasmuch as the sub-mucous tissue is least abundant on the vocal cords, they suffer least of all from œdema, but occasionally it is limited to the part below the level of the cords, constituting the sub-glottic variety; the œdema due to iodide of potassium sometimes occurs in this situation. On the other hand, the mucous membrane over the ary-epiglottic folds being loosely attached to the sub-glottic tissues, these folds very readily become œdematous. Struebing's angio-neurotic œdema depends upon an increased irritability of the vaso-dilator nerves.‡ In cases of secondary œdema, it may commence in the mouth and pass along the pharynx to the larynx.

Symptoms.—Difficulty in breathing, which may increase with such rapidity as to threaten life in two or three hours, is the characteristic symptom of œdema of the larynx. There is usually, also, the feeling of a foreign body in the larynx, and there may be difficulty in deglutition; this is the more marked when the epiglottis is much swollen. The voice also becomes weak, or is lost.

On laryngoscopic examination, the epiglottis may be

* Charazac, *Centralblatt*, vol. ii., p. 352.
† Hajek, *Centralblatt*, vol. viii., p. 342.
‡ *Centralblatt*, vol. iii., p. 339.

found to be erect, tense, enormously swollen, and nearly touching the back of the tongue; it is usually of a bright red colour. The ary-epiglottic folds are frequently obscured by the swollen epiglottis, but, if they can be seen, they form plum-like bodies, and may nearly meet in the middle line. In those rare cases in which the œdema is confined to the connective tissue below the cords, red, fleshy swellings may be seen bulging from beneath the cords. In the absence of the laryngoscope, the swollen condition of the epiglottis and ary-epiglottic folds may be recognised on making a digital examination.

Diagnosis.—If a laryngoscopic view can be obtained, this is very easy; in its absence, it is at times impossible to state with certainty the cause of the obstruction.

Prognosis.—The prognosis is always grave, except in the cases in which the œdema is limited in character; and even in these cases rapid extension may occur. If, in addition to the ary-epiglottic folds, other parts of the laryngeal mucous membrane are also affected, there is great danger of suffocation.* Œdema due to caries of the cricoid cartilage, causing obstruction below the glottis, is eminently dangerous. Over and above the risk attending the blocking of the larynx from the swollen condition of the mucous membrane, the possibility of the occurrence of spasm of the glottis should be borne in mind.

Treatment.—The patient should be put to bed, kept absolutely quiet, and strictly enjoined not to speak. The food should be soft or liquid, so as to prevent any injury to the swollen parts. If there be marked dysphagia, feeding the patient per rectum will materially assist in promoting recovery.

Pellets of ice to suck, and an ice-bag applied to the outside of the larynx, are to be preferred to warmth. In

* Gougenheim, *Centralblatt*, vol. i., p. 214.

order to diminish the tendency to spasm of the glottis, and as well as for its general sedative effect, bromide of potassium, in 10- to 20-grain doses every two or three hours, will be useful. Pilocarpine $\frac{1}{8}$ grain as a subcutaneous injection, every twenty minutes for three doses, has had an excellent effect, the patient feeling quite comfortable a quarter of an hour after the last injection.

Free scarification will often give immediate relief. Mackenzie's guarded laryngeal lancet is the best instrument

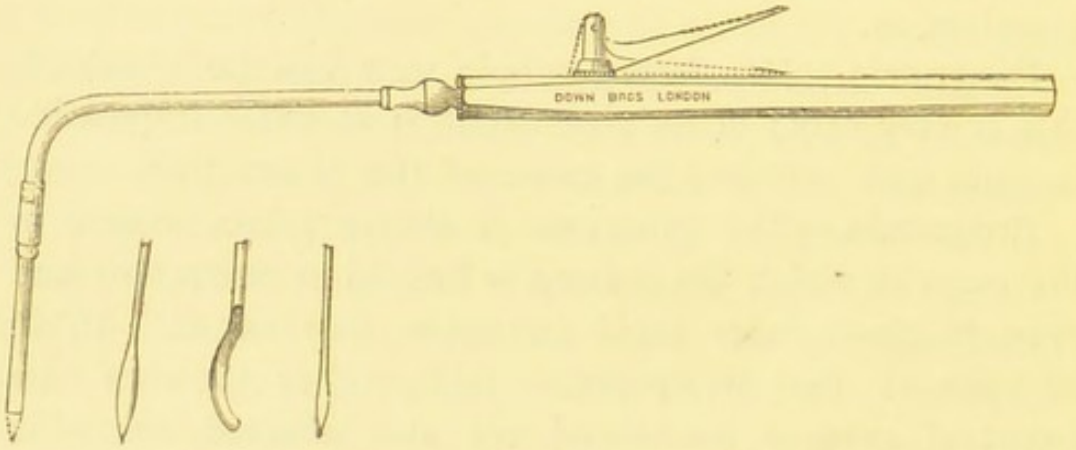


Fig. 44.—Mackenzie's Laryngeal Lancet.

for the purpose (Fig. 44). The application of a 20 per cent. solution of cocaine (formula No. 51), either in the form of spray or by the brush, to the larynx, will facilitate the operation, and may even itself suffice to put the patient out of immediate danger. If other measures fail, intubation may be tried, but, on account of the great swelling of the parts round the glottis in these cases, it is rarely successful, so that in the end we have to fall back upon tracheotomy. This operation should not be delayed until the patient is *in extremis*, but should be performed immediately after the first attack of suffocation occurs.

11. PERICHONDRITIS OF THE LARYNX.

Inflammation of the perichondrium of the larynx, leading to death and detachment of a part or the whole of the affected cartilage.

Ætiology.—The affection may be primary, but it is almost invariably secondary to some other laryngeal disease. The term "primary perichondritis" should be restricted to cases in which inflammation of the perichondrium occurs as the result of catarrh, or even possibly from sudden and violent over-use of the voice, or other indefinable causes, without any previous affection of the larynx. The recognition of cases of primary perichondritis is at times exceedingly difficult, and often it is only at the *post-mortem* examination that one can definitely say that the case was primary and not due to syphilis or tuberculosis. The author has recorded a striking example of this difficulty in a case brought before the Clinical Society.* As a transition between primary and secondary perichondritis may be mentioned the perichondritis described by Dittrich, as due to "decubitus, in consequence of the pressure of the cricoid cartilage, particularly if ossified, upon the soft parts in front of the vertebral column." Gerhardt† has described two cases of cricoid perichondritis, caused by decubitus in patients with disease of the vertebræ, with forward curvature of the cervical spine. The causes of secondary perichondritis are traumatism, *e.g.*, blows, gunshot wounds, stabs, and other injuries; tuberculosis; syphilis; malignant disease; acute and chronic infectious diseases, especially typhus and typhoid fevers.

Morbid Anatomy and Pathology.—The pathology

* *Transactions of Clinical Society*, vol. xv., p. 195, and vol. xvii., p. 151.

† *Archives of Laryngology*, vol. i., p. 19.

of primary perichondritis of the larynx, followed by necrosis of cartilage, is involved in difficulty. How the suppuration is brought about does not admit of any very ready explanation; it is not consistent with the views at present held on the pathology of inflammation, to assume that an abscess may form without local injury or septic infection. "In cases of perichondritis following upon syphilitic, tubercular, or carcinomatous ulceration, the morbid process is easily studied. Septic or specific micro-organisms penetrate the perichondrium from the mucous or ulcerated surface of the larynx, and there set up inflammatory changes, at first characterised by thickening of the fibrous tissue of the perichondrium, and followed by the formation of pus, which accumulates so as to dissect from the cartilage its source of nutrition, in the same way as, in necrosis of bone, the periosteum is separated, and leads to death of the part. The morbid process is generally confined to one cartilage—the cricoid—to begin with, but it may, in severe cases, extend to others. As the pus accumulates, the perichondrium softens and ruptures, and the inflammation spreads to the surrounding parts through which the pus burrows, and, according to the situation of the disease, an abscess may rupture into the œsophagus, pharynx, larynx, or trachea, or it may discharge externally and produce a laryngeal fistula. The dead or necrosed cartilage becomes eroded, and is slowly separated from the living. When complete exfoliation has taken place, the abscess collapses, and, as a rule, leads to great deformity of the larynx."*

As regards the occurrence of laryngeal perichondritis in enteric fever, there can be no doubt that this complication is more frequently met with on the Continent than in this country. For instance, Luening,† of Zurich, states that

* David Newman, *British Medical Journal* 1890, vol. i., p. 718.

† *Centralblatt*, vol. i., p. 73.

out of 1,745 *post-mortem* examinations in enteric fever, laryngeal complications were found in seventeen per cent. In 115 *post-mortem* examinations of typhoid laryngeal complications, which led to stenosis of the larynx, perichondritis with necrosis was found in 59, and in 9 other cases the ulceration extended down to the cartilage, or there was perichondrial abscess without necrosis. Ziemssen is in favour of the decubital origin of the typhoid perichondritis, and this view is supported by the record of 8 cases at Tiflis.* In these the perichondritis came on five to ten weeks after the commencement of enteric fever, and in all without pain. This certainly looks like a condition brought about by defective nutrition rather than by any specific inflammatory process. Sestier† regards the perichondritis as being due to the tendency to abscess, gangrene, and necrosis, caused by the profound debility of the convalescents from typhoid fever. In none of the 12 cases collected by Sestier was there ulceration at any other part of the larynx, and the same holds good in 3 cases related by Eve;‡ and there is ground for believing that, in some cases, at all events, the inflammation originates in the perichondrium, and is not the result of extension of typhoid ulceration down to the cartilages. Moreover, as Eve points out, necroses of the cartilages, similar to those occurring in typhoid fever, are found during convalescence from variola, and in glanders, thus indicating that this condition may be regarded as one of the sequelæ of exhausting zymotic diseases, and not a specific result. Koch, on the other hand, asserts that ulceration of the larynx is a true laryngo-typhoid state, which always coincides with the acute period of the general disease; and he is of opinion that when, in

* *Centralblatt*, vol. v., p. 30.

† *Transactions of Pathological Society*, vol. xxxi., p. 37.

‡ *Ibid.*

the state of convalescence from typhoid fever, symptoms of laryngeal stenosis come on, they are the result of a perichondritis, and are such as usually occur in the acute illnesses of long duration.

Symptoms.—In primary perichondritis, the first symptom to suggest that the perichondrium is affected, is a dull, aching pain, which is increased upon pressure over the larynx. Dysphagia and more or less odynphagia are usually present, especially if, as is generally the case, the cricoid cartilage be implicated. Cough and hoarseness are constant symptoms, and there is dyspnœa in proportion to the degree of obstruction.

At an early stage, laryngoscopic examination may disclose only some swelling of the mucous membrane, and perhaps immobility of one vocal cord. Even when an abscess forms, it is difficult to determine whether or no the perichondrium is affected, unless portions of cartilage be expectorated, or a rough area of necrosis be detected by the aid of the laryngeal probe. Perichondritis may simulate acute œdema of the larynx in its onset.

In secondary perichondritis, the symptoms are often so masked by those of the primary disease, that a diagnosis is impossible until portions of cartilage have been expectorated, or until perchance an attack of dyspnœa has resulted from the cartilage, suddenly dislodged, becoming impacted in the glottis. In other respects the symptoms are much the same as those mentioned as occurring in primary perichondritis.

Syphilitic perichondritis is, however, not attended by much pain. There is usually early enlargement of the cervical lymphatic glands, and swelling over and around the larynx, which will be found to be tender on palpation, and crepitus may be detected. The cough is attended with expectoration of a muco-purulent matter, which is

sometimes very offensive; the breath in these cases will be fœtid.

In the later stages of the disease, when sinuses connected with the abscess cavity have formed and opened externally, or into the œsophagus, the patient presents a miserable aspect, and may die worn out by the exhausting nature of the discharge, pain and want of sleep.

The causes of laryngeal obstruction in perichondritis may be arranged under the following heads: Œdema; immobility of one or of both vocal cords; swelling, due to the formation of an abscess; impaction of a portion of necrosed cartilage in the glottis; collapse of the cartilaginous wall of the larynx; and finally, in the more chronic cases, the cicatrisation which follows the healing of the ulceration; this latter result is almost entirely confined to the syphilitic cases.

Diagnosis.—The diagnosis of primary laryngeal perichondritis is a matter of great difficulty. In the first place, it is often impossible to exclude a constitutional origin of the affection; and secondly, unless there be extrusion of a portion of the cartilage, or bare cartilage be detected by the probe, it is hard to say whether the swelling seen with the laryngoscope is simply in the mucous membrane, or whether the cartilage is also affected.

In secondary perichondritis, the question of the cause is often one which will baffle the keenest diagnostician. In phthisical cases, the arytenoid cartilages are particularly liable to be affected. A very common site of tubercular ulcers is the inter-arytenoid fold, or they may be seen on the anterior aspect of the arytenoid cartilages. These ulcers are often very small in circumference, but, penetrating deeply, they lay bare the cartilage. The general pallor of the pharynx and larynx, and the puffy swelling of the epiglottis and arytenoid cartilages, will often assist

in making the diagnosis, and if tubercle bacilli are found in the secretion removed from the surface of the ulcer by the laryngeal brush, it hardly requires the corroboration of apical mischief in the lungs to clinch the diagnosis.

In syphilitic perichondritis, the congested appearance of the larynx is in marked contrast with the pallor of tubercular disease. Syphilitic perichondritis is characterised by the absence of pain, and the fact that in many cases the mischief has extended from, or is complicated with, ulceration of the pharynx; and there is possibly the history of past syphilitic manifestations. It is important to remember that a tubercular affection may become engrafted on a syphilitic basis.

But it is in the diagnosis of perichondritis arising from cancer that the greatest difficulties arise and the most painful mistakes are made. A thickened and infiltrated condition of the thyroid and cricoid cartilages and of the surrounding tissues, and the occurrence of hæmorrhage from the larynx, are very suggestive of malignant disease. Abscess, in the case of cancer of the larynx, is rare, and the enlarged cervical glands met with in this disease very rarely suppurate.*

In making a diagnosis, the importance of the effect of treatment should be borne in mind. Hence, in all doubtful cases, an anti-syphilitic treatment should be instituted and thoroughly carried out. Temporary improvement does not warrant the diagnosis of syphilis, as many cases of malignant disease are benefited by the administration of iodide of potassium.

Prognosis.—From what has been already stated it will be inferred that the prospects of a patient affected with perichondritis are very gloomy. In the rare instances in which the disease is primary and of limited extent, recovery

* Lennox Browne, *British Medical Journal* 1889, vol. ii., p. 593.

may occur, but in these cases possibly not until after tracheotomy has been performed, and it may be necessary for the patient to wear the canula for the remainder of his life. Even if tracheotomy can be avoided, much damage is generally done to the delicate mechanism of the larynx, particularly to the crico-arytenoid joint, leading to ankylosis and consequent fixation of the cord. In secondary perichondritis, the traumatic and syphilitic varieties are the most hopeful, but, as already mentioned, the healing of syphilitic ulceration is generally accompanied by stenosis, due to the formation of fibroid tissue, and, as we shall see, treatment by dilatation leaves much to be desired.

In 52 cases of laryngeal stenosis after enteric fever in which tracheotomy was not performed, only 4 escaped death, and out of 147 tracheotomised, 77 died. These were not all cases of perichondritis, but they will serve to illustrate the grave nature of the laryngeal complications of enteric fever.

Treatment.—At the commencement, and especially in cases of primary perichondritis, an attempt should be made to check the inflammatory process by keeping the patient in the recumbent position and forbidding him to talk, so as to ensure functional rest as far as possible. Cold should be applied externally by means of the ice-bag or Leiter's coil, and the patient should be instructed to swallow pellets of ice. Leeches applied to the throat are sometimes useful. If there be pain or tenderness, the administration of opium, in combination with small doses of tincture of aconite or antimonial wine, is indicated. Iodide of potassium, in gradually increasing doses, should be given in all cases. Even when no syphilitic taint be present, this drug often benefits the patient considerably. In cases of syphilitic origin, the inunction of blue ointment may be employed in addition to the iodide. If symptoms of laryngeal stenosis come on, a 20 per cent. solution of cocaine should

be painted over the mucous membrane of the larynx; this may succeed in causing contraction of the swollen parts, and if this does not in itself relieve the dyspnœa, the cocaine will facilitate the use of the scarifier in cases of œdema, or of the laryngeal lancet if there be evidence of the presence of pus; suppuration may be favoured by poultices and by warm and sedative inhalations. The possibility of suffocation suddenly occurring from the separation of a piece of necrosed cartilage, and its impaction in the glottis, should be borne in mind, and if loose cartilage be felt it should be removed, if possible, by means of forceps. Should a severe attack of dyspnœa have occurred, tracheotomy must be performed before time has elapsed to cause the morbid changes in the lungs due to obstruction in the upper air passages.

Unfortunately, when once tracheotomy has been performed, we are confronted with the difficulty of removing the canula in those cases in which death has not occurred from exhaustion. Schroetter* claims brilliant results for his plan of dilatation, but in this country, so far as I know, no cases of permanent success of dilatation of a stenosed larynx, as the result of perichondritis, have been recorded.

Eight-and-twenty years ago, the late Duncan Gibb† recommended that when the larger cartilages are affected, and the seat of the necrosis can be made out, after immediate danger has been prevented by tracheotomy, "the thyroid cartilage must be laid open through one of its wings, so that the pent-up dead portion may be removed"; and he claims for himself the credit of being the first person to recommend the removal of necrosed laryngeal cartilage. Sajous‡ is of opinion that "intra-

* See section on "Stenosis of the Larynx."

† *Diseases of the Throat*, 3rd edition, p. 50.

‡ *Sajous' Annual* 1888, vol. iii., p. 304.

laryngeal abscess from diseased cartilage is best treated by splitting the larynx in the middle, removing the dead structures, and thoroughly scraping the parts down to healthy tissue. This being accomplished, measures should immediately be taken to provide for drainage in case of continuation of the suppurative process, and to adopt such aseptic management of the parts as the conditions found may indicate. Thorough response to the indications may require precautionary tracheotomy for respiratory purposes until subsidence of the diseased process has taken place, or for the purpose of securing functional rest to the larynx when such subsidence is not going to take place."

Mr. W. G. Spencer has operated on a patient of the author's in this manner, and though the result is not completely satisfactory, as the patient still wears a tracheotomy tube, it is undoubtedly the right course to pursue, rather than to allow the patient to die from exhaustion, consequent on the suppuration brought about by the necrosed cartilages acting as foreign bodies, or from septic poisoning, the result of the absorption of pus, which, according to the ordinary canons of surgery, should have been evacuated by the most direct access possible.

In cases in which radical treatment is not deemed advisable, it may be necessary, after tracheotomy has been performed, to feed the patient by a soft rubber tube or by the rectum.*

12. ABSCESS OF THE LARYNX.

As a rule, abscess of the larynx is met with as a result of erysipelatous inflammation of the larynx (*see* p. 293), or

* This section is based upon a paper read by the Author as an introduction to the discussion on perichondritis of the larynx at the Leeds Meeting of the British Medical Association. See *British Medical Journal* 1889, vol. ii., p. 588.

in connection with perichondritis (*see* p. 352). Very occasionally, however, it may be of idiopathic origin; that is to say, no distinct cause is recognisable. Traumatism is the probable explanation of these cases (*see* p. 292).

Should inflammation of the larynx go on to suppuration, the abscess may point, and the yellow colour of the pus may be detected laryngoscopically.*

Treatment.—As soon as the presence of suppuration is diagnosed, the abscess, if small, may be opened with the laryngeal lancet (Fig. 44, p. 350), the parts having previously been anæsthetised with cocaine. If the abscess be very large, it may be necessary to do tracheotomy, and plug the trachea before the abscess is opened.

13. AFFECTIONS OF THE CRICO-ARYTENOID ARTICULATION.

Under this heading will be discussed inflammation of the joints; the result of this process, viz., ankylosis of the crico-arytenoid articulation; and luxation of the cartilage.

Crico-Arytenoid Arthritis.

Inflammation of the crico-arytenoid joints has been found to be of much more frequent occurrence than was at one time suspected.

Ætiology.—In the acute form, crico-arytenoid arthritis is due to many causes, thermic, chemical, and mechanical, acting upon the larynx. Among the mechanical causes may be mentioned external blows, penetrating wounds, swallowing hard and sharp substances, and the unskilful use of the laryngeal forceps. Acute inflammation of the joint has been described as occurring as the result of rheumatic

* Morell Mackenzie, *Diseases of the Throat and Nose*, vol. i., p. 283.

and gouty attacks, tonsillitis, typhoid fever, measles, diphtheria, scarlatina, bronchitis, and other acute disorders.

The most common cause, however, is cold, especially if combined with over-use of the voice in the open air. The author had, about two years ago, under his care a striking example of the effect of these combined causes in producing the arthritis. A music-hall singer, while staying at the seaside, went out rowing late at night, and commenced singing. Next morning he had pain in the right side of the throat, with loss of voice. When first seen, two or three weeks later, the right vocal cord was in the cadaveric position, and there was swelling at the base of the arytenoid cartilage.

The following is a very similar case. A medical man of about forty, while recently convalescent from influenza, went out for a ride on a windy day, and had to raise his voice to make himself heard. On his return home, he was hoarse, and had all the symptoms of an acute laryngitis. When seen by the author, some months after the onset, the right arytenoid cartilage was somewhat swollen, and the vocal cord was fixed in the cadaveric position. The patient was afterwards examined by Dr. Semon, who confirmed the diagnosis.

In the chronic forms, the disease generally results from syphilis, cancer, tuberculosis, or lupus of the larynx.

Morbid Anatomy and Pathology.—So little attention has been paid to the condition of this small joint, that nothing very definite is known as to the changes which take place in inflammation; but it is unlikely that they differ from the changes met with in other inflamed joints.

Symptoms.—Pain in the throat, and tenderness over the affected side, dysphagia with or without odynphagia, dyspnœa and hoarseness, are the symptoms met with in varying degree. If both arytenoid joints are affected, the

symptoms will, of course, be more marked, but in all the cases the author has seen the affection has been unilateral. On laryngoscopic examination, there is usually some amount of thickening, or swelling, to be detected around the joint; if the case be seen at the commencement, the mucous membrane over the joint will be found red and swollen. The appearances will vary according as the arytenoid is fixed in adduction or abduction.

Diagnosis.—If the case be acute, and the patient be seen early, there is not usually much difficulty in making a diagnosis. The sudden onset of the symptoms following upon a cause known to be capable of producing the arthritis, the swelling round the joint, and the fixed position of the cord, are very characteristic. The difficulty in diagnosis comes at a later stage, when the acute symptoms have passed by and we have to deal with a condition of ankylosis; but this question will be discussed in the next section.

Prognosis. — Early and prompt treatment will often prevent permanent damage to the voice, but, when once the stage of ankylosis has been reached, the only hope of improvement in the voice consists in the possibility of over-action in the sound vocal cord, whereby it transgresses the median line, and so comes more into apposition with the fixed cord. Cartaz* points out that a crico-arytenoid arthritis and a consecutive ankylosis may be the first manifestations of laryngeal tuberculosis.

Treatment.—The treatment at first is the same as for primary perichondritis (*q. v.*). Later on, external inunction of the red iodide of mercury ointment over the affected part, the use of electricity—both the galvanic and the faradic current—the application of astringents, and the administration of iodide of potassium, should be tried.

* *Journal of Laryngology*, vol. i., p. 70.

Ankylosis of the Crico-Arytenoid Joints.

Every form of stiffness of the crico-arytenoid articulation, which is produced by mechanical causes, is called an ankylosis of this joint. There are two forms, viz., *true* ankylosis, in which the stiffness is produced by intra-capsular disease, and *false* ankylosis, in which extra-capsular changes lead mechanically to impairment of the functions of the joint. In some cases, true ankylosis is a consequence of a long-existing false ankylosis.

By luxation of the crico-arytenoid articulation is meant a displacement of the arytenoid cartilage from the articular surface of the cricoid; in some cases, both ankylosis and luxation are present simultaneously.

Ætiology.—Inasmuch as true ankylosis is brought about by changes taking place in the joint itself, the cause of this condition is manifestly due to an inflammation of the joint, however slow and insidious this may be; hence, the causes of *true* ankylosis are those which produce arthritis.* Semon† points out that "besides the, no doubt, *more frequent* suppurative form, another and more chronic form, *the adhesive*," may exist, "in which, without any free exudation between the inner layer of the perichondrium and the cartilage, the affected part becomes considerably thickened in consequence of inflammatory new formation of dense connective tissue." *False* ankylosis is due to cicatricial contraction of the mucous membrane, or of the muscles after injuries, typhoid, syphilitic, and other kinds of ulceration. It is possible, also, that ankylosis may occur as the result of the forced inactivity of the arytenoid cartilage—as, for example, in cases of pressure on the recurrent laryngeal nerve, complete stenosis of the lower part of the larynx, etc.

* See p. 360.

† *Medical Times and Gazette*, vol. ii., 1880.

Morbid Anatomy and Pathology.—In some cases there is simply roughness of the joint; in others, the articular surfaces are firmly adherent. If suppuration has occurred, there will, of course, be more or less destruction in the joint from caries or necrosis. In syphilitic affections, the most noticeable feature is the amount of fibrous tissue developed in and about the joint. In gouty cases, deposits of urate of sodium occur. In false ankylosis, the changes consist chiefly in the formation of cicatricial tissue in the muscles and mucous membrane.

Symptoms.—The symptoms of ankylosis of the crico-arytenoid joint will depend upon whether the affection is unilateral or bilateral, upon the position in which the cord or cords are fixed, and upon the amount of swelling of the cartilage. Hence, there may be all degrees of dyspnœa, from some shortness of breath on exertion, up to a condition demanding the prompt performance of tracheotomy. The voice also varies very much; there is usually hoarseness, but it is not a necessary accompaniment. In some cases there is compensatory action of the unaffected cord, which permits of approximation of the cords, and of a fair voice. If the cords are fixed in the phonatory position, the dyspnœa will be very great, but the voice may be natural, or have a falsetto character should there be luxation of the arytenoid cartilages and increased tension of the cords.

On laryngoscopic examination, the joint may be found fixed in any position; in syphilitic cases, attended with cicatricial contraction, it may even be drawn over the median line; usually, however, it is fixed between the cadaveric and phonatory positions. In the majority of cases, there is swelling of the arytenoid cartilage and some tumefaction over the joint. In false ankylosis, there may be no swelling at all. In cases in which ankylosis is combined with luxation, the relative position of the surfaces of the

arytenoid cartilage may be altered, so that parts of it come into view which are not seen under normal conditions, and, on the other hand, parts usually to be seen are now concealed from view, and some of the mucous folds attached to the cartilages are lax and the others are tense.

Diagnosis.—If one, or both, vocal cords be found immobile, the presumption is in favour of this being the result of paralysis. In cases in which there is no apparent cause for paralysis, and in which there is a history of symptoms pointing to some inflammatory affection of the throat, the possibility of ankylosis should be entertained. For confirmatory evidence, the presence of tumefaction about the joint, absolute immobility of the cartilage, and the signs of previous ulceration should be looked for. Percy Kidd* has directed attention to a "peculiar obstructive form of laryngeal tuberculosis which simulates bilateral abductor paralysis." In the cases he observed, though the cords lay close together, as in bilateral paralysis, their movements to and from the median line were almost equally impaired. But in all his cases, as also in one under the author's care, laryngoscopic examination revealed the presence of some alteration in the neighbourhood of the arytenoid cartilages.

Prognosis.—In cases where the cords are fixed near the middle line, or where there is great swelling of one arytenoid and corresponding ary-epiglottic fold, as in an out-patient at the Westminster Hospital,† death may threaten unless tracheotomy be performed in time. As regards the question of voice, this will depend upon the duration of the symptoms. The prognosis is better in false than in true ankylosis, and in the traumatic form rather than the perichondritic. One factor in causing improvement in the voice is the compensatory action of the unaffected cord.

* *British Medical Journal*, March 29th, 1890.

† *Westminster Hospital Reports*, vol. i., p. 130.

Treatment.—In recent cases, especially of a simple inflammatory or syphilitic nature, iodide of potassium in gradually increasing doses should be tried, and iodine ointment or the red iodide of mercury ointment rubbed in externally over the affected part. In the early stages, the treatment of ankylosis is that of the arthritis on which it usually depends, and in the later stages stenosis is the prominent symptom which requires to be treated. The treatment of stenosis, from whatever cause arising, will be found at page 415.*

14. NON-MALIGNANT NEW GROWTHS OF THE LARYNX.

Growths of an innocent character, projecting from the mucous membrane of the larynx.

Ætiology.—All the growths met with in other organs of the body may have their counterpart in the larynx. According to Morell Mackenzie,† papillomata are by far the most frequent, sixty-seven out of a hundred being of this nature; fibromata come next in frequency, with eleven cases. The remaining growths, such as cysts, myxomata, adenomata, lipomata, angiomata, cartilaginous and mixed tumours, are comparatively rare. Schwartz‡ puts the proportion of cysts to other laryngeal tumours at three per cent. According to Garel, however, they are much more common, as, out of a total of 60 cases, he had 16 cases of cysts, *i.e.*, upwards of twenty-six per cent. Wolfenden§ has given

* This section is for the most part an abstract of Semon's admirable and exhaustive article on "Mechanical impairments of the functions of the crico-arytenoid articulation," which appeared in the *Medical Times and Gazette*, vol. ii., 1880.

† *Diseases of the Throat and Nose*, vol. i., p. 310.

‡ *Journal of Laryngology*, vol. i., p. 254.

§ *Ibid.*, vol. ii., p. 291.

references to 12 cases of angiomata. Clifford Beale* has recorded a remarkable case of Hodgkin's disease, in which there was a lymphomatous growth affecting the interior of the larynx.

Any cause of irritation seems sufficient to serve as the starting-point of benign growths in the larynx; hence, chronic laryngitis is the most frequent precursor.

Males are more commonly affected with laryngeal growths than females. Papillomata not infrequently occur in childhood; fibromata, on the other hand, are almost exclusively met with in adults. Congenital growths are occasionally seen.

Tumours developing late in life, *i.e.*, after the fiftieth year, should suggest the probability that they are of a malignant nature.

Morbid Anatomy and Pathology.—Papillomata are composed of a basis of connective tissue supporting blood-vessels, and covered with epithelium. They may be sessile or pedunculated, and either single or multiple. They often present a cauliflower-like appearance, and most commonly grow from the vocal cords. Papillomata are generally of a pinkish colour, but they may be greyish or white. Virchow has applied the term "pachydermia verrucosa" to this form of growth (see p. 341).

Fibromata consist of firm, dense, fibrous tissue, but sparingly supplied with blood-vessels. The surface is usually smooth, and the colour varies from white to pink. When growing on a vocal cord, a fibroma can often only be recognised by its shape, as in colour it is indistinguishable from the cord. Fibromata may be sessile or pedunculated, and are usually oval or round.

Cysts generally spring from the epiglottis, or from the laryngeal ventricles, and vary in size from a pin's-head to a bantam's egg. They may be classed among retention-cysts.

* *Lancet* 1887, vol. ii., p. 749.

Of the remaining tumours met with in the larynx, it is sufficient to say that they differ pathologically in no respect from similar growths found in other organs.

Intra-laryngeal growths occur in connection with syphilis and tuberculosis of the larynx; they will be discussed under these headings. It has been suggested that syphilis has some influence in promoting the formation of neoplasms of a non-specific nature, but this is extremely doubtful.

Symptoms.—The symptom which is most commonly complained of is some alteration in the voice. This may vary from slight hoarseness up to complete aphonia. The degree of loss of voice does not depend upon the size of the growth: a small sessile tumour will often cause much greater hoarseness than a larger tumour, which, by being pedunculated, does not interfere with the vibration of the cord to the same extent. Should the pedicle be long, and the polypus freely movable in the respiratory current, the condition of the voice will vary greatly, according to the condition of the polypus; at one moment the patient may be able to speak in a natural voice; at the next, he may be almost aphonic, on account of the growth being caught between the cords. Cough is not a constant symptom. The majority of patients with laryngeal growths are free from it, but in a certain number it is very troublesome, and hacking or irritating in character. Angiomata occasionally give rise to hæmorrhage, which may be mistaken for hæmoptysis. Dyspnœa depends almost entirely on the size of the growth, and to a less extent on its position. For example, tumours springing from the margin of the glottis are much more likely to cause dyspnœa, than those originating from the epiglottis and consequently obstructing the air-passage less. Dysphagia is only met with in cases where, on account of the size of the growth, there is some mechanical interference with the act of swallowing, or when

it is seated on the epiglottis. Pain is almost invariably absent.

Diagnosis.—This is usually to be effected by means of the laryngoscope, and may be confirmed by the microscopic examination of portions of the growth expectorated by the patient or removed by the surgeon.

The diagnosis of laryngeal cysts is usually comparatively easy; the opaline tint and the smooth, tense, rounded nature of the tumour at once suggest its character. On the other hand, blood cysts are very difficult of recognition. Certain cysts, especially when small, are liable to be mistaken for œdema and tubercular infiltration of the arytenoids.

The diagnosis between malignant and non-malignant growths is discussed under the former heading. The condylomata of secondary syphilis are to be distinguished by the rapidity with which they disappear under treatment. Gummata and the excrescences met with in tertiary syphilis might possibly mislead; but attention to the general condition of the larynx, and the help furnished by constitutional symptoms, should prevent error. The same holds good in the case of tubercular infiltration and tumours. But the possibility of the co-existence of tertiary syphilis or phthisis, and an independent papilloma, or other growths in the larynx, should be remembered. In a case of phthisis with hoarseness observed by the writer, the appearances were at first those of chronic laryngitis with thickening of the left vocal cord, and were compatible with the diagnosis of laryngeal tuberculosis, secondary to pulmonary phthisis. After an interval of three years, a growth of the size of a small cherry was found attached to one of the vocal cords, occupying about two-thirds of its length. The results of treatment proved that the laryngeal condition was quite unconnected with that of the lungs.

Gougenheim and Tissier have described a special form

of laryngeal tuberculosis which they call "pseudo-polypoid phthisis," which is characterized by the occurrence of growths situated in the inter-arytenoid commissure and on the vocal cords.

Prognosis.—This has to be considered with regard to (1) the danger to life and (2) the state of the voice. The danger to life is comparatively small, as, even in those rare cases in which the growth cannot be removed *per vias naturales*, there is always the possibility of recourse to tracheotomy; and if this operation be not unduly postponed, the risk to life is small. Death has, however, followed the removal of a laryngeal polypus, as in a case of Gruenwald's. The patient was a badly nourished man of seventy-three years, with atheromatous vessels, and, in spite of tracheotomy and plugging the larynx, he died from loss of blood.*

As regards the voice, greater caution is needed in expressing an opinion. Some growths may after a time remain stationary, and cease to give trouble. A distinguished singer, who had a sessile growth (probably a fibroma) seated on the left cord, is known to have pursued his profession without any apparent damage to the voice. A single growth, especially if pedunculated, can generally be so completely removed that the restoration of voice may be confidently predicted; on the other hand, in the case of multiple and recurrent papillomata the prognosis is much less favourable. Thanks to the introduction of cocaine, operative procedures for the removal of laryngeal growths have been greatly facilitated.

Stoerk† has seen individuals who have suffered from papillomata with recurrences for twenty-five years. There are now numerous instances on record in which growths,

* *Centralblatt*, vol. vii., p. 527.

† *Sajous' Annual* 1888, vol. iii., p, 314.

usually soft papillomata, have been expelled during a violent fit of coughing. The spontaneous disappearance of laryngeal growths has been noticed after the performance of tracheotomy.* Papillomata are not infrequently present in youth, and they occasionally disappear without any operative treatment.

Treatment.—Before deciding on the removal of an innocent growth in the larynx, the possibility of damaging the adjacent soft parts in attempts at removing the growth must, of course, be borne in mind. The amount of success in removal of these growths naturally depends on the practice and skill of the operator, and the operation should certainly be left in the hands of those who are in the constant habit of treating laryngeal cases. Some tumours, notably fibromata, which are sessile or imbedded in the vocal cord, require much greater skill in removal than pedunculated growths; again, the situation of the growth is an important factor in treatment.

It must also be remembered that some growths, and especially fibromata, as already mentioned, after a time remain stationary, and may even shrink. Mackenzie recommends that in these cases the larynx be examined once or twice a year, to see that the neoplasm does not increase in size.

Recent experience has fully confirmed the following statement enunciated at the International Medical Congress of 1881: "Every benign laryngeal tumour ought, if possible, to be removed *per vias naturales*, and only if an experienced laryngologist has established the inexpediency of this method may the extra-laryngeal operation be adopted."†

* H. Mackenzie, *Journal of Laryngology*, vol. iv., p. 168. *Centralblatt*, vol. vii., p. 155; vol. viii., pp. 298, 406.

† Burow, Abstracts, *Internat. Med. Congress* 1881, p. 175.

The two most common methods of removal are the forceps and the snare. In this country, Morell Mackenzie's

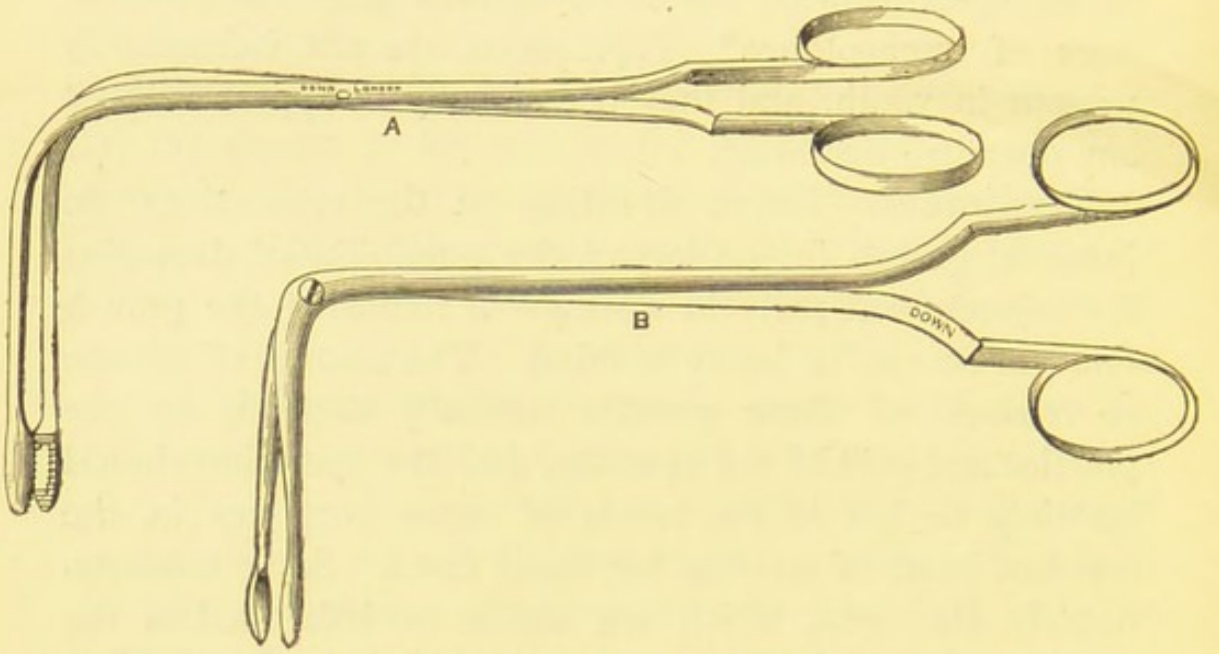


Fig. 45.—Mackenzie's Laryngeal Forceps.

cutting forceps (Fig. 45) have been largely employed, and if used judiciously, and in suitable cases, they answer admirably. In France, Fauvel's forceps, which are very

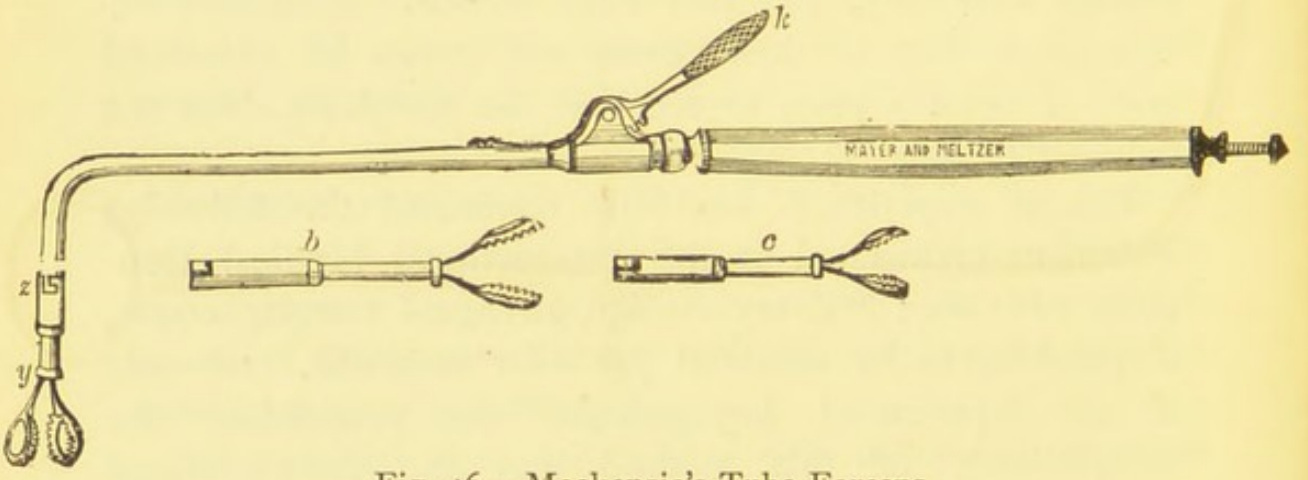


Fig. 46.—Mackenzie's Tube Forceps.

similar to Mackenzie's, are very generally used. Then there are various kinds of tube forceps, such as Mackenzie's (Fig. 46) and Schroetter's (Fig. 47). Some

operators prefer the snare; this was the method of treatment employed by Gibb and George Johnson. At the

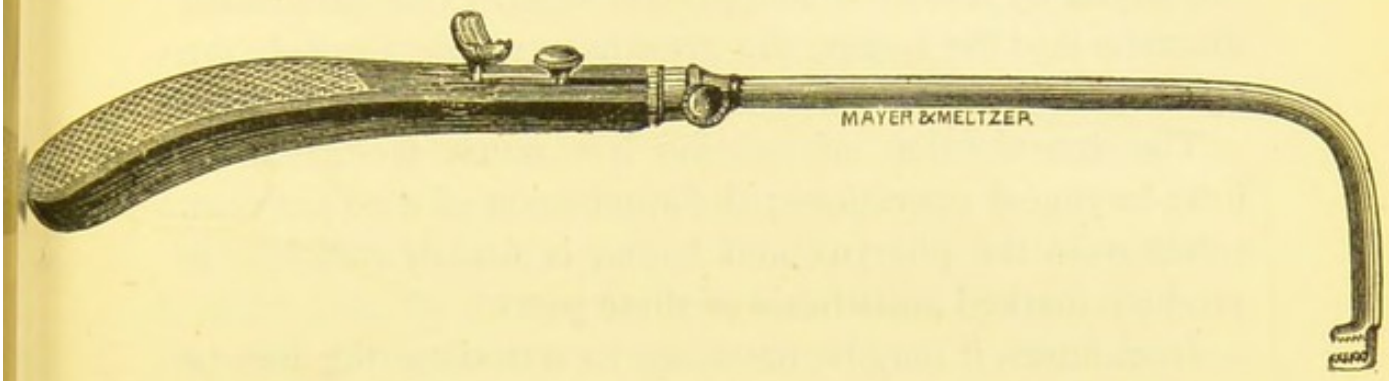


Fig. 47.—Schroetter's Laryngeal Forceps.

present time it is recommended by Lennox Browne and others (Fig. 48). One objection to the use of the snare is that supposing the growth is tougher than was expected, there may be equal difficulty in disengaging the wire as in

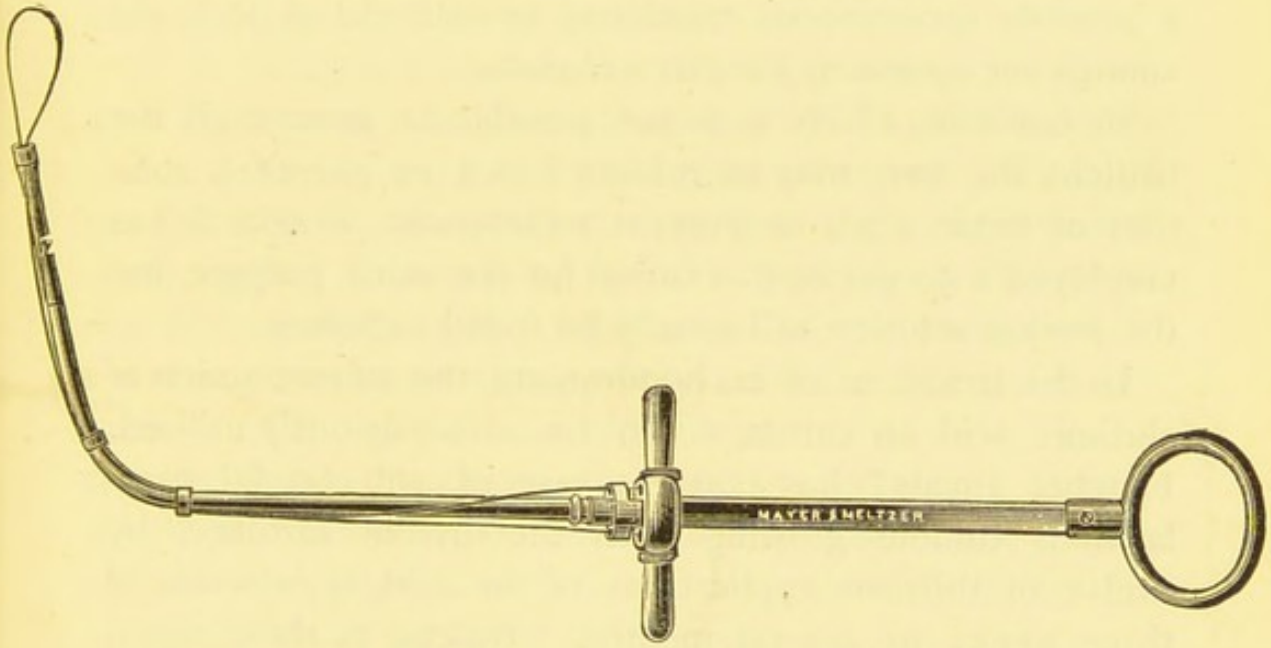


Fig. 48.—Lennox Browne's Laryngeal Snare.

removing the growth. This difficulty may be obviated by having the snare attached to a galvano-caustic apparatus, so that in case of need the wire may be made red-hot, in

order to burn through the growth. Lichtwitz,* of Bordeaux, employs a method of removing papillomatous growths from the larynx by means of fenestrated tubes. On introducing the tube into the larynx, the growths protrude through the opening, and can then be removed.

The introduction of cocaine has much facilitated all intra-laryngeal operations; the application of a 20 per cent. solution to the pharynx and larynx is usually sufficient to produce marked anæsthesia of these parts.

In children it may be necessary to introduce the forceps into the larynx, whilst the patient is under the influence of chloroform. Mark Hovell † has recorded a case in which he operated successfully in this manner on a boy aged three and a half years. In the case of infants with congenital laryngeal tumours, tracheotomy should be performed if there be urgent dyspnœa, and one should then wait for a possible spontaneous expulsion, or until the child is old enough for operating *per vias naturales*.

In cases in which it is not possible to remove all the pedicle, the base may be rubbed with a 20 per cent. solution of lactic acid, to prevent recurrence. Rossbach has employed a 50 per cent. solution for the same purpose, but the weaker solution will usually be found sufficient.

In the treatment of enchondromata, the solvent action of chromic acid on cartilage can be advantageously utilised. Fletcher Ingals ‡ has cured a case of sub-chordal cartilaginous tumour growing from the thyroid cartilage, by twelve or thirteen applications of the acid, at intervals of three weeks to several months. Except in these cases, caustic applications to benign growths in the larynx are to be condemned; they can do no good, and may,

* *Sonderabdruck aus der Deutschen Medicinischen Wochenschrift* 1892.

† *Journal of Laryngology*, vol. iv. p. 285.

‡ *Ibid.*, p. 538.

by exciting spasm or inflammation, render tracheotomy necessary.

Voltolini was an advocate for the removal of laryngeal growths by attaching a piece of dry sponge to a laryngeal probe, and so rubbing them off. This method will be found to succeed in some cases of papillomata and softer growths, notably in certain forms of tuberculous tumours.

If the growth be non-pedunculated, it may be impossible to snare it or to remove it by the cutting forceps; in this case, the galvano-cautery may be employed, or the curette. Massei * is a great advocate for the use of the latter, using Heryng's curettes (the same as employed in the treatment of laryngeal tuberculosis). He says that this method of treatment is very serviceable for growths situated in the sub-glottic region, and especially for diffuse papillomata on the free edges of the vocal cords. After the curette has been used, lactic acid can be rubbed in.

J. F. Baldwin † records a remarkable case of a boy, aged eight years, who had a large papilloma attached with rather a broad base to the margin and upper surface of the left vocal cord, filling the anterior angle between the vocal cords. In order to facilitate breathing, intubation was had recourse to, the largest-sized tubes being used to exercise pressure on the growth. As the boy could not swallow with the tube *in situ*, it was taken out in the morning, and introduced again in the evening. After a month of this method of treatment, the tumour had almost entirely disappeared, and the patient was eventually discharged without a trace of the growth.

The fear, which has been expressed by some writers, that repeated attempts at the removal of benign new growths

* *Journal of Laryngology*, vol. iii., p. 58.

† *New York Medical Record*, March 8th, 1890. Cited by *Centralblatt*, vol. vii., p. 265.

by the endo-laryngeal method may result in the conversion of benign into malignant growths, in consequence of the irritation to which they may have been exposed, has been shown to be utterly groundless. The collective investigation started by Semon, as editor of the *Centralblatt für Laryngologie*,* has resulted in the collection of 10,747 cases of benign new formations in the larynx, and of these, 8,216 were operated on by the endo-laryngeal method. A transformation of growths, apparently benign, into malignant is reported in 33 out of the 8,216 cases; therefore, in less than a ½ per cent. of all the operation cases. But when these 33 cases come to be carefully analysed, in only 5 was the evidence absolutely in favour of this transformation; of the remainder, in some it was probable, in others very dubious. Moreover, it must be borne in mind that this transformation of benign into malignant growths is reported in cases which were never subjected to operative interference.

The extra-laryngeal method should only be employed in cases in which the tumour is unusually large, or seated on a broad base. It may also be impossible to remove a growth *per vias naturales* if it be infra-glottic or if it arise from the interior of the ventricle. Some papillomata grow so rapidly that it may be necessary to remove them through an external incision.

15. MALIGNANT NEW GROWTHS OF THE LARYNX.

New formations of a malignant nature (carcinomata and sarcomata) growing from the mucous membrane of the larynx. For clinical convenience, cases of malignant disease of the larynx may be divided into two groups, viz., intrinsic and extrinsic. Intrinsic malignant disease of the larynx

* Vol. vi., pp. 273, 280.

includes tumours growing from the ventricular bands, the ventricles, the vocal cords, and the parts immediately below the cords. The term extrinsic is applied to growths taking their origin from the epiglottis, the ary-epiglottic folds, the inter-arytenoid fold, and the pyriform sinus.

Ætiology.—Cancerous tumours of the larynx are very rare under thirty years of age, but their rate of incidence gradually increases after that period, and reaches its maximum between the ages of fifty and seventy. Out of 53 cases reported by Mackenzie, 3 died under thirty, 6 between thirty and forty, 10 between forty and fifty, and the remaining 34 (*i.e.*, sixty-four per cent.) died above fifty. The proportion becomes still more remarkable when the difference in the number of persons living at the ages mentioned is borne in mind. As regards the sarcomata, they are much more equally distributed, nearly as many being met with under as above fifty.

Males are much more liable than females to both cancer and sarcoma, the proportion being about four to one. Of other ætiological factors little can be stated definitely. The predominance of males would suggest over-use of voice, exposure to changes of temperature, tobacco-smoking and other irritants, as possible factors in the production of malignant disease of the throat.

Morbid Anatomy and Pathology.—Under the head of malignant disease of the larynx are included carcinomatous and sarcomatous tumours, the former occurring much more frequently than the latter, in the proportion of sixty-two to one.*

The anatomical peculiarities of these growths in the larynx differ in no respect from similar growths elsewhere, and it need only be said that epithelioma (squamous-celled carcinoma) is by far the most common form of malignant

* Bosworth, *Diseases of the Nose and Throat*, vol. ii., p. 743.

disease affecting the larynx. Out of 50 cases of cancer of the larynx collected by Butlin,* 38 were epitheliomata.

As regards the situation of the neoplasm in the larynx, it may be mentioned that only in 5 cases out of the 50 just mentioned, was the growth infra-glottic.

The larynx is very rarely affected secondarily, and, in cases of primary disease, secondary growths in other organs are uncommon. Of Butlin's 50 cases, in only 3 were there deposits in kidney, liver, and lungs, respectively, besides the glandular affection in each instance.

Symptoms.—Hoarseness is one of the earliest symptoms of intrinsic cancer of the larynx, and though it generally increases with the progress of the disease, the voice is hardly ever entirely lost. Pain in many cases comes on very early ; but it may be quite absent, of so trivial a nature, or so temporary, as not to form an important feature of the disease. Extension of pain to the ear is in no way pathognomonic of cancer, as it is also present in other chronic laryngeal diseases. Cough is not a constant symptom ; there is usually, however, an increased secretion of mucus, and later on in the disease the expectoration, as well as the breath, of the patient may be offensive. Fauvel regards salivation as a constant symptom. Hæmorrhage, especially if abundant, points to malignant disease. The degree of dyspnœa will depend on the amount of obstruction to the lumen of the larynx, whereas dysphagia is affected by the situation of the growth, being present when the posterior wall is attacked, or the epiglottis is implicated. Cachexia, such as is met with in malignant diseases of other organs, is not an early or marked feature of the laryngeal affection.

Objectively, though there is nothing absolutely distinctive in the appearance of laryngeal cancer, still the

* *Malignant Disease of the Larynx*, p. 33.

experienced laryngologist will generally be able to form a correct opinion from the laryngoscopic examination. Cancer of the larynx is eminently a polymorphic disease; and thus it may simulate a papilloma or a fibroma. In a case of Semon's,* which the author had the opportunity of seeing during life, the growth resembled an angioma; in rare cases, the tumour is even distinctly pedunculated. Sometimes, instead of there being a distinct growth, the cancer is more diffuse, causing simply a thickening of one cord. A fringe-like growth, attached to nearly the whole length of a cord, and even extending to the ventricular band, the arytenoid cartilage, and the ary-epiglottic fold, the other half of the larynx being healthy, is, according to Semon, very suggestive of cancer; this is especially the case when it occurs in a patient above fifty. The same observer has rightly emphasized the importance of impaired mobility of the affected cord, as a diagnostic sign of cancer. Malignant growths most frequently spring from the ventricular bands, and the posterior part of the larynx is attacked by preference. Tumours growing from the vocal processes, and the inner surface of the arytenoid cartilages, may be mistaken for pachydermia, and *vice versa*.

In the later stages of the disease, the soft parts of the larynx may become infiltrated, and finally perichondritis may result, and the malignant growth may even eat its way through the skin, and appear externally. Enlargement of lymphatic glands is very rare with intrinsic, but common with extrinsic, cancer of the larynx. Glandular enlargement may exist, but may not be detected during life. Further clinical experience has confirmed Butlin's † contention that it is quite exceptional for the glands to become affected

* *Lancet* 1893, vol. ii., p. 1568.

† *Malignant Disease of the Larynx*, p. 11.

in cases of sarcoma of the larynx. Lennox Browne,* however, maintains that the glands are involved, and states that in three out of four cases in his own practice the glands were affected. Enlarged lymphatic glands may press on the recurrent laryngeal nerve, causing partial or complete loss of movement in the vocal cord, and thereby giving rise to hoarseness.

Diagnosis.—Age is an important factor in arriving at a conclusion; thus, in a patient above thirty-five, in whom a laryngeal growth is detected, the *possibility* of this being of a malignant nature should be contemplated, and in one over fifty the *probability*. The position of the growth at the posterior part of the larynx, and the immobility of the affected cord, have been already mentioned as diagnostic points in favour of cancer. Gottstein † points out that an irregularly formed warty growth situated on an infiltrated base, and an intimate connection of the neoplasm with the subjacent mucous membrane, are typical of carcinoma. Microscopic examination of portions of the growth, removed for the purpose, or expelled by cough, is only of decisive value when the growth is found to be malignant; a merely negative result is of little or no significance. It is not desirable to remove portions of the growth for this purpose, unless the patient has previously consented to a radical operation, in the event of the microscopic examination proving malignancy, inasmuch as partial removal tends to stimulate the growth of the remainder.‡

For the diagnosis of malignant disease of the larynx from syphilitic and tubercular affections of this organ, *see* pp. 405 and 393.

Among the difficult cases for diagnosis are those in

* *Diseases of the Throat and Nose*, 2nd edition, p. 440.

† Congress at Berlin. See *Journal of Laryngology*, vol. iv., p. 482.

‡ Newman, *Malignant Disease of the Throat and Nose*, p. 102.

which the symptoms are at first those of perichondritis and its consequences. In the absence of evidences of syphilis or tuberculosis, and bearing in mind the great rarity of primary laryngeal perichondritis, the mere existence of perichondritic inflammation should suggest the suspicion of malignant disease. In very exceptional cases, the discharge of an abscess into the larynx may be the first indication of malignant disease.

Clinically it is almost impossible to distinguish between a sarcoma and a carcinoma. The outline of the sarcomata is usually more regular than that of the carcinomata, they are softer in consistence, and, as already mentioned, the lymphatic glands are only exceptionally affected. Nevertheless, in most cases a microscopic examination of portions of the growth removed for the purpose, is usually necessary to clinch the diagnosis.

The great, nay insuperable, difficulties which sometimes attend the diagnosis of malignant disease of the larynx, are well illustrated by a case of Beschorner's.* When the patient, a lady of seventy, first came under observation, a diagnosis of papilloma was made and verified by microscopic examination of portions of the growth; the following year, the rapid growth and extension of the neoplasm, and a microscopic examination, led to the diagnosis of carcinoma. Tracheotomy was performed, and the patient remained free from further laryngeal troubles, eventually dying from cardiac failure, some six years after she first came under observation. At the *post-mortem*, the growth was found to be papillomatous and not cancerous.

Prognosis.—Intrinsic carcinoma of the larynx is not so quickly fatal as the extrinsic form; still, death may occur within the year, but, on the other hand, it does not usually occur under eighteen months, and it may even be delayed

* Reprint from *Monatsschrift für Ohrenheilkunde*, No. 5, 1889.

three, four, or more years. The fatal termination is generally brought about by cachexia, especially if the tendency to death by asphyxia has been averted by tracheotomy. In the absence of this operation, death may be due to suffocation, which may come on quite suddenly. Lung affections and pyæmia sometimes bring about a fatal termination. Death due directly to loss of blood is rare; in a case seen by the author, the patient was much weakened by large and repeated losses of blood, and his end was apparently greatly accelerated by the hæmorrhage. Sarcoma follows much the same course as carcinoma, and is only a little less rapidly fatal. Newman,* however, records a case of alveolar sarcoma which terminated in about three months from its probable commencement.

Treatment.—When once the diagnosis of malignant disease has been satisfactorily established, it is not advisable, under ordinary circumstances, to attempt to remove the growth *per vias naturales*. This rule still holds good for the great majority of cases, though intra-laryngeal removal has been carried out with success in a few instances. Schnitzler† has recorded a case in which the patient was alive and well twenty-one years after the intra-laryngeal removal of a tumour, diagnosed clinically and microscopically to be epithelioma. Fraenkel‡ has had an excellent result in one case, as four years after the operation there was no recurrence; he has adopted the same plan in five other cases, in one of which a year later there was no recurrence, and in another no recurrence after six months.

Should the more radical methods of treatment be pre-

* Quoted by Hunter Mackenzie, *Journal of Laryngology*, vol. ii., p. 287.

† *Sajous' Annual* 1889, vol. iv., G. 20.

‡ *Deutsch. Med. Wochenschrift*, 1889, Nos. 1-5. Quoted by *Journal of Laryngology*, April 1889.

ferred, three kinds of procedure are open to the surgeon: (1) Thyrotomy, with removal of the diseased parts; (2) Partial excision of the larynx; and (3) Complete excision of the larynx.

These operations offer the best prospect of success, if restricted to cases of intrinsic malignant disease of the larynx. Hahn* believes that the carcinomata with cornifying tendencies, *i.e.*, keratoid carcinomata, are more favourable for operation than the soft cancers. The earlier in the course of the disease that the operation is carried out, the better is the patient's chance. Cancers which have invaded the soft parts, or in which the glands are enlarged, are no longer amenable to any but palliative treatment. A radical operation is not to be recommended for patients over seventy, or for those who are feeble or who are suffering from any serious organic disease. Butlin,† in his admirable paper read at the International Medical Congress held at Berlin in 1890, gave the results of a series of cases he had collected up to that date as follows: Of the 28 thyrotomies, 3 patients died of the operation; in 13 cases the disease recurred; 8 patients recovered, and were well at various periods, but sufficient time had not elapsed to allow of their being regarded as cured (persons are only regarded as *cured* who were free from the disease at least three years after the last operation); and one patient died at the end of thirteen months, without recurrence of the disease. In 3 cases, the operation was quite successful, for one of the patients died four years afterwards of apoplexy, at the age of sixty-seven; the second was well at the end of eight, and the third at the end of twenty, years.

Of the 23 patients on whom partial excision was performed, 7 died of the operation; in 6 cases the disease recurred; 5

* *Sajous' Annual* 1888, vol. iii., p. 313.

† *British Medical Journal* 1890, vol. ii., p. 449.

patients recovered, and were well at the end of various periods within three years; and one died, at the end of two years and a half, without recurrence of the disease. In 4 cases, the operation was quite successful, for one was well at the end of three years and a half, 2 were well at the end of four years, and the fourth died of apoplexy, at the age of sixty, five years after the operation.

Of the 51 patients on whom complete excision was performed, 16 died of the operation; in 17 cases the disease recurred; 4 patients recovered and were well at the end of various (for the most part, short) periods; 6 died of other causes. In 8 cases, the operation may be said to have been quite successful, as all the patients were alive and free from recurrence at periods varying from three and a half to nine years after the operation.

Butlin points out that it might appear from his tables that the results of partial and complete excision are much better than those afforded by thyrotomy. It must be borne in mind, however, that the immediate mortality of the operation was more than twice as great after partial and complete excision than after thyrotomy. Again, 8 patients who recovered from thyrotomy were well up to the time of the last report, and there is every reason to believe that some of these will eventually be added to the list of successful cases. The number of recurrences after thyrotomy indicates that many of the cases were unsuitable for so modified an operation. Better results in the future will, doubtless, be attained by more care in selecting the operation most suitable to the individual case. These statistics, when compared with those published at an earlier period,* justify the hope that in cases of intrinsic malignant disease, a favourable issue may be expected if due care is taken in selecting suitable cases for operation, and if every detail of

* *Journal of Laryngology*, vol. i., p. 441; vol. ii., p. 8.

the operation be carefully and skilfully carried out. For the particulars of the operations, the reader is referred to the paper just quoted, to Butlin's *Operative Surgery of Malignant Disease*, and to Newman's *Malignant Disease of the Throat and Nose.*

The immediate risk to life after the operation for complete extirpation of the larynx, and the condition in which the patient is left, even if the operation be a success, will probably prevent it ever being regarded as one of the triumphs of surgery.

Should it be deemed inadvisable to submit the patient to any radical treatment, attempts may be made to relieve the pain and dysphagia by insufflations of morphine, $\frac{1}{6}$ to $\frac{1}{2}$ grain, or the application of a 10 or 20 per cent. solution of cocaine by means of the spray or brush. If the growth be ulcerating, and the secretion fœtid, insufflation of formula No. 47, or antiseptic inhalations, such as the vapor iodi, or creasoti B.P., or formula No. 68, will be found useful. In some cases it may be necessary to feed the patient per rectum. In the event of death threatening from stenosis of the larynx, tracheotomy should be performed, and it will, in a large number of instances, lengthen the duration of life. As the malignant disease may extend downwards, it is advisable to perform a low tracheotomy.

16. TUBERCULOSIS OF THE LARYNX.

Tubercular Laryngitis: Laryngeal Phthisis.

A chronic disease of the larynx, depending on the presence of tubercle, and almost invariably associated with pulmonary tuberculosis.

Ætiology.—Laryngeal tuberculosis is met with in about thirty per cent. of the cases of pulmonary tuberculosis. The question of a primary laryngeal tuberculosis has received

much attention. That its occurrence is possible must of course be admitted, because if other organs can be attacked, before the lungs are affected, as we have the strongest evidence for believing, why should not also the larynx be thus attacked? Certainly no one would maintain that the larynx has any special immunity against tuberculosis. On the other hand, it is almost impossible to obtain *post-mortem* evidence of this fact, as, by the time death takes place, the lungs are also involved; still, a few cases have been recorded, in which, at the autopsy, tubercular disease of the larynx has been found without any deposit in the lungs.* In the great majority of cases, however, laryngeal tuberculosis is secondary to the pulmonary affection. There is no evidence forthcoming to show whether the larynx is more likely to be affected in inherited or acquired phthisis. Any of the conditions which were mentioned as giving rise to laryngitis, are also operative in favouring the onset of laryngeal tuberculosis in persons of the tubercular diathesis. In patients suffering from pulmonary tuberculosis, who at the same time have an abrasion of the laryngeal mucous membrane, the larynx, in all probability, becomes infected by the bacillus-laden sputa.† Korkunoff,‡ however, has shown that in the immense majority of instances, the bacilli found in the larynx are carried from pneumonic foci by the blood and lymph-vessels into previously dilated sub-epithelial lymph-spaces of the mucous membrane of the larynx. It seems probable that syphilitic ulceration of the larynx may predispose to laryngeal tuberculosis, by affording a suitable nidus for the development of the tubercle bacillus.

* Sedziak has written an exhaustive monograph on the subject, and appended a list of the pertinent literature. *Journal of Laryngology*, vol. iii., pp. 217, 270, and 316.

† Bosworth, *Diseases of the Nose and Throat*, vol. ii., p. 608.

‡ *Sajous' Annual* 1891, vol. iv., F. 3.

Morbid Anatomy and Pathology.—Primary tuberculosis of the larynx is characterised by the occurrence on the mucous membrane, singly or in groups, of small roundish nodules, sometimes attaining the size of a pin's-head. In Schnitzler's * case, the pillars of the fauces were simultaneously affected, and he removed a small piece of the mucous membrane of the right pillar and subjected it to a microscopic examination, with the result that the presence of a miliary tubercle with giant cells was established.

In secondary tuberculosis of the larynx two stages are recognised: (1) that of infiltration; and (2) that of ulceration. In the first stage, the mucous membrane will be found swollen, from cellular infiltration of the mucosa and submucosa—the overlying epithelium appearing normal, unless ulceration has occurred. The tubercles are more numerous in the upper part of the mucosa, and become more sparse in the deeper layers. Together with the deposit of tubercle, there is usually more or less œdema of the surrounding parts. In the second stage the tubercles have softened and broken down, forming superficial ulcers, which, by extending into the deeper tissues, lead to perichondritis, with necrosis and subsequent exfoliation of the cartilages. Tubercle bacilli are found in the secretion bathing the surface of the ulcers, and in the giant-cell systems.

From Mackenzie's † statistics of the naked-eye appearances in one hundred *post-mortem* examinations, the parts were affected in the following order, beginning with those attacked most frequently: the ventricular bands, the interarytenoid folds, the arytenoid cartilage and ary-epiglottic folds, the vocal cords, and the epiglottis.

Symptoms.—The symptoms of tuberculosis of the larynx

* Reprint, *Wiener Med. Presse*, 1881.

† *Diseases of the Throat and Nose*, vol. i., p. 377.

are so intimately blended with those of the pulmonary affection, that it is difficult at times to assign the due share to each organ. Even hoarseness, which might be considered essentially a laryngeal symptom, may be owing to an implication of one of the recurrent laryngeal nerves (more commonly the right), in a lesion of the lung or of the bronchial glands. Hoarseness is an early symptom of the disease, and frequently passes into complete loss of voice; cough and expectoration are almost invariably present, as the result of the combined laryngeal and pulmonary affection. One of the most painful and characteristic of the symptoms of laryngeal phthisis is dysphagia, due to the swollen and ulcerated condition of the larynx, and especially of the arytenoids. If the epiglottis be ulcerated, there is acute pain on swallowing. In some cases, distressing attacks of coughing and suffocation ensue upon the patient attempting to take food, so that he suffers greatly from mal-nutrition. The shortness of breath usually observed in laryngeal phthisis is, in many cases, due to the pulmonary mischief. Dyspnœa of sufficient moment to necessitate tracheotomy is rare, but it may come on at any time from œdema of the larynx, or more gradually from fixation of the vocal cords in the median position.

Laryngoscopically, one of the earliest signs to suggest the onset of tubercular disease is pallor of the laryngeal mucous membrane. A partial anæmia, *i.e.*, pallor limited to the epiglottis, ventricular bands, and the mucous membrane covering the arytenoids, is more suggestive than a general anæmia.* In some cases, the blood-vessels coursing over the surface make the anæmia more apparent. In any case, partial or even general anæmia of the larynx should suggest a careful examination of the lungs in order to detect any incipient phthisis, and the patient should be kept under

* Semon, *St. Thomas's Hospital Reports*, vol. xii.

observation. Contrasting with this anæmic condition of the rest of the larynx, one vocal cord may sometimes be noticed to be congested. Pallor is distinctive of the chronic and more frequent form of laryngeal tuberculosis, but, as Cohen* has pointed out, there is an acute form in which congestion of the mucous membrane is a marked feature. This condition, which resembles an acute catarrhal laryngitis, passes, in the course of two or three weeks, into a chronic laryngeal catarrh, and it is only later on that the manifestations of the tubercular nature of the affection become indubitable. Very frequently, the acute stage described above is altogether absent, and the disease begins with the signs of a chronic laryngitis, and it is only the presence of lung mischief and the further development of the case which enable the diagnosis to be made. A very suspicious condition is a serrated appearance of the inter-arytenoid fold of mucous membrane; later on this may be the seat of ulceration. A much-contested point is as to the recognition during life of miliary tubercles on the surface of the laryngeal mucous membrane. Morell Mackenzie,† with his great experience, declined to accept the observations that had been made; on the other hand, Schnitzler‡ describes a case in which he watched the development of shallow ulcerations from miliary tubercles. Tuerck, Stoerk, and others, have reported similar cases. It must therefore be accepted that, in very rare cases, tubercle is deposited in the form of miliary nodules of a yellow colour on the laryngeal mucous membrane, and that these nodules may break down and form shallow, lenticular ulcers.

The later stages of laryngeal tuberculosis are very characteristic. The most frequent manifestation is a

* *American Journal of Medical Sciences*, January 1883.
† *Diseases of the Throat and Nose*, vol. i., p. 375.
‡ *Wiener Med. Presse*, 1881.

pyriform swelling of the arytenoids, which prevents the approximation of the vocal cords. The epiglottis may take on a similar condition, presenting a turban-like appearance. The infiltration may extend into the ary-epiglottic folds, so that the glottis may be almost occluded by a pale, puffy swelling extending all round it. The swollen mucous membrane is prone to ulcerate. The ulceration generally commences superficially, but extends in length and depth. In some cases, only the stump of the epiglottis may be left. The ulcerated surface is usually bathed in a milky-white secretion, which is very characteristic of tubercular ulceration. In the varieties of laryngeal tuberculosis just described, the vocal cords may be but little affected, though they usually lose their polish and become dull. There are, however, cases in which the brunt of the disease falls on the cords, which become injected and thickened, and after a time ulceration occurs. Quite irrespective of any gross alteration in the cords themselves, loss of mobility in one or both cords is frequently observed. This may be due to functional causes, as is the case in hysteria, or degenerative changes may have taken place in the laryngeal muscles; there may be paralysis from pressure upon the laryngeal motor nerves, on the right side, due to the recurrent being implicated in a pleural thickening at the apex of the right lung, and on the left side from enlarged glands; or, lastly, there may be some mechanical condition preventing the approximation of the cords, such as swelling of the soft parts, or ankylosis or other disease of the crico-arytenoid joint.

In some cases, the vocal cords become fixed almost in the phonatory position, giving rise to the symptoms of laryngeal stenosis, and simulating a bilateral abductor paralysis.* Sluggish action, or, as it has been termed, *lameness* of one cord, has been thought to point to tuber-

* Percy Kidd, *British Medical Journal* 1889, vol. i.

cular disease in the corresponding lung; but this is very problematical.

Of late years, attention has been directed to the occurrence in the larynx of tumours of a tubercular nature. They are not necessarily accompanied by any other obvious lesion of the larynx, and they may therefore be regarded as the first local manifestation of the tubercular process. Schnitzler,* in 1883, described the case of a young man with pulmonary phthisis, in whom multiple tumours, varying in size from a bean to a hazel-nut, were seen to project into the cavity of the larynx, springing from the ventricles of Morgagni. The tumours were removed with the guillotine, tracheotomy having been previously performed, and on examination they were found to consist of aggregations of miliary tubercles. Percy Kidd† brought before the notice of the Clinical Society the case of a man suffering from pulmonary phthisis, whose larynx was normal except for the vocal cords. On the posterior extremity of the left cord was a spherical tumour as large as a small pea. On the corresponding part of the right cord there was a small pinkish prominence. Seven weeks later it was noted that there was a slight increase in size of the laryngeal tumour, and that the prominence on the right cord was almost exactly like that on the left, both being of the size of an ordinary pea, and of a pinkish-grey colour. At the autopsy, nine months after the patient had first come under observation, no ulceration was found on the surface of the tumours, though there was extensive ulceration of the whole of the posterior wall of the larynx. Microscopic examination showed the tubercular nature of the tumours and the presence of an immense number of bacilli. Since these observations were made,

* *Wiener Med. Presse*, April 8th. See also *Transactions of the Eighth International Medical Congress*, Section of Laryngology.

† *Transactions of Clinical Society*, vol. xvii., p. 154.

other examples of the same condition have been recorded. Gougenheim and Tissier * describe polypoid vegetations as occurring in tuberculosis. They usually form a lobular mass, more or less pedunculated, sometimes sessile; in colour, white, yellow, or congested; in consistence, soft, so that they may even be detached by coughing. They generally arise from the base of the epiglottis, the inter-arytenoid space, and sub-glottic region, and they occur without any other lesion of the laryngeal mucous membrane.

Diagnosis.—In the early stages, when there is merely pallor of the mucous membrane or congestion of the cords, the diagnosis must, to a large extent, depend upon the result of an examination of the lungs, as there is at this time nothing characteristic in the appearance of the larynx. The pale, puffy swelling of the epiglottis, arytenoids, and ary-epiglottic folds is pathognomonic. Where ulceration is the chief feature, syphilis and cancer have to be excluded. The withdrawal of some of the secretion from the larynx by means of a brush under guidance of the laryngeal mirror, and the discovery of bacilli, will settle the point in favour of tuberculosis. As a rule, the ulcerative process is slower in tuberculosis than in syphilis, the ulcers are smaller, more numerous, and are seated on a paler base; rapid and advancing destruction of the epiglottis and the presence of cicatrices are in favour of syphilis. In making a diagnosis, however, it must be borne in mind that syphilis and phthisis may co-exist, and that a case originally syphilitic may take on a tubercular transformation. Even at the autopsy, it may be extremely difficult to say whether syphilis, or tuberculosis, or a combination of both, are present. Ulceration attacking one cord alone is in favour of syphilis. Tuberculosis of the larynx may usually be differentiated from malignant disease by the presence of pulmonary

* *Journal of Laryngology*, vol. iii., p. 35.

phthisis, the pallor of the pharynx and larynx, the pale, puffy swelling of the arytenoids, and by the fact that, as a rule, both sides of the larynx are implicated. In malignant disease, on the other hand, usually only one side of the larynx is at first attacked, the mucous membrane has a dark, purplish appearance, the secretion has often a foul odour, and hæmorrhage is not uncommon. The ulcers of laryngeal phthisis are usually small and multiple, a single large ulcer being more characteristic of malignant disease. The age of the patient will often aid in the diagnosis, as malignant disease is rare under thirty-five, whereas laryngeal phthisis is most common between the ages of twenty and thirty; and three-quarters of the cases, according to Morell Mackenzie, occur under the age of forty. The differential diagnosis between tuberculosis and lupus of the larynx is discussed on p. 206.

Prognosis.—Though cases of arrest and even cure of tubercular ulceration of the larynx have, from time to time, been recorded, and especially within the last few years, as the outcome of the recent advances in the local treatment of the disease, nevertheless it must be confessed that the outlook of a patient with laryngeal tuberculosis is a gloomy one. Morell Mackenzie's statistics show that of 100 cases submitted to *post-mortem* examination, 26 died in the first twelve months, 56 within eighteen months, and 75 within two years; and only 12 lived upwards of two and a half years. Since these figures were compiled, the state of affairs has somewhat improved, though it cannot yet be said that the treatment of this condition is attended with much success. Cases of the spontaneous cicatrisation of tuberculous ulcers of the larynx are occasionally seen; at the time of writing this, there is attending the Throat department at the Westminster Hospital a man with advanced pulmonary phthisis, who, a year ago,

had a large tuberculous ulcer on the left ventricular band, which has been healed for some months, though he has had hardly any local treatment.

Treatment.—The constitutional treatment of laryngeal tuberculosis differs in no respect from that which has been found useful in pulmonary tuberculosis. The internal administration of creasote is especially deserving of mention. The drug may be administered in the form of capsules, each containing 2 minims. One of these may be taken three times a day, and as the patient becomes tolerant of the drug, the number is gradually increased until six, eight, or even ten of the capsules are taken in the twenty-four hours.

Sommerbrodt,* from an experience of over 5000 cases, maintains that creasote is not merely a useful drug for the symptomatic treatment of tuberculosis, but that it exerts a specific influence on the disease by the resistance it offers to the cultivation of tubercle bacilli. He says that the more creasote a patient can bear in the day the greater is the success attained.

Beech creasote, which is the best form for administration, contains from sixty to ninety per cent. of guaiacol,† and of late this remedy has been substituted for creasote in the treatment of tuberculosis. The smell and taste of guaiacol are pleasanter than those of creasote, but, like the latter drug, guaiacol sometimes disagrees with the patient, causing vomiting and diarrhœa. Guaiacol is most conveniently administered in the form of capsules, each containing a minim. Of these the patient should take at first three a day, and the dose should be gradually increased until 12 or more minims are taken daily. The treatment requires to be persevered in for months. Both creasote

* *Lancet* 1889, vol. ii., p. 336.

† *British Medical Journal* 1887, vol. ii., p. 1238.

and guaiacol can be given in cod liver oil. If the creasote or guaiacol cause loss of appetite, it should be omitted for a few days, and arsenic in combination with the hypophosphites (formula No. 21) substituted.

As regards the climatic treatment of laryngeal tuberculosis, the cold, dry, rarefied air of high altitudes has been found to act unfavourably; hence, cases of this disease should not be sent to Davos Platz and similar places, but to San Remo, Pau, Madeira, etc., or to one of the southern health resorts of our own country. Charazac,* of Toulouse, has come to the conclusion that sulphur mineral waters should be avoided in the treatment of laryngeal phthisis, and in this he is supported by Heryng, Baginski, Baratoux, and others. Guinier,† on the other hand, claims for the sulphurous waters of Cauterets that they exercise a very remarkable influence upon the general innervation and nutrition, and that, in addition, they have a favourable local action on the mucous membrane in cases of laryngeal phthisis.

Patients suffering from laryngeal tuberculosis should be directed to use the voice as little as possible, and loud speaking should especially be avoided.

In the early stages of laryngeal phthisis, astringents such as formulæ Nos. 36 and 39 can be employed with advantage, the iron pigment being especially useful. The application should be made with the laryngeal brush twice a week, or on alternate days, according to circumstances. In some cases, especially in the more acute ones, sedative and antiseptic inhalations (formula No. 67 and the vapor olei pini sylvestris, B. P.) will be found to answer better than the astringent applications. Schmidt‡ highly recommends the inhalation of balsam of Peru (formula No. 69).

* *British Medical Journal* 1887, vol. ii., p. 1237.
† *Sajous' Annual* 1889, vol. iv., G. 9.
‡ *Journal of Laryngology*, vol. i., p. 162.

Inhalations may after a time be replaced by astringent sprays, *e.g.*, Nos. 62 to 66. In cases of ulceration the author has obtained excellent results from insufflation, once or twice daily, of iodoform (formula No. 47), and he can quite endorse what Semon * says: "Regular applications of iodoform in powder to the ulcerations of laryngeal phthisis produce cleansing, and in many cases diminution in size, of the ulcers, often diminution of the surrounding œdematous infiltration, decrease of pain and soreness, and frequently considerable improvement of the dysphagia and odynphagia, which had previously formed some of the most distressing and most serious features of the disease." By some, the ethereal solution of iodoform (strength 1 to 3) is preferred to the powder. If the smell and taste of iodoform are very disagreeable to the patient, iodol may be substituted, though it is not so efficacious. Before insufflating, the surface of the ulcer should, if practicable, be cleansed by the alkaline spray (No. 52). Menthol dissolved in paroleine, or olive oil (5 to 10 per cent. solution), is another drug which often has a very beneficial action. It can be applied by the brush or in the form of a spray. As it is an analgesic, a second application can be made of an increased strength without discomfort, but though the symptoms are relieved and the ulcers clean, cicatrisation is not obtained. Fronstein † speaks very highly of the action of resorcin; though not so powerful a local anæsthetic as cocaine, he says it acts more satisfactorily in allaying the pain and distress caused by laryngeal ulceration of tuberculous origin; it may be applied in a 10 to 20 per cent. solution by means of the brush, or a 2 per cent. solution may be used in the form of spray. The author has

* *St. Thomas's Hospital Reports*, vol. xii.

† *Lancet* 1888, vol. i., p. 38.

found the combination of a 20 per cent. solution of cocaine with a 5 per cent. solution of resorcin answer very well.

The local treatment, however, which at the present time is adopted by the greatest number of laryngologists, and which appears to yield the best results, is the application of lactic acid with or without previous curetting. This method, for which we are indebted to Heryng, in combination with creasote internally as described above, has gone far to remove laryngeal phthisis from the list of incurable diseases.* The cases suitable for the lactic acid treatment are those in which the laryngeal affection is

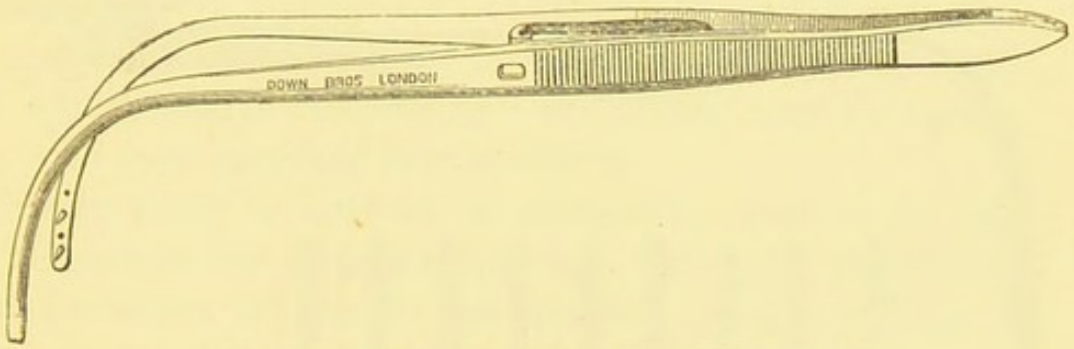


Fig. 49.—Krause's Cotton-Wool Forceps.

apparently unaccompanied by pulmonary tuberculosis; cases of laryngeal tuberculosis accompanying early pulmonary phthisis, or phthisis running a chronic course; and, lastly, cases in which the laryngeal affection gives rise to great pain on swallowing and coughing. In the last class of cases the treatment is to be considered rather as a palliative than a curative measure.

If ulceration has occurred in the laryngeal mucous membrane, it will only be necessary to rub in the lactic acid by means of cotton-wool firmly wrapped round rectangular laryngeal forceps; or, better still, the forceps introduced for the purpose by Krause (Fig. 49); but where there is simply an infiltration, or tuberculous outgrowths,

* Semon, *Lancet* 1893, vol. i., p. 525.

a still more radical plan of treatment is necessary to bring the lactic acid into contact with the sub-mucosa. For the former, Heryng advises that the acid should be injected beneath the mucous membrane by means of the sharp-pointed syringe he has devised for this purpose; or the surface may be scraped with the curette, and the acid can then be rubbed in. The tuberculous outgrowths can be removed by the curette (Fig. 50), forceps, or galvano-caustic loop, according to their size and shape; the lactic acid can then be rubbed into the raw surface. Before

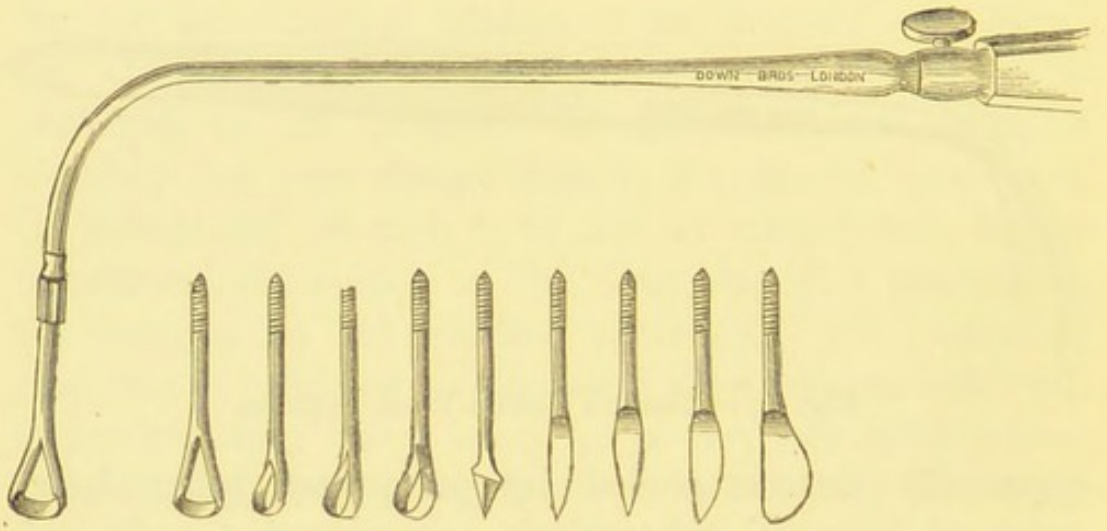


Fig. 50.—Heryng's Curette.

applying the lactic acid, or curetting, the affected surface of the larynx should be freely swabbed with a 20 per cent. solution of cocaine. It is advisable to begin with a weak solution of lactic acid—say 20 per cent. If but little local irritation be caused, the strength of the solution may be increased at the next sitting, otherwise it is advisable to continue the original solution for three or four sittings before increasing the strength. A 50 per cent. solution will usually suffice to effect cicatrisation, but 60 and 80 per cent. solutions, and even the pure acid, have been employed. The applications should be made three times a week at the

commencement, and then, as healing takes place, at greater intervals; from twelve to twenty, or even more applications, may be necessary to obtain cicatrisation, and the acid should be well rubbed in, some force being employed in doing so. The amount of pain experienced varies very much according to the idiosyncrasy of the individual. It usually passes off in about an hour, but in some very sensitive patients it may last even twenty-four hours. Should much pain result from this method of treatment, the patient should have ice to suck, and cold compresses should be applied to the neck. The results obtained by Heryng and Krause, who introduced this method of treatment, have been confirmed by the great majority of surgeons who have given it a fair trial, both in this country * and abroad, and the author has seen most excellent results from it.

Tracheotomy is only to be advised in cases where life is threatened by laryngeal stenosis. In spite of the recommendation of Hunter Mackenzie,† Moritz Schmidt,‡ and others, this method of treatment has not met with general acceptance; one great drawback to it is the fact that, after tracheotomy, there is sometimes a rapid increase in the pulmonary symptoms, and increasing difficulty in coughing. Percy Kidd § has ably summed up the advantages and disadvantages of tracheotomy in laryngeal phthisis, and points out that the weight of evidence is against the performance of this operation, except in cases of stenosis.

When the case is too far advanced for any curative treatment, the dysphagia which is so frequently met with may be diminished by applying to the larynx a 5 or 10

* See discussion on the treatment of laryngeal disease in tuberculosis. *British Medical Journal* 1890, vol. ii., p. 611.

† *British Medical Journal* 1890, vol. ii., p. 615.

‡ *Deutsche Med. Wochenschrift* 1887, No. 43.

§ *Lancet* 1888, vol. i., p. 619.

per cent. solution of cocaine by means of either a spray apparatus, or brush, five minutes before a meal is taken. In some cases, the difficulty in swallowing liquids which attends loss of the epiglottis by ulceration may be obviated by placing the patient prone across the bed, with the head hanging over the side, and allowing him to suck milk from a mug placed on the floor through a piece of india-rubber tubing. This method was suggested by a patient to Dr. Wolfenden.

There seems to be some risk in the removal of primary tuberculous tumours of the larynx, because the bacilli, hitherto shut up in the tumour, can then enter the organism through the wound and set up pulmonary tuberculosis. Hence, it is advised that they should be removed by the galvano-caustic loop or cautery.*

For Lupus of the Larynx, *see* Lupus of Pharynx and Larynx, p. 201.

17. SYPHILIS OF THE LARYNX.

Syphilitic disease of the larynx may accompany the secondary or tertiary manifestations of the disease, or it may be the result of inherited syphilis.

Ætiology.—Affections of the larynx are of very frequent occurrence in syphilis. According to Pollak,† eleven per cent. of all syphilitic patients examined had an affection of the larynx. Zaverthal ‡ states that this affection is found in sixty per cent. of all cases of laryngeal disease. Statistics show that males suffer more than females. Mackenzie's § tables, based upon the examination of 10,000 cases of throat

* *Sajous' Annual* 1889, vol. iv., G. 11.
† *Journal of Laryngology*, vol. ii., p. 211.
‡ *Archives of Laryngology*, vol. i., p. 291.
§ *Diseases of the Throat and Nose*, vol. i., p. 353.

disease, give 118 cases of secondary syphilitic affection of the larynx, whereof 84 were males and 34 females; out of the 189 cases of tertiary syphilis of the larynx, males number 120 and females 69. Inasmuch as syphilitic affections of the larynx usually start from a laryngeal catarrh, the predominance of males attacked is to be explained by their greater exposure to the effects of changes of temperature, irritating dust, alcohol, tobacco, and other causes of laryngeal catarrh.

Secondary syphilitic affections of the larynx usually occur in young adults, but there is, of course, no limit as regards age. They make their appearance most frequently from about a few weeks to a few months after infection, or their advent may be delayed for a year, or even eighteen months. Tertiary lesions are more common in the middle period of life, and they have occasionally been met with in old age. They have been reported as early as the sixteenth month,* and their first appearance has occurred as late as the thirtieth and even the fiftieth year † after the date of infection. In some cases of tertiary syphilis of the larynx it is impossible to get any date of infection, and it may manifest itself without having been preceded by secondary symptoms. In these cases, the possibility of the disease being inherited should be borne in mind.

Morbid Anatomy and Pathology. — The earliest changes met with in the larynx, as a result of syphilitic infection, consist in hyperæmia and its results. That is to say, patches of the laryngeal mucous membrane become injected and swollen. Then a localised hyperplasia of the epithelium, attended with an infiltration of small cells, may take place, and a growth, to which the term of mucous

* Tuerck. Quoted by J. Solis Cohen, *Transactions of Philadelphia County Medical Society*, September 12th, 1888.

† Mackenzie, *Diseases of the Throat and Nose*, vol. i., p. 357.

patch, papule, or condyloma is variously applied, appears on the mucous membrane; or the opposite process may occur, and a superficial erosion be the result. If the local and general condition of the patient be of an unhealthy character, the erosion may pass into distinct ulceration, and this in its turn may give rise to œdema. The ulcers have a greyish-yellow base, with irregular edges, and are surrounded by a red zone.

Ulceration is the most common manifestation of tertiary syphilis in the larynx. The ulcer may commence as a superficial loss of substance, with a deeply inflamed margin, showing a great tendency to spread laterally, or, as is more frequently the case, it results from the softening and breaking down of a gumma. In the latter event, especially, the process has a tendency to extend deeply into the subjacent structures. If a vessel becomes eroded, serious hæmorrhage may be the consequence, and the loss of blood has been sufficient to cause death. Extending to the cartilages, the ulceration may give rise to perichondritis, caries, necrosis, and subsequent exfoliation of the necrosed cartilages. This process may take months, or even years. In some instances, perichondritis occurs without previous ulceration of the mucous membrane; if it proceed to suppuration, the abscess which forms may burst in any direction. The epiglottis is the usual seat of ulceration, and not infrequently it is entirely destroyed. The ulceration is, as a rule, unilateral, but it may extend in all directions. Should the crico-arytenoid joint be involved, ankylosis may occur, as a result of which the vocal cord may be left fixed. Consequent upon the healing of the ulcerations, cicatrices form, and these may bring about stenosis of the larynx. Adhesions may also form between adjacent parts; thus, the epiglottis may become adherent to the posterior or lateral wall of the pharynx, or adhesion may take place between

the vocal cords or the ventricular bands. In some cases, vegetations of a luxuriant character grow from the vocal cords and other parts of the larynx, and may occlude the glottis.

The gummatous lesions which precede ulceration vary in size from a small bird-shot to a hazel-nut. If only one nodule be present, the surface is smooth ; otherwise, it is irregular. At first the gumma is hardly to be distinguished in colour from the normal mucous membrane, or possibly it has rather a redder tinge. Soon, however, it turns yellow in colour, softens in the centre, breaks down, and gives rise to the characteristic tertiary ulcer. Myopathic paralysis of the muscles of the larynx may occur in the later periods of secondary syphilis, and in tertiary syphilis at any period. As a rule, the affection is unilateral, and the left side is more frequently attacked than the right. The onset is often sudden, following exposure to cold and damp.*

Symptoms.—In the secondary stage the patient may complain of hoarseness, which sometimes passes on to complete loss of voice, and a feeling of discomfort in the throat. Occasionally there is an irritating cough. Neither dyspnœa nor dysphagia is present unless there be œdema. In tertiary syphilitic disease of the larynx, the symptoms are usually much more severe than those met with in the secondary stage, and not infrequently bring about a fatal issue. Impairment of voice is usually present, and dyspnœa, accompanied with stridor, occurs whenever there is a diminution in the lumen of the larynx, be it from œdema, vegetations, gummata, cicatrices, etc. In cases where the epiglottis has been entirely destroyed, there may be attacks of suffocation from food entering the larynx. This, however, rarely happens, as patients are usually able to take food without discomfort, in spite of the entire loss of the epiglottis. If the gummatous infiltration give rise to great

* J. Solis Cohen, *loc. cit.*, p. 10.

swelling, especially of the posterior wall of the larynx, deglutition will be interfered with; and if ulceration also exist, pain on swallowing will be present, and may radiate up to the ear. Sudden death may arise from œdema of the larynx or from the impaction of a detached cartilage in the glottis. As a rule, however, the onset of suffocation is more gradual. In cases where the ulceration has laid bare a cartilage, a very offensive discharge will be coughed up, and, as a matter of course, the patient's breath will also be offensive. As already stated, a considerable quantity of blood will be lost in the event of a large vessel becoming eroded.

The results of a laryngoscopic examination may be deduced from the description of the pathological changes met with in the larynx.

Complications.—It is now recognised that syphilis and phthisis may exist simultaneously in the same patient, and that an originally syphilitic affection may take on a tubercular character; and, (though this is less frequently observed,) a phthisical ulceration may serve as a basis for syphilitic disease. The transformation of a tertiary syphilitic affection of the larynx into tubercular disease is readily explained on the assumption that the tubercle bacillus enters the organism by the ulcerated surface, and finds a suitable soil in the syphilitic infiltration. The author's own observations have convinced him that tertiary syphilitic lesions in the larynx may, in very rare cases, be the starting-point of malignant disease.

Diagnosis.—"Differential diagnosis between secondary and tertiary lesion is sometimes difficult, particularly in the transitional period especially described by Whistler. The discriminating characteristics are less well marked in laryngeal syphilis, perhaps, than in any other variety. It may, however, be broadly stated that secondary lesions,

erythematous, papular, condylomatous, or paralytic, are superficial; and that tertiary lesions are gummatous, ulcerous, carious, necrotic, and deep-seated. Laryngitis occurring within a few months of infection is almost invariably secondary. Lesions appearing before the termination of the third year are presumptively secondary; those appearing within the third year secondary, or transitional; and those appearing after the termination of the third year, tertiary. Nevertheless, secondary lesions may be ulcerous, and undoubted tertiary manifestations have been recognised even within nine months of infection."* The colour of the mucous membrane is more dusky than in acute catarrhal laryngitis, and the mucous membrane has a more mottled appearance; but, in the absence of condylomata, there is usually nothing in the laryngeal affection of secondary syphilis which would enable one to make a diagnosis with any certainty, should collateral information be wanting. Some authorities, Semon † amongst others, go so far as to deny the existence of condylomata in the larynx; they are certainly rare, but from my own observation I am satisfied that they do occur.‡

In the tertiary stage, the diagnosis has to be made from tuberculosis, lupus, leprosy, and cancer. The differential diagnosis from tuberculosis and lupus is discussed at pp. 392 and 205. The absence of the cutaneous manifestations of leprosy and the history of the case will serve to exclude this disease. From cancer, the diagnosis is at first sometimes a matter of difficulty, but in this disease a new growth usually precedes the ulcerative stage, the progress is much slower, and pain is a more common symptom; still, some doubt so often exists, that it is advisable to subject the

* J. Solis Cohen, *loc. cit.*, p. 15.

† *Lancet* 1882, April and May.

‡ See also *Centralblatt*, vol. viii., p. 151.

patient to a course of specific treatment, before definitely deciding against syphilis in favour of malignant disease. Even if the patient improves under treatment, it must be remembered that iodide of potassium, by causing absorption of inflammatory products round a malignant growth, may produce so much objective, as well as subjective, improvement as to be misleading. Again, syphilis and cancer are occasionally associated, and specific treatment may thus produce marked improvement for the time. This apparently is the only explanation to be given of the case of a man who was under the author's care at the Westminster Hospital. When he first applied in the out-patient department, he was suffering from dysphagia and extreme dyspnœa. On laryngoscopic examination, the right ary-epiglottic fold was enormously swollen, the glottis being hardly perceptible. On account of the urgency of the symptoms, he was admitted as an in-patient. A 20 per cent. solution of cocaine was applied, he had ice to suck, and he was ordered iodide of potassium in doses gradually increased to 30 grains every four hours. Under this treatment he rapidly improved, and was discharged in the course of a fortnight apparently well, except for some swelling around the right crico-arytenoid articulation. Subsequently he was admitted on two or three occasions for similar attacks. Each time he derived less benefit from treatment, and the glands on the right side of the neck became greatly enlarged and fluctuating. In the idea that a piece of necrosed cartilage was keeping up the trouble, the thyroid cartilage was split anteriorly by Mr. Macnamara, and an attempt made to remove the obstruction. The breathing was much relieved by the operation, but unfortunately the patient died of pneumonia (evidently a croupous pneumonia, and not due to the entrance of pus, etc., into the lung) some days after the operation. The *post-mortem* showed that malignant disease

of the larynx existed, and that the glands were similarly affected.

Prognosis.—This varies with the stage of the disease. The secondary affection of the larynx, though occasionally troublesome from their chronicity, give no other cause for uneasiness; on the other hand, tertiary syphilis of the larynx may cause death through acute œdema, or the glottis may become suddenly obstructed by portions of cartilage which have exfoliated, or deep ulceration may extend into a large vessel, and give rise to fatal hæmorrhage.

Lastly, the dangers incident to stenosis of the larynx, and the consequent tracheotomy, must be borne in mind. Even after tracheotomy has been performed a hyperplastic process may extend from the larynx down the trachea, and eventually cause death. Though a gloomy picture has been drawn of the possibilities attendant upon syphilis of the larynx, nevertheless marked improvement may take place in cases apparently desperate, when they are subjected to anti-syphilitic treatment. Ulceration is often arrested, swelling disappears, and the normal outline of parts can again be recognised. In young children suffering from congenital syphilis there is an additional element of danger in the small size of the glottis, and the consequent great risk of death from asphyxia.

Inherited Syphilis.

That inherited syphilis is accompanied very frequently by affections of the larynx has been proved to demonstration. Owing to the early age at which the disease usually manifests itself, the use of the laryngoscope is neglected, and consequently many cases are overlooked. Barlow * found it quite a common occurrence that syphilitic children,

* *Lancet*, April 10th, 1880.

when first brought for treatment with snuffles, thrush, etc., had also a harsh, weak voice; but as this rapidly improved under mercurial treatment but little attention was paid to it. Now these are just the symptoms which would indicate laryngitis; and indeed, if the case be neglected, further changes take place in the larynx, which unmistakably prove the specific origin of the affection. There can therefore be little doubt that John Mackenzie,* who has written an able paper based on one hundred and fifty cases of throat syphilis of congenital origin, is justified in his statement that laryngeal disease is not rare in inherited syphilis, but that, on the contrary, it is one of the most constant and characteristic of its pathological phenomena, and that the invasion of the larynx is of as frequent occurrence in the inherited as in the acquired form of the disease. The most common period for the larynx to be affected is the first six months after birth. Laryngeal syphilis has even arisen during intra-uterine life. On the other hand, it must be remembered that it is quite possible for the symptoms to develop much later. Cartaz† has collected twenty-seven cases of late hereditary syphilis, which occurred in patients varying from three to twenty-eight years of age; and as the appearances in the larynx do not differ materially from what is seen in acquired syphilis, the importance of recognising the possibility of the affection being of an inherited nature need not be insisted on.

Three chief forms of disease may be distinguished in inherited syphilis. In the first form the changes are superficial, and are limited to the mucosa and submucosa. Under this category comes the class of cases which, as already mentioned, yield to treatment so readily that they are often disregarded. The second form is characterised

* *American Journal of Medical Sciences*, October 1880.

† *Journal of Laryngology*, vol. iii., p. 430.

by the occurrence of deep ulceration, which runs an acute course, the cartilages being involved early. This is a very fatal manifestation of the disease; fortunately, however, it is of rare occurrence. In the third form, which is of a chronic nature, there is a gradual growth of dense fibrous tissue, which tends to cause contraction of the lumen of the larynx.

In the first variety, the symptoms referable to the larynx may be only slight, hoarse cough and cry being the most noticeable. Should the mucous membrane become swollen there will be dyspnœa, and possibly croupy attacks. In the second form the symptoms will be very grave; urgent dyspnœa comes on, in which inspiration and expiration are equally affected, voice and cry almost inaudible, and cyanosis supervenes. Death may occur in these cases with startling rapidity. In the remaining form, in which we have to deal with a hyperplastic syphilitic laryngitis, the symptoms come on more gradually—cough, huskiness of voice and cry, and increasing difficulty of breathing being the most characteristic. Death may occur suddenly, either from an attack of laryngismus or from œdema of the larynx. The laryngoscopic appearances of inherited syphilis differ in no respect from those met with in the acquired disease. They may be those of a catarrh of the larynx, or great thickening of the mucous membrane, accompanied with deep ulceration. In the hyper-plastic forms the glottis may be reduced to a mere chink by the swelling of the mucous membrane, the change being especially marked in the epiglottis, the ary-epiglottic folds, and the inter-arytenoid fold. The occurrence of the disease—for the most part in infants—and the urgent symptoms which so frequently accompany it, will often render a laryngoscopic examination impracticable.

The *diagnosis* is seldom a matter of difficulty, as there are almost invariably other signs of syphilis present on the

skin, mucous membrane of the mouth, throat, etc. The difficult cases are those in which the symptoms of inherited syphilis are first detected in an adult; but even here it is generally possible to arrive at a correct diagnosis by paying attention to other signs of inherited syphilis, such as the state of the nose, eyes, teeth, the presence of linear cicatrices at the angles of the mouth, and of ulceration of the skin and mucous membranes. Semon * records a notable case of anchylosis of the left crico-arytenoid articulation with atrophy of the corresponding cord as a result of inherited syphilis.

Treatment.—In the laryngeal affection, which is one of the manifestations of secondary syphilis, constitutional treatment is most important. It is generally advisable in these cases to commence with mercury. This can be employed in the form of blue pill or grey powder, 1 or 2 grains being given two or three times a day, or the solution of the perchloride may be given in drachm doses in a bitter infusion, also two or three times a day. The combination of iodide of mercury and iodide of potassium (formula No. 24) is exceedingly useful in some cases. If mercury administered by the mouth disagrees with the patient, it may be introduced into the system by inunction. For this purpose half a drachm of blue ointment, or 20 grains of a 5 per cent. oleate of mercury ointment made with lanoline, may be rubbed in at night, first into one axilla and then into the other, so as to avoid irritating the skin. After a time iodide of potassium (formula No. 26) must be substituted for the mercury; but as the constitutional treatment of secondary syphilis of the larynx differs in no respect from a similar condition affecting other parts of the body, for further particulars the reader is referred to any of the standard works on surgery.

* *Lancet*, May 13th, 1882.

Painting the larynx with astringent applications, such as formulæ Nos. 35, 39, or the weaker solutions of nitrate of silver, will assist in clearing up a syphilitic laryngitis. Schnitzler * highly recommends inhalations of perchloride of mercury, 4 to 6 drachms of the solution (formula No. 38) to be inhaled from the steam atomiser daily.

The patient should be enjoined to use the voice as little as possible, and to abstain from alcohol, smoking, and everything likely to irritate the throat.

Cases of tertiary syphilis of the larynx sometimes require the most energetic treatment, in order to prevent death from suffocation due to the glottis becoming blocked through œdema, or sudden swelling of the soft parts. Though, as a rule, iodide of potassium, in doses of from 5 to 30 grains or even more, every six hours, will effect a speedy improvement, there are cases, and these usually the most threatening, in which the administration of mercury, as well as of iodide of potassium, is necessary. The patient should remain in bed, and the room be kept at an even temperature. Every four or six hours he should take 10 to 30 grains of the iodide, and twice daily 20 grains of blue ointment should be rubbed into the axillæ or inner side of the thighs. If urgent dyspnœa comes on, the application of a 20 per cent. solution of cocaine by means of the laryngeal brush will sometimes give relief; if not, it will, at all events, facilitate the process of intubation, which should be performed in preference to tracheotomy. In the absence of the instruments necessary for intubation, it will, of course, be necessary to do tracheotomy. The canula should be removed as soon as possible, as the longer it remains in the greater difficulty will there be in doing without it. The healing of chronic tertiary ulcers of the larynx is promoted by insufflations of iodoform or iodol, or by the

* *Archives of Laryngology*, vol. i., p. 187.

application of a solution of sulphate of copper (formula No. 35). Vegetations may require the use of the curette, galvano-cautery, or galvano-caustic loop. The greatest care should be taken in preventing the formation of adhesions between the cords. When once the process has started, it sometimes goes on with such rapidity that the patient's life is endangered. An example of this kind came under observation in the department for diseases of the throat at the Westminster Hospital. When the patient presented himself for treatment there was a commencing union between the cords, and the patient was urged to come into the hospital. Unfortunately, he refused; and when he attended the following week it was necessary to perform tracheotomy at once, so diminished in size had the glottis become. In order to prevent adhesion occurring, astringents, such as formulæ Nos. 34 and 35, should be applied daily by the laryngeal brush, or Schroetter's hollow bougies may be introduced, the larynx having been previously painted with cocaine. The treatment of stenosis is considered at p. 415.

The treatment of inherited syphilis, as it affects the larynx, requires no special mention. In infants and children, the most effectual method of employing mercury is to spread 15 or 30 grains of blue ointment, diluted with an equal quantity of lard or vaseline, on a piece of flannel, which the child wears constantly round the abdomen, as recommended by Berkeley Hill.* In young children local treatment of the larynx is, of course, impracticable.

18. STENOSIS OF THE LARYNX.

Diminution in the lumen of the larynx, either by changes in the walls of the larynx or by growth from within.

Ætiology.—Though stenosis of the larynx does not represent an independent disease, but is a condition

* On *Syphilis and Local Contagious Disorders*, p. 449.

brought about by very varied causes, devoting a separate section to its consideration will save repetition. Two forms may be distinguished—those running an acute, and those running a chronic course. Among the former may be mentioned all acute inflammatory affections of the larynx, especially if coming on with the specific infectious diseases, and notably smallpox, typhoid fever, and diphtheria, acute perichondritis, chemical and mechanical injuries, and the impaction of foreign bodies. By far the most frequent, and certainly the most persistent, form of chronic laryngeal stenosis is that produced by the cicatrisation, which results in the healing of tertiary syphilitic ulceration of the larynx. In inherited syphilis a chronic interstitial laryngeal inflammation occurs, which leads to great contraction of the lumen of the larynx. Stenosis is also a frequent result of malignant disease; but in these cases death usually occurs from exhaustion or hæmorrhage, so the stenosis does not attract much attention. In tuberculosis of the larynx, tracheotomy may at times be necessary to avert impending death from suffocation, usually brought about by œdema. Generally, however, destructive changes take place in the larynx, which are sufficient to maintain the patency of the respiratory tract. Lupus and leprosy may also lead to stenosis.

Stenosis is met with as a result of bilateral paralysis of the crico-arytenoidei postici, and in a bilateral affection of the crico-arytenoid joints, leading to fixation of the cords almost in the median line. Benign new formations sometimes attain sufficient size to nearly occlude the glottis. Amongst other ætiological factors may be mentioned membranous webs,* chronic subglottic laryngitis,† and perichondritis, from whatever cause arising.

* *See* p. 428.

† *Archives of Laryngology*, vol. ii., p. 227.

Morbid Anatomy and Pathology.—In acute diseases the narrowing of the lumen of the larynx is due to infiltration of the mucous membrane with inflammatory products. In some cases the swelling may be almost entirely due to œdema. In syphilis, infra-glottic infiltration may be a cause of stenosis. The more characteristic examples of syphilitic stenosis are those in which a web is formed by the adhesion of the vocal cords or other parts of the larynx. At times a general hypertrophy of the structures at the level of the glottis occurs, whereby the aperture is much diminished. In cancer the obstruction is partly due to the new growth and partly to the collateral œdema. In traumatic cases the stenosis is usually dependent on the formation of a web-like membrane.

Symptoms.—The severity of the dyspnœa is the gauge of the amount of the obstruction, but with this proviso, that a rapidly advancing stenosis produces much more serious symptoms than one which is slowly developed; indeed, it is often a matter of surprise to observe with what little discomfort a patient can breathe through a glottis the diameter of which is not much larger than that of a quill.

Diagnosis.—The only difficulty in making a diagnosis is that to which attention is directed under the head of bilateral paralysis, viz., the possibility of a double stenosis—*i.e.*, a stenosis in the trachea as well as one in the larynx. (*See* p. 455.) Two examples of this have occurred in patients under the author's care. The one occurred in a case of aneurysm of the ascending and transverse portions of the arch of the aorta pressing on the trachea, and causing at the same time bilateral abductor paralysis;* the other in a man whose vocal cords were firmly adherent by a thick web. In this case the hyperplastic process extended into the trachea, so that, notwithstanding tracheotomy, the patient died.

* *Clinical Society's Transactions*, vol. xix., p. 80.

Prognosis.—The only cases of stenosis which offer a prospect of cure are the syphilitic and the traumatic. The former require the most persevering and systematic treatment; and even when a fair amount of dilatation has been attained they are very liable to relapse. Whenever extensive cicatricial contraction has taken place, treatment can only be palliative; on the other hand, if the obstruction be narrow and membranous, the prospect of success is much greater. According to Cohen,* if the stenosis be caused by adhesions between the arytenoids, dilatation never affords permanent relief.

Traumatic are more hopeful than syphilitic cases.

Treatment.—As has already been stated, stenosis of the larynx may come on suddenly, or develop gradually. For the former tracheotomy or intubation may have to be performed; but the cases of laryngeal stenosis which run a more chronic course require to be treated in a different manner. The simplest case of stenosis to treat is that due to the presence of a web or membrane between the vocal cords. As a rule, this can be excised by an intra-laryngeal operation, and if the vocal cords are prevented from again becoming adherent, by the occasional passing of hollow bougies, a good result is obtained.

It is in cases of stenosis of a syphilitic nature that the greatest difficulty in effecting and keeping permanent the dilatation occurs. To Schroetter must be assigned the credit of introducing the methodical treatment of laryngeal stenosis by dilatation. This plan of treatment consists of two distinct methods:—

1. The introduction of hollow tubes into the larynx previous to the performance of tracheotomy.

2. Dilatation after tracheotomy has been performed.

The tubes invented by Schroetter for the first method

* *Journal of Laryngology*, vol. iii., p. 45.

are made of vulcanite, are of a triangular shape, and curved so as to correspond to the interior of the larynx.

Before attempting to introduce an instrument, the larynx should be painted with a twenty per cent. solution of cocaine. If the stenosis be at all extreme, it is advisable to accustom the patient to the use of instruments by beginning with an ordinary flexible catheter, No. 3 or 4. Any instrument employed for dilatation should be smeared over with carbolised vaseline. The tube should be lightly but firmly grasped between the index and middle finger of the right hand above, and the thumb below, and introduced into the larynx under the guidance of the mirror. If the cords are still intact they may offer some resistance to the passage of the tube, but when the patient inspires the cords separate, and the tube can be pushed down through the stenosed part of the larynx. At the first two or three sittings it is not desirable to leave the tube in for more than a few seconds, but as the parts become more tolerant, it may be left in for five to thirty minutes at each sitting, according to the amount of discomfort it causes the patient. The tube should be introduced daily, and gradually left in for a longer period. As soon as the tube passes quite easily a larger one should be substituted; but the dilatation should be carried out very slowly, so as to avoid the risk of setting up inflammatory mischief in the larynx. After a period, varying from weeks to months, the tubes need be introduced only on alternate days, then twice a week, and finally, when complete dilatation has been effected, passing a tube once or twice a month may suffice to prevent contraction occurring. This method of treatment, to be successful, requires the greatest amount of patience and perseverance on the part both of patient and doctor. In some cases of adhesion between the cords Whistler's * cutting dilator will be found

* *Syphilitic Strictures of the Larynx*, p. 18.

to act admirably (Fig. 51). It is easily introduced into the larynx; and by putting the tissues on the stretch before the incision is made, it enables this to be carried out with more precision than if it were effected by the knife alone. Lennox Browne* has devised a hollow laryngeal dilator with a cutting blade, which, he says, combines the advantages of Whistler's cutting dilator with the hollow tube of Schroetter.

After tracheotomy has been performed there are two chief methods of dilatation: (1) by instruments introduced

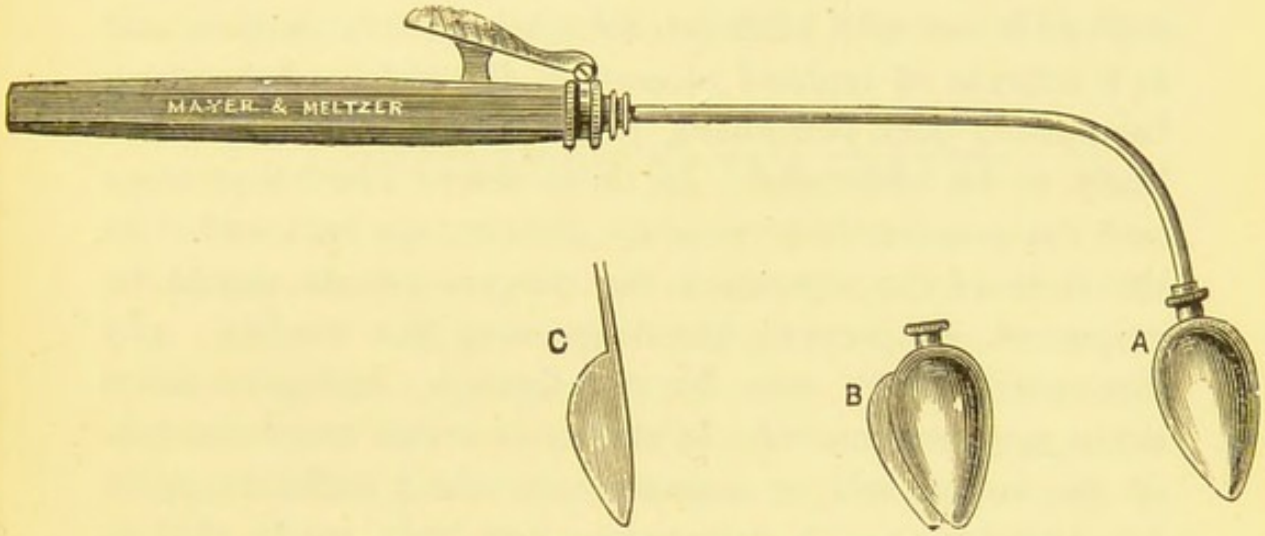


Fig. 51.—Whistler's Cutting Dilator.

through the mouth; (2) by instruments introduced through the tracheal opening.

Thanks to the exertions of Schroetter,† the former method is the one now commonly employed. He uses tin bolts of a triangular shape, so as to correspond to the interior of the larynx. The bolt, to which a piece of string is attached, is introduced through the glottis by means of a suitably curved rod, and when it is placed in the proper position, the rod can be withdrawn, and the loop of string

* *British Medical Journal* 1887, vol. ii., p. 463.
† *Behandlung der Larynx-Stenosen*, Wien, 1876.

secured round the patient's ear. When required, the bolt can be removed by means of the string.

As regards the method of dilating the stenosed larynx by instruments introduced through the trachea,* it has only this in its favour, that it can be carried out by a surgeon who is unskilled in the technique of laryngology.

Newman* has successfully treated cases of complete stenosis produced by suicidal wounds of the larynx, by tents of tupelo wood dragged up into the larynx, through the tracheotomy wound, by means of a cord.

In the narrow, undilatable, and callous form of stricture, such as is met with after extensive syphilitic ulceration, and as a sequela of typhoid ulceration, for which tracheotomy has already been performed, treatment by dilatation is not likely to be successful. In these severe cases thyrotomy and the external division of the stricture are indicated. At the time of the operation the tampon canula should be employed, to prevent blood entering the trachea; any cicatricial bridles may be cut through, and granulation tissue may be removed. In still more severe cases resection of the larynx will be necessary to afford sufficient space for breathing.† A suggestion has been made that in cases of bilateral paralysis of the abductors the larynx should be opened, and the vocal cords removed. But, as Semon‡ has pointed out, relief to the laryngeal dyspnœa would be dearly bought at the incurable and complete loss of voice which must necessarily follow such an operation. The usual practice of performing tracheotomy in such cases, and providing the patient with a valve to the tube, which enables him to speak without closing the opening with his finger, is surely much better. Trendelenburg

* *British Medical Journal* 1888, vol. ii., p. 616.

† Bruns, *Berliner Med. Wochenschrift* 1880, Nos. 38, 39.

‡ *British Medical Journal* 1887, vol. i., p. 134.

points out that after tracheotomy has been performed for stenosis, in course of time an additional factor in preventing the removal of the canula comes into play—namely, the impaired power of the abductors of the vocal cords. During deglutition the adductors are called upon to close the glottis while the abductors are at rest, owing to the breathing being carried on through the canula. Hence the importance of removing the canula as soon as possible. In some cases the orifice of the tube may be plugged for a short time daily, in order to compel the patient to breathe through the mouth. The length of time the plug is in may be gradually increased, until the patient acquires confidence to dispense with the tube.

19. INTUBATION OF THE LARYNX.

In the treatment of acute stenosis threatening death from asphyxia the choice rests between tracheotomy and intubation. For the mode of performing the former, reference must be made to surgical text-books. The instruments devised by O'Dwyer * for intubation consist of a gag, five laryngeal tubes, each tube having a separate obturator, an introducer, an extractor, and a gauge (Fig. 52). There is nothing special to be noted about the gag. The tubes vary in length from $1\frac{1}{2}$ to $2\frac{1}{2}$ inches, the calibre of the largest being about $\frac{1}{4}$ inch by $\frac{1}{8}$ inch ; that of the smallest is about half this size. The tubes are of brass, gold-plated. At the upper end of the tube is a diamond-shaped head, with rounded edges ; this rests on the ventricular bands, and prevents the tube slipping down into the trachea. The anterior part of the tube, where it rests against the epiglottis, is bevelled off, and in the anterior angle is a hole through which a thread is passed. The tube itself is fusiform in

* See J. B. Ball, *Intubation of the Larynx*, and Wolfenden, *Journal of Laryngology*, vol. i., p. 1.

shape, so as to prevent its being expelled too easily from the larynx. The distal extremity of the tube is rounded off. To each tube is fitted a jointed obturator, which exactly closes the openings at each end of the tube, projecting slightly below the lower one. At the upper end of the obturator is a hole, into which the point of the introducer screws. The introducer consists of a handle and a metal

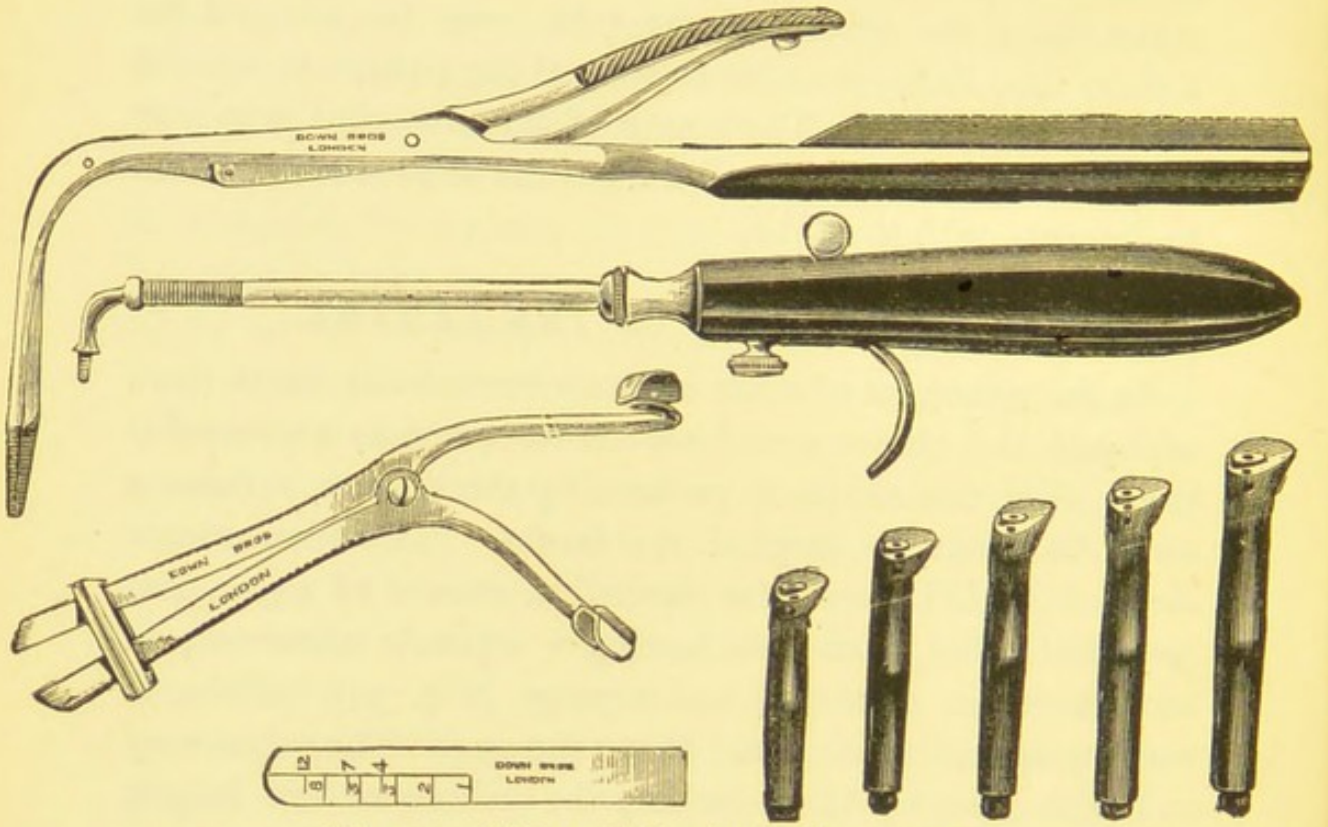


Fig. 52.—O'Dwyer's Intubation Instruments.

shank, the distal extremity of which is bent at right angles. By pressing on a button placed in the handle, a tube sliding on the shaft presses forward two claws, by which the obturator can be detached from the laryngeal tube as soon as this is *in situ*.

On the gauge is marked the length of each tube. The smallest tube reaches to line 1, and is for children of one year and under; the next tube reaches to line 2, and is for children between one and two years of age; the line

marked 3-4 indicates the tube for children between two and four years; 5-7 is for the next three years; and the largest tube is for children from eight to twelve.

The extractor consists of a handle with a shaft curved like a laryngeal brush, the distal extremity of which has two blades; these are introduced closed into the laryngeal tube, and on pressing a lever in the handle the blades open out, and come in contact with the inner surface of the laryngeal tube, which can then be withdrawn.

The Method of performing Intubation.—The first thing to be done is to choose a tube suitable to the age and size of the child; the larger the tube that can be introduced the better for the patient. The tube should then be threaded with stout silk thread about half a yard long, and the ends tied together. The introducer should be tested to see if it works smoothly.

The child is wrapped in a shawl so as to secure the arms, the nurse sits in a high-backed chair, takes the child on her lap, and lets his head rest against her left breast, places her arms round him, and holds his wrists; an assistant introduces the gag at the left corner of the mouth and steadies the patient's head. The operator takes the suitable tube with its obturator already fixed in the introducer, and, inserting the index finger of the left hand in the child's mouth, he passes it rapidly backwards until he can feel the epiglottis and the arytenoid cartilages; guided by the index finger, he then passes the tube into the glottis. The handle of the introducer is at first held parallel to the sternum. When the tube approaches the pharyngeal wall the handle is elevated, otherwise the tube would enter the œsophagus. The entrance of the tube into the larynx is indicated by cough and expectoration. No force should be employed, as it is never necessary. As soon as the tube is in position the obturator should be detached from it and withdrawn,

and the gag removed. After waiting a few minutes for the child to clear the trachea, and to get free of the dyspnœa which accompanies the introduction of the tube, the gag is again placed between the teeth, and the silk thread cut through; the finger is then passed down to the head of the tube, and the thread withdrawn. In introducing the tube no pain should be inflicted on the child; and if the attempt be not at once successful it is better to give the patient a little rest before trying again.

When it is considered desirable to remove the tube, the child is placed in the same position as for its introduction, and the gag inserted. The extractor, under guidance of the index finger of the left hand, is passed backwards and downwards until the tip can be directed into the opening of the laryngeal tube. When this is satisfactorily accomplished, the lever in the handle is pressed, which causes the blades to dilate, and thus firmly fix the tube, which can then be removed. Should difficulty be experienced in its removal, it may be necessary to administer an anæsthetic.

The operation of introducing the tubes is at times by no means easy, especially if the child be refractory. There is also another difficulty—viz., that the tube may force down membrane, and so block the trachea, and thus necessitate tracheotomy. It is, therefore, advisable to be prepared to perform the latter operation if required. If, after the performance of intubation, dyspnœa continue, or if there be an increase in the frequency of the respiration, this indicates the existence of some complication, or extension of the disease below the tube.

As regards the after treatment of cases of intubation, the question will arise, how long is the tube to be left in? The answer given is that it should be extracted on the fourth to the sixth day in all cases, and if there be dyspnœa it should be replaced. Should the tube become blocked

by membrane before this, it will probably be expelled by a fit of coughing, and will require to be reintroduced.

The great difficulty of intubation, however, is to feed the patient. Soft solids are usually readily taken, but fluid is apt to enter the larynx and set up cough. Two methods of supplying the patient with liquids have been found to obviate this difficulty. In one the child is placed on his back across the nurse's lap with the head dependent, and then allowed to suck fluid out of an ordinary feeding-bottle. In the other method the child is placed on its abdomen across a sofa, with the head hanging over the edge, and is then told to suck fluid out of a mug on the floor by means of a tube. If neither of these plans succeed the child may be fed through a nasal tube.

The chief dangers of intubation are * :—

1. The tube may be coughed up, and in the absence of skilled assistance death may occur before it can be replaced.

2. The tube may slip down into the trachea, though this is not likely to happen with the large heads now used by O'Dwyer.

3. The tube may become plugged with false membrane, and death may occur before it can be expelled.

4. On introducing the tube false membrane may be pushed down before it, and so occlude the trachea.

5. Fluids may enter the trachea and set up pneumonia.

6. The pressure of the tube may set up ulceration in the larynx, especially during epidemics of measles.

7. Damage may be done to the larynx by unskilful and rough attempts to remove the tube.

8. The tube may be coughed up and swallowed.

According to Waxham,† intubation has the following advantages over tracheotomy :—

* Charters Symonds, *British Medical Journal* 1887, vol. ii., p. 1098.

† *Journal of Laryngology*, vol. ii., p. 176.

1. "It can be performed by the expert quickly, almost instantly.

2. "There is no loss of blood to further prostrate the patient.

3. "There is no injury to the soft tissues, and little or no pain.

4. "There is no shock from the operation.

5. "There is no danger from septicæmia, or from erysipelas, as from an open wound.

6. "There is very little irritation from the tube, much less than from a tracheotomy tube.

7. "There is no open wound to close by slow granulation.

8. "The air enters the lungs through the natural passages.

9. "Recovery is rapid after the removal of the tube.

10. "We can do with less skilled attention than after tracheotomy.

11. "Consent of parents is much more easily obtained.

12. "We can save as large a proportion of cases as by tracheotomy at all ages, and a much larger proportion among children less than three years of age."

Stern* has analysed 519 cases of intubation with reference to age and result, and has compared them with Bourdillat's statistics of tracheotomy as follows :—

	Per cent. of Intubation recoveries.	Per cent. of Tracheotomy recoveries.
Under 2 years	15·5	3
Between 2 and 2½ years	24·5	12
,, 2½ ,, 3½ ,, ...	28·9	17
,, 3½ ,, 4½ ,, ...	33·7	30
,, 4½ ,, 5½ ,, ...	28·3	35
Over 5½ years	37·3	39·5

* *Journal of Laryngology*, vol. ii., p. 41.

In comparing the amount of attention required by a child who has been intubated, with that required by one who has been tracheotomised, it must be remembered, that so long as the intubation tube remains in the larynx, the only care the child requires is in feeding. Unfortunately at any moment the tube may be expelled by a fit of coughing, and it can only be replaced by the doctor. In this respect intubation is at a disadvantage as compared with tracheotomy, because if the tracheotomy tube should by chance slip out, the nurse can usually replace it easily, otherwise the treatment after tracheotomy requires much greater skill and attention than after intubation. Again the length of the after treatment must be remembered. In intubation the tube is seldom required longer than from four to nine days, and in no case has twenty-one days been exceeded. After tracheotomy the tube may have to be worn for weeks or even months.

Besides its great use in diphtheria, intubation has been successfully employed in other conditions of acute stenosis of the larynx—as, for instance, in scald of the larynx, œdema of the larynx, acute laryngitis, and sudden spasm of the glottis.

Intubation in Chronic Stenosis of the Larynx.

O'Dwyer,* at the Ninth International Medical Congress in 1887, read notes of five cases of chronic stenosis in which intubation was successfully carried out. The tubes provided in the intubation case are designed for children. If, therefore, adults are affected, special tubes must be employed. The series consists of ten tubes. The larger ones are made of hard rubber, the medium of brass gold-plated, with

* *New York Medical Journal* 1888, vol. xlvii., p. 255.

vulcanite heads ; the smaller tubes are made of metal only. The introducer and extractor are larger and stronger, and with a longer curve than the instruments used for children.* If practicable, there can be no doubt that intubation offers the patient the best chance of complete recovery. The immediate effect of tracheotomy is usually to cause an increase in the amount of laryngeal obstruction, as the dilating effect of the current of air passing upwards and downwards is lost. On the other hand, in intubation the presence of the tube not only tends to maintain the size of the lumen of the larynx, but it also frequently causes some enlargement. Again, intubation may tide the patient over the dangerous time, and so give an opportunity for anti-syphilitic or other treatment to act. In one of O'Dwyer's cases the tube was worn continually for ten months and four days, thus demonstrating that it may be worn for almost an indefinite period without serious inconvenience and without becoming obstructed. O'Dwyer † says that he has never found it necessary to remove a tube from an adult larynx for the purpose of cleaning, as is sometimes necessary in children. The patient becomes aware of any accumulation of mucus, and expels it by a voluntary act of coughing. Adults experience the same difficulty as children in swallowing after intubation, and solids are more readily swallowed than fluids. There is considerable difference in the power of swallowing. Some patients can do so very well from the commencement, whilst others have the greatest difficulty until the tube has been in for some time. The length of time that the tube is allowed to remain in the larynx depends on the amount of irritation and interference with deglutition which it produces. Intubation has also been found of great service in cases in

* Leffert's *Medical Record* (New York), October 4th, 1890.

† *Journal of Laryngology*, vol. ii., p. 149.

which, after tracheotomy, restoration of breathing by the natural passage had previously been found impossible.

Pitts * has put on record four cases in which, after removing cicatricial and granulation tissue, he has been enabled to intubate, and eventually to remove the tracheotomy canula.

In using intubation tubes for the purpose of dilating a stenosed larynx, the same rule holds good as in treatment by Schroetter's plan—viz., that the dilatation should be effected slowly and gradually. At the commencement the smallest tube that will admit of easy respiration, and which fits the larynx without becoming impacted, should be employed, so as to allow of a certain amount of movement during the act of deglutition. Intubation in adults is, in one respect, more difficult than in children, in consequence of its being often impossible to reach the epiglottis with the index finger; hence the aid of the laryngoscopic mirror may be necessary for the introduction of the tube, but the index finger of the left hand will be required to push the tube into the laryngeal cavity. In extracting, too, the mirror will usually be of service. Again, in the case of children with diphtheria, no force need be employed, but in the case of chronic stenosis a considerable amount of force may be required to introduce the tube into the narrowed glottis.

Thorner † has recorded a case of chronic laryngeal stenosis for which he employed intubation. The tube was removed at the end of about fifteen hours, at the patient's request. The patient died a few minutes after he left Thorner's office. The explanation of the accident is best given in Thorner's words. "After the pressure exercised for fifteen hours by the tightly fitting tube upon the infiltrated tissues

* *Medical Society's Transactions*, vol. xiv., p. 99.

† *Annals of Ophthalmology and Otology*, vol. ii., No. 3, July 1893.

had been suddenly relieved, a subglottic œdema ensued, causing a fatal issue within a short time." The lesson to be deduced from this case is the necessity of keeping the patient under supervision, for some time after the removal of the intubation tube, in cases of chronic laryngeal stenosis.

20. CICATRICIAL AND CONGENITAL MEMBRANES.

The vocal cords are occasionally found united by a membrane, or web, as it has been termed. This condition may be of congenital origin, or it may result from inflammatory mischief, giving rise to adhesion of the cords. In the latter case syphilis is almost invariably the cause.

Vivian Poore exhibited at the Seventh International Medical Congress, London, a good example of the former condition. The patient was a healthy girl, aged thirteen. The anterior thirds of the vocal cord were united by a web, "perfectly symmetrical, smooth, and apparently covered by healthy mucous membrane."*

The congenital cases are best treated by dividing the membrane with the galvano-cautery, though the simple knife may be used. Re-adhesion is to be prevented by the use of Schroetter's tubes.

The treatment of acquired adhesions will be found described under the head of "Stenosis of the Larynx." (*See* p. 415.)

21. PROLAPSE OF THE VENTRICLE.

By this term is understood the protrusion of the mucous membrane lining the sacculus laryngis, or ventricle of Morgagni, so that it becomes visible between the ventricular

* *Transactions of Congress*, vol. iii., p. 316.

bands and vocal cords. Some writers make a distinction between prolapse and eversion, but the one passes into the other by such insensible gradations that the distinction is unnecessary.

Ætiology.—Prolapse of the ventricle is favoured by a relaxed condition of the mucous membrane. Hence it may occur in connection with tuberculosis, cancer, syphilis, or any chronic catarrhal condition leading to hypertrophy of the mucous membrane. Gougenheim * reports five cases of prolapse, tuberculosis being present in four. Shallowness of the ventricle is also a predisposing cause. The usual exciting cause is an attack of violent coughing, but it has been known to follow a blow upon the larynx. It is curious that of ten reported cases in which the side affected was mentioned, in two it was bilateral, and in the remaining eight it was always the right side on which the prolapse occurred.

Symptoms.—In unilateral cases alteration in the voice is the usual, and sometimes the only symptom ; the prolapsed mucous membrane, by getting between the cords, may prevent their approximation, and lead to aphonia. Occasionally pain is complained of, and in bilateral cases the obstruction may be sufficient to cause dyspnœa.

On laryngoscopic examination the larynx will usually be found hyperæmic. In well-marked cases a swelling, directly continuous with the ventricular band, obscures, more or less completely, the vocal cord, and the entrance into the ventricle is obliterated. The swelling resembles in colour the normal mucous membrane of the larynx ; it is smooth and soft, and can be partly replaced, for a time, by pressure with the probe. The prolapse may at first be small, and may gradually increase in size. A case is recorded in which the prolapse appeared as six smooth, round, bright red tumours,

* *Centralblatt*, vol. vii., p. 127.

one of which was of the size of a cherry, and the others the size of a pea. By pressure the smaller tumours could be made to disappear between the ventricular band and vocal cord.

Diagnosis.—Prolapse of the ventricle has to be differentiated from new growths, chronic hypertrophic catarrh of the larynx and abscess. The situation of the tumour should, in the first place, suggest its possible nature. The absence of the line of demarcation between the ventricular band and the ventricle, the possibility of replacing the prolapsed mucous membrane, and the speedy recurrence of the eversion on coughing, should suffice to prevent a mistake being made.

Treatment.—In the first place, the general catarrhal condition of the larynx will require treatment by astringents. Remedies should be ordered to relieve the cough, and the patient should be advised to use his voice as little as possible. If, in spite of these measures, the tumour, after it has been replaced, continues to prolapse, attempts should be made to reduce its bulk by the application of chromic acid or the galvano-cautery, or the prolapsed portion may be removed by the cutting forceps. Jelenffy * recommends that two or three small incisions should be made into the prolapsed part daily, along the border of the ventricular bands, commencing anteriorly. By these incisions the nutrition of the prolapsed part is prevented, and it is thus caused to shrink. He succeeded in curing one case in ten days by this plan. In a case recorded by Lefferts,† thyrotomy was performed and the prolapsed mass removed. The operation was followed by relief to all the symptoms and restoration of voice.

* *Centralblatt*, vol. vi., p. 366.

† Bosworth, *Diseases of the Nose and Throat*, vol. ii., p. 714.

22. FRACTURES OF THE LARYNX AND HYOID BONE.

Fractures of the larynx and hyoid bone can be caused by direct force, as by the blow of a fist, more especially if the cartilages have lost their elasticity. They can also be caused by compression or traction, as in garrotting,* or in cases in which a handkerchief worn round the neck is caught in a machine. Attempts at cutting the throat with a blunt instrument may likewise cause fracture. Instances of the fracture of the right cornu of the hyoid bone † and of the right wing of the thyroid cartilage,‡ as the result of muscular action, have been recorded. Arbuthnot Lane's § examination of about 100 dissecting-room subjects revealed the existence of fractures of the larynx and hyoid bone in at least 9 per cent., after the exclusion of all doubtful cases. The above figures prove that these fractures are not always accompanied by severe and characteristic symptoms, and they must consequently be frequently overlooked. Lane's observations are in striking contrast with the results of clinical experience. Durham ‖ states that out of 69 cases of fracture of the larynx and hyoid bone which he has collected, 53 ended fatally; and he adds, "It is worthy of special note that every case (28 in number) in which the cricoid was fractured proved fatal." Three cases of recovery, after fracture of the cricoid, have been recorded.¶ Among Lane's specimens, however, there was certainly 1, and probably 2, examples of fracture of the cricoid cartilage. This discrepancy between the results of *post-mortem* examination and clinical experience has yet to be explained.

* *Lancet* 1893, vol. i., p. 410.
† Holmes' *System of Surgery*, 3rd edition, vol. i., p. 747.
‡ *Archives of Laryngology*, vol. iii., p. 248.
§ *Transactions of the Pathological Society*, vol. xxxvi., p. 90.
‖ Holmes' *System of Surgery*, 3rd edition. vol. i., p. 749.
¶ *Sajous' Annual* 1890, vol. iv., F. 14.

Fracture of the upper cornua of the thyroid, which, according to Lane's figures, is the most common of all the fractures, can be produced with comparative ease by a combination of lateral compression and backward pressure.

Symptoms.—In the less severe cases, after a blow or other violence to the larynx, the patients complain of pain, which is sometimes increased on swallowing, especially if the food be solid; and there may be some alteration in the voice, the patient only being able to speak in a hoarse whisper. Should the injury be more severe, a choking sensation may be complained of, the breathing may become at once difficult, and there may be cough with bloody expectoration. The patient may hardly be able to speak at all. Cyanosis may be present, and subcutaneous emphysema, extending all over the neck and trunk, has been recorded in some cases. If the patient survives the immediate shock, there may be purulent and very fœtid expectoration, in which pieces of necrosed cartilage may sometimes be detected. On manipulating the larynx, which process greatly intensifies the patient's sufferings, the nature of the fracture may sometimes be detected, and crepitus may be felt. On laryngoscopic examination, usually performed with difficulty, the configuration of the larynx may be found to be much altered. In one case* two red swellings, corresponding to the superior edges of the thyroid cartilage, filled the whole of the interior of the larynx.

Treatment.—If the fracture be at all extensive, and accompanied by dyspnœa, tracheotomy should be at once performed, even though the symptoms are not very urgent. Roe† goes so far as to say that tracheotomy should be performed immediately after the injury in all cases.

* Sokolowski, *Journal of Laryngology*, vol. iii., p. 367.

† *Archives of Laryngology*, vol. ii., p. 130.

After tracheotomy has been performed, attempts may be made to place the broken parts of the larynx in as favourable a position as possible. Subcutaneous emphysema may require to be relieved by puncture.

In less severe cases endeavour must be made to keep the larynx quiet by the application of strapping, abstinence from speaking, and feeding the patient *per rectum*. Should there be signs of inflammatory mischief ice poultices may be cautiously applied externally to the larynx.

23. OTHER INJURIES TO LARYNX.

In addition to fractures and dislocations of the larynx, there may be punctured, incised, gunshot wounds, or other injuries. Semeleder* records an unique case. A woman was stabbed in the throat with a stiletto; there was but little hæmorrhage, and the patient made a good recovery, except that she remained hoarse. On laryngoscopic examination the left vocal cord was found completely divided transversely.

24. DISLOCATION OF THE THYRO-HYOID ARTICULATION.

Occasionally the ligaments connecting the greater horns of the hyoid bone with the superior cornua of the thyroid cartilage become so relaxed, as to allow of abnormal movement of the hyoid bone on the thyroid cartilage. In one case Gibb† at the *post-mortem* found an abnormal pouch or synovial capsule around the thyro-hyoid articulation, which permitted of an extraordinary amount of movement. The author has seen two examples of this condition. The

* *Medical Record* (New York) 1890.

† *Diseases of Throat and Windpipe*, 2nd edition, p. 421.

first case was sent to him by Dr. Davidson, of Nottingham. The patient, a man of thirty-one, stated that, after a violent attack of vomiting, he felt intense pain in the throat, which lasted some hours. Since then he had had the sensation of something being out of place in the throat on the left side, and he felt a click on swallowing. On pressing over the right side of the hyoid bone, the bone could be felt and heard to slip, and this movement caused the patient pain. On laryngoscopic examination nothing abnormal could be detected. When the patient was seen five months later there was a distinct swelling of the left thyro-hyoid articulation to be felt, and he complained of some difficulty in swallowing.

The second case was that of a lady, thirty-four years of age. The first attack of displacement took place thirteen years ago, and from the account she gave it is clear that the condition lasted twenty-four hours. The pain was so great that she fainted. She stated that the attacks come on about twice a year, and they last from a few minutes to thirty-six hours. They have usually occurred when she was laughing. She feels something click on the left side of the throat, and has great pain in swallowing, even saliva. The attacks always end with the feeling of something slipping back into its place. A sneeze or a choking attack may determine this. On moving the hyoid bone laterally on the thyroid cartilage distinct grating could be felt on the left side.

H. S. Wood * and Daly † have each met with a case.

Gibb ‡ describes two cases. One was on the left side, and the other was bilateral. It is a curious coincidence that of the six cases to which reference has been made, in five the displacement took place on the left side, and in the

* *Lancet* 1890, vol. ii., p. 232.

† *Archives of Laryngology*, vol. i., p. 162.

‡ *Diseases of Throat and Windpipe*, 2nd edition, p. 420.

remaining case it was bilateral. These cases have been detailed at rather greater length than perhaps the importance of the subject requires; but Lane* appears to throw a doubt on their nature, and, as the author's personal experience agrees with Gibb's, it has been thought well to put them on record.

Treatment.—Gibb† recommended the treatment employed by Dr. Ripley in his own person. "It consisted in throwing the head backward as far as possible, so as to place the muscles of the neck upon the stretch, then relaxing the lower jaw, when the displacement becomes reduced, after a few attempts, with a click, at the same time gently pressing or rubbing over the displaced part."

Luxation of Crico-thyroid Articulation.

Braun‡ has directed attention to luxation of the crico-thyroid articulation — he is himself a sufferer: "The luxation of the inferior horn of the thyroid cartilage forward from its articulation with the cricoid cartilage, occurs during deep inspiration, and more frequently during yawning."

For further particulars of this hitherto undescribed lesion, see the article referred to.

25. FOREIGN BODIES IN THE LARYNX.

The list of foreign bodies which have passed into the larynx is now a very lengthy one, and contains all kinds of articles. Among the most numerous may be mentioned pieces of food, seeds, beans, nutshells, buttons, marbles, bullets, pebbles, pieces of money, pins, needles, pieces of glass, wood, crockery, teeth (both artificial and natural),

* *Pathological Transactions*, vol. xxxvi., p. 89.
† *Op. cit.*, p. 422.
‡ *Sajous' Annual* 1891, vol. iv., F. 13.

fragments of nasal or naso-pharyngeal polypi and tonsils, leeches, and worms, such as ascarides. In America, cockle-burs seem to possess a particular facility in finding their way into the larnyx. Between December 19th, 1889, and January 1891, Parker * met with 4 cases of burs in the larynx.

Mode of Entrance.—Foreign bodies which enter the larynx generally do so by way of the mouth. Durham † points out that "as a rule, the foreign body is drawn in from the mouth by a strong, sudden, ill-timed, or unguarded respiratory act." If, while eating, or when there is a foreign body in the mouth, the person talks, laughs, or coughs, there is always the possibility of the object entering the larynx during the inspiration which precedes these actions. Hence, children, and partially drunken or insane people, are more liable to this accident than others; also persons whose teeth are defective, or altogether absent, so that the food has been imperfectly masticated. The cases on record of suffocation during a meal are now so numerous, that the symptoms should at once draw attention to the probable cause. Yet, from time to time, in the *post-mortem* room, the larynx is found blocked with some article of food, the mode of death having been previously not suspected. The loss of sensibility of the laryngeal mucous membrane, which attends bulbar and diphtheritic paralysis, favours the entrance of foreign bodies into the larynx. A fisherman, in endeavouring to loosen a small fish which had become entangled in his net, seized its head between his teeth. The fish slipped into his throat, and he fell dead in a few moments. At the *post-mortem* examination, the fish was found lying two-thirds in the larynx, with the tail against the base of the tongue.‡

Food, after it has entered the stomach, may be vomited,

* *New York Medical Record*, vol. xl., p. 652.
† Holmes's *System of Surgery*, 3rd edition, vol. i., p. 756.
‡ *Archives of Laryngology*, vol. i., p. 104.

and, becoming impacted in the larynx, cause sudden death. Hence the necessity of administering anæsthetics on an empty stomach. The author has personal knowledge of two instances in which the inhalation of chloroform, employed by the individual himself for the relief of pain or insomnia, has led to a fatal result, on account of vomited matter occluding the larynx. Lumbrici make their way into the stomach, and thence pass into the pharynx and larynx. Another mode of entrance of foreign bodies is through the neck, as in gun-shot wounds. Tauber * describes the case of a man who was shot in the neck, and from whose left pyriform sinus he removed a bullet, one-quarter of an inch in diameter and half an inch long, twelve years later.

Situation.—Though external to the larynx, it will be convenient to include the pyriform sinus in the enumeration of the situations in which foreign bodies have been met with. Indeed, this sinus is one of the commonest spots for the body to be arrested in its downward course.

Pins, needles, and other small, pointed bodies not infrequently transfix the ary-epiglottic folds; flat and irregular bodies, such as pieces of bone, generally get caught about the level of the vocal cords; soft substances, such as pieces of meat, too large to enter the larynx, are usually found impacted in the glottis; coins, beads, buttons, and other rounded bodies, often pass into the ventricles of the larynx. At a *post-mortem* at the Westminster Hospital, on a child brought in dead, the tube of a toy balloon was found projecting between the vocal cords, and the distension of the balloon on the expiratory act which followed its entrance had effectually blocked the larynx.

The exact position of the foreign body may be most important from a medico-legal point of view. Thus, a case

* *Archives of Laryngology*, vol. ii., p. 62.

is reported in which a cork was found tightly inserted into the larynx. It was suggested that the deceased, whilst extracting the cork from the bottle with her teeth, might have had it driven, by the sudden impetus of the contained fluids, into her larynx. This theory, however, was negatived, as the sealed end of the cork was found uppermost in her throat. The medical opinion was that the cork must have been forced into the throat by another person while the woman was helpless from intoxication.*

Symptoms.—If a foreign body impacted in the glottis be sufficiently large to entirely occlude it, the symptoms of suffocation come on immediately, and if the person be not relieved within the space of one or two minutes at the outside death will speedily occur. Sharp-pointed or jagged bodies, by the irritation they produce, may excite spasm, and thus cause death almost as speedily as in the cases of complete occlusion.

If death does not at once supervene upon the entrance of the foreign body, the symptoms will be modified by its size, character, and situation. Other things being equal, the greater the bulk of the foreign body, the greater will be the dyspnœa. The amount of pain depends upon the character of the foreign substance; if it be sharp or jagged, there is usually severe pain, which is increased by the cough, so frequent an accompaniment of these cases, and by swallowing; the breathing is usually stridulous, urgent attacks of dyspnœa not uncommon, and the voice is hoarse, or even lost. On the other hand, a small round body may become lodged in one of the ventricles and give rise to hardly any symptoms. During a course of operations on the cadaver, laryngotomy was performed. On opening the larynx, a one-mark piece was found in it, and there was also perichondritis of the thyroid cartilage. The

* Taylor's *Medical Jurisprudence*, 3rd edition, vol. ii., p. 84.

patient had suffered from chronic phthisis, but, except for hoarseness, had never exhibited any symptoms of the presence of a foreign body.* Massei† draws attention to the fact that a foreign body may penetrate into the windpipe without any sign and without the knowledge of the individual, even though he be an adult in full possession of his senses. If a leech finds its way into the larynx and attaches itself to the mucous membrane, spitting of blood is usually a marked symptom.‡

Semon's§ case of the removal of a pin from the larynx of a boy, in which it had been impacted for thirteen months, is a striking example of the damage which may be wrought by the presence of a small but sharp foreign body in the larynx. In this case, there was immobility of the whole of the left half of the larynx from the inflammatory mischief set up by the pin. As an example of the length of time a foreign body may be retained in the larynx, may be mentioned a case recorded by Ravenel.‖ A boy, seven years of age, swallowed a needle. For twenty-four years his health was unaffected; then his voice became hoarse, he had a chronic cough, and lost flesh. Fourteen years later, he had a violent fit of coughing, and brought up a hard, black object, imbedded in a mass of mucous secretion, which proved to be the long-lost needle. Laryngoscopic examination, then made for the first time, showed that the needle had lain across the larynx with its ends imbedded in either ventricle.

Diagnosis.—If a laryngoscopic examination be practicable, and the foreign body can be seen, there is, of course,

* *Journal of Laryngology*, vol. iii., p. 35.
† *Ibid.*, vol. iv., p. 86.
‡ Cases by Godet, *Sajous' Annual* 1889, vol. iv., G. 24.
§ *Transactions of Clinical Society*, vol. xvi., p. 138.
‖ *Centralblatt*, vol. viii., p. 392.

an end to all doubt; but cases are constantly occurring in which patients assert that they have swallowed something, and point to the larynx as the seat of their discomfort. In some instances, the foreign body has entered the larynx and been again expelled and swallowed, but not before it has bruised or scratched the mucous membrane. Time will generally suffice to clear up these cases; occasionally, however, in neurotic patients, the sensation remains after the cause has been removed.

On the other hand, a child may be taken suddenly ill with symptoms of laryngeal stenosis, and if he should chance to have been playing with beads or buttons shortly before, the suspicion of a foreign body being in the larynx may be excited. A careful inquiry into the history of the case, the condition of the fauces, and the presence or absence of pyrexia, ought to prevent a mistake being made. A case recorded by Pick* is remarkable, on account of the absence of the severe and characteristic symptoms usually attending the entrance of a foreign body into the larynx. When the child came under observation "there were literally no symptoms except the hoarse and croupy voice, which might easily have been caused by a prolonged fit of screaming." Her temperature was 97° Fahr. The child was perfectly well when the mother left her in the morning, and the alteration in the voice came on suddenly, with nothing in the fauces to account for it and with an absence of all febrile symptoms; the child said that she had swallowed an ear-ring. Tracheotomy was performed, and the foreign body was readily felt, but could not be dislodged from its position in the ventricle. Thereupon the cricoid cartilage was divided, and the ear-ring seized with a pair of dressing-forceps, and removed.

* *Lancet* 1889, vol. i., p. 219.

Lennox Browne * has reported an instance of supposed laryngeal cancer or phthisis in a lady thirty-five years of age, from whose larynx he removed a plate of artificial teeth, which had been impacted there for twenty-three months.

Treatment.—Owing to the large number of medical men who are now familiar with the use of the laryngoscope for diagnosis and treatment, cases are constantly being recorded in which foreign bodies have been removed from the larynx under the guidance of the laryngeal mirror. Consequently, recourse to bronchotomy in these cases is daily becoming less necessary. It must, however, be remembered that, so long as there is a foreign body in the larynx, the patient is never out of danger; hence, temporizing measures, which may be justifiable if the patient be under observation in a hospital, are wholly inadmissible if he be at a distance from medical aid. Bodies situated above the glottis can usually be removed by forceps, and the results of this method of treatment have much improved since the introduction of cocaine permitted the laryngeal mucous membrane to be anæsthetised. For the purpose of removal, laryngeal forceps, opening laterally or antero-posteriorly, according to the position of the foreign body, may be employed; or Mackenzie's tube forceps, or Durham's flexible forceps, which are capable of being curved or bent in any direction (Fig. 53).

The laryngoscope has been successfully employed at very tender ages; for example, a child twenty-two months old had a splinter of bone in the larynx. This was detected by a laryngoscopic examination made while the child was half recovering from chloroform narcosis. The bone was seen to be situated between the right arytenoid and the left vocal cord. It was extracted by forceps.†

* *Medical Press and Circular*, Dec. 17th, 1890.

† *Journal of Laryngology*, vol. i., p. 113.

Crawberry * employed an ingenious method in removing a cockle-bur from the larynx. He wrapped some cotton-wool around the end of his right index finger, which he then passed down to the larynx, and, after several attempts, he succeeded in entangling and removing the bur. Max Thorner, in a similar case, succeeded in extracting the bur by means of a laryngeal probe, with a small sponge securely fastened to the end. He passed the instrument into the larynx below the bur, and a rapid and vigorous upward movement dislodged the foreign body.

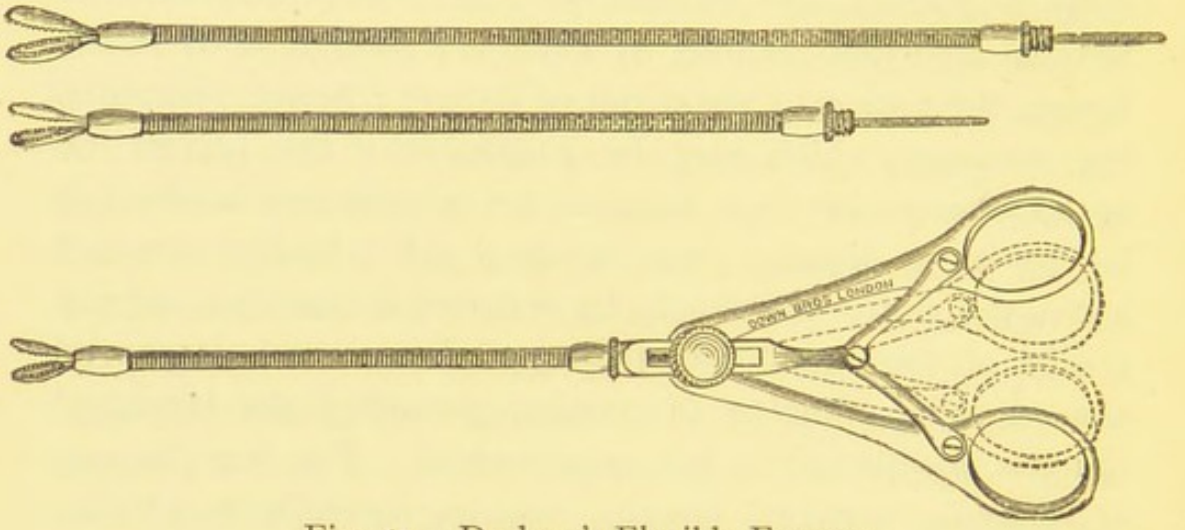


Fig. 53.—Durham's Flexible Forceps.

Emetics and sternutatories I must mention only to condemn; they do more harm than good by favouring the deeper penetration of the object, or by causing it to become impacted in the glottis and thus giving rise to sudden death.

Inversion and succussion will sometimes succeed in dislodging the substance, especially if this be hard or heavy, like a coin or a bullet. The administration of chloroform facilitates the procedure by relaxing the spasm of the glottis which is so apt to be present. On account of the liability of the foreign body to become impacted in the glottis while inversion is being practised, this proceeding is not free from

* *Journal of Laryngology*, vol. i., p. 150.

danger, and it should not be attempted unless the surgeon is prepared to do tracheotomy at once in case of need.

As far as the presence of foreign bodies in the larynx is concerned, bronchotomy should be restricted to cases in which their removal *per vias naturales* is impracticable, on account either of the urgency of the symptoms not admitting of delay, or because the patient is too young or uncontrollable (*e.g.*, some lunatics), or because the foreign body is too firmly wedged in the larynx, or out of sight in one of the ventricles.

Surgical interference may be of three kinds: (1) Tracheotomy; (2) Thyrotomy, with or without previous tracheotomy; (3) Sub-hyoidean pharyngotomy.

Tracheotomy is naturally the operation which will be undertaken in cases of great urgency, *i.e.*, where the glottis is completely occluded by a large body which cannot be removed by the forceps, and in cases of dyspnœa due to œdema or spasm of the glottis. It has happened that during the administration of chloroform, previous to the performance of tracheotomy, relaxation of the muscular spasm in the larynx has taken place, and the foreign body has been expelled either by a violent cough or by an attack of vomiting. This occurred in Kendal Franks'* case, in which a large chicken-bone was impacted in the larynx for twenty-three days. When the patient has become accustomed to the canula, further measures may be taken to promote the expulsion of the foreign body. Possibly the laryngoscope may now be employed and the body extracted with the forceps, or it may be dislodged by a probe introduced through the canula or tracheotomy wound, or inversion may be tried.

If these measures fail, *thyrotomy* is usually the alternative. In some cases—as, for example, when the foreign

* *Archives of Laryngology*, vol. iii., p. 352.

body is out of sight in the ventricle and not giving rise to urgent symptoms—thyrotomy may be suggested as the primary operation. The weight of evidence is, however, in favour of opening the trachea before doing thyrotomy. Cases are on record in which, during the performance of thyrotomy, or during the removal of the foreign body, severe attacks of suffocation have come on, necessitating the immediate and hasty performance of tracheotomy; hence, it is better that this operation should be done as a preliminary step to thyrotomy, when it can be performed carefully and deliberately. Moreover, as already mentioned, after tracheotomy has been performed, it may be possible to remove the foreign body without interfering with the framework of the larynx, with the consequent risk of damage to the voice. The previous performance of tracheotomy also permits of the trachea being tamponed during the thyrotomy, thereby preventing the entrance of blood into the lungs, and obviating one of the great dangers of operative procedures on the larynx. A partial division of the thyroid cartilage has been successfully performed for the removal of a foreign body. If carried out with the precaution above mentioned, the risk to life in thyrotomy is extremely small. As regards the integrity of the voice, this will greatly depend upon the time at which the operation is performed. If it be delayed, the presence of the foreign body, in contact with the delicate structures of the larynx, may set up so much ulceration as to render the patient permanently hoarse.

Holmes has discussed the whole question of thyrotomy for the removal of foreign bodies in an able paper in the *Medico-Chirurgical Transactions*, vol. lxv.

Lefferts * recommends *sub-hyoidean pharyngotomy* "as

* *Eighth International Medical Congress*, Section of Laryngology, p. 133.

a substitute to thyrotomy with its possible dangers of opening so large and so important a part of the air-tube, and of permanently damaging the vocal function." He says that it is specially applicable for foreign bodies impacted in the upper portions of the larynx, and even for such as are located deep within its cavity and which, from their mode of lodgment, are not removable by the natural passage.

26. LARYNGEAL CHANGES AT PUBERTY.

At puberty, as is well known, a change takes place in the voice, more especially in the male, to which the term "breaking of the voice" has been applied. This occupies usually a few weeks or months at the outside, and though the individual may be hoarse, medical advice is not sought; occasionally, however, it happens that the process is more prolonged or incomplete, and then the patients come under observation. If, as is generally the case, hoarseness be the symptom which is complained of, it will be found that there is a certain amount of laryngeal catarrh, combined with paresis of the adductors. In one case, the catarrh may be in excess, and in another the paresis may be the more important factor. Besides these more common cases of simple hoarseness, it occasionally happens that, owing to arrested development of the vocal apparatus or to inco-ordination of the muscles of phonation, the youth speaks with a high, squeaking falsetto voice (*voix eunukoïde* of Fournier). Before proceeding to treat the patient for either of these conditions, the nose and naso-pharynx must be carefully investigated and any abnormal condition rectified. If the voice still remains hoarse or squeaking, then Fournier's system of "laryngeal gymnastics" must be tried. "For the first

three or four days, the patient is taught to make deep and slow inspirations and expirations, and, on the latter, to make a sound as low as possible. The procedure is repeated for five minutes, several times daily. Subsequently, when the patient has attained a certain routine and skill, he is made to pronounce words in the same lowest tone, making them longer and longer, and, later on, to read aloud, etc. In from ten to fourteen days, the patient is cured; that is, he becomes able to speak with his new permanent voice (usually baritone or bass) with perfect ease and freedom." *

27. THE FUNCTIONS AND INNERVATION OF THE LARYNX.

The larynx has three more or less distinct functions, viz., respiratory, phonatory, and protective. Special muscles, or groups of muscles, are concerned in carrying out these functions. The abductor muscles (crico-arytenoidei postici) are the muscles which especially preside over the respiratory function, as it is by their action that the glottis remains patent. Respiration being essential to life, the nerve fibres supplying these muscles have, as we shall see later on, a bulbar representation. On the other hand, phonation is almost a purely voluntary action; hence, the nerve fibres supplying the adductors have a cortical representation. The phonatory muscles are the adductors (the crico-arytenoidei laterales, the external part of the thyro-arytenoideus and the arytenoideus), and the tensors (the thyro-arytenoideus internus and the crico-thyroideus). The third function of the larynx is the reflex action, whereby the glottis is closed to prevent the entrance of a foreign body, be it solid, liquid, or gaseous; the adductors of the cords are the muscles concerned in this case.

* *Journal of Laryngology*, vol. iii., p. 395.

The action of the abductors and adductors is clearly expressed by their name; the former cause the vocal cords to separate, the latter bring them into juxtaposition. The crico-arytenoidei laterales and the external portion of the thyro-arytenoideus close the anterior part of the glottis; the arytenoideus closes the posterior part. The tensors stretch the cords and render them tense; hence their name. How the thyro-arytenoideus internus acts it is difficult to say, and a satisfactory explanation is still wanting. The crico-thyroid was formerly considered to act by drawing downward the thyroid cartilage, but the result of recent experiment has been to show that it acts by drawing up the anterior part of the cricoid. As a result of this there is a lever-like movement of the posterior part of the cricoid and the arytenoids downwards and backwards, with a consequent separation of the extremities of the vocal cords, which are thus more or less stretched. The thyro-epiglottic muscles act as depressors of the epiglottis, and the ary-epiglottic muscles assist in closing the aperture of the larynx.

This short account of the functions of the larynx will be fitly concluded by drawing attention to Semon's * excellent paper on the position of the vocal cords in quiet respiration. He has conclusively shown that the glottis is wider open during quiet respiration (inspiration and expiration) than after death, or after division of the vagi or recurrent laryngeal nerves. This wider opening during life is brought about by a reflex tonus of the abductor muscles, due to tonic impulses, which their ganglionic centres receive from the neighbouring respiratory centre in the medulla oblongata. He further points out that the adductors ordinarily serve the function of phonation only. "Their respiratory functions are limited to (*a*) Assistance in the protection of the lower air passages against the entrance of foreign

* *Proceedings of the Royal Society*, vol. xlviii., p. 403.

bodies; (*b*) Assistance in the modified and casual forms of expiration known as cough and laughing."

It is now generally agreed that the spinal accessory is the motor nerve of the larynx. But even this, which might seem quite an elementary question, is not definitely settled, as Grabower's experiments have led him to consider the vagus as the motor nerve of the larynx, and his view has received a certain amount of support.

Accepting the generally received theory that the spinal accessory is the motor nerve of the larynx, it only remains to add that all the muscles of the larynx, except the crico-thyroid, the depressors of the epiglottis (ary-epiglottic and thyro-epiglottic muscles), and possibly the arytenoideus in part, are innervated by the inferior or recurrent laryngeal nerve, which is purely a motor nerve. Risien Russell has shown experimentally that "the abductor and adductor fibres in the recurrent laryngeal nerve are collected into several bundles, the one distinct from the other, and each preserving an independent course throughout the nerve trunk to its termination in the muscle or muscles which it supplies with motor innervation."* Onodi had previously obtained similar results.

The superior laryngeal nerve contains both sensory and motor fibres. It supplies sensory fibres to the mucous membrane of the larynx, and motor fibres to the crico-thyroid and the depressors of the epiglottis. As regards the arytenoid muscle, it certainly receives innervation from the recurrent laryngeal; fibres from the superior laryngeal have also been traced into the muscle, but it is suggested that these only traverse the muscle to reach the mucous membrane covering it.† Though, as above stated, the crico-thyroid is usually exclusively innervated by the

* Reprint from *Brain*, Parts LIX.-LX., 1892, p. 26.

† Luc, *Les Névropathies Laryngées*, p. 31.

superior laryngeal nerve, the recurrent laryngeal occasionally takes part in it. This is proved by the fact that cases have been observed in which, though only the recurrent laryngeal has been destroyed, nevertheless atrophy of this muscle has been present. This is one among other proofs of the statement, that conditions of innervation vary in different individuals.*

The remaining point to be considered is that of the central motor innervation of the larynx. The experiments of Semon and Horsley † show that there is, in each cerebral hemisphere, an area of bilateral representation of the adductor movements of the vocal cords, situated "in the foot of the ascending frontal gyrus, just behind the lower end of the præcentral sulcus." ‡ After complete excision of this area, and allowing the wound to heal, no paralysis of the cords is observed. If now the corresponding area in the opposite hemisphere be excited, a bilateral adduction of the cords is produced as completely as if the opposite area were intact.

From these facts it follows that unilateral paralysis of a vocal cord from a lesion of a cerebral hemisphere is not possible. Cases in which this condition is reported to have existed, have been recorded, notably by Garel and Dor; but, as Semon and Horsley § point out, these cases are capable of another explanation.

From what has just been stated, it follows that the phonatory or voluntary movements of the laryngeal muscles are represented principally in the cortex. On the other hand, the abductors, which are the respiratory muscles, are

* Schroetter, *Vorlesungen über die Krankheiten des Kehlkopfes*, p. 423.

† *Philosophical Transactions of Royal Society* 1890, vol. clxxxi., B. pp. 187-211.

‡ *Ibid.*, p. 197.

§ Reprint from *Brain*, Parts LIX.-LX., 1892, p. 31.

innervated by fibres which take their origin in the bulb, like other nerves which preside over the functions of organic life, the nucleus being situated in the ala cinerea in the lower half of the calamus scriptorius.

28. NEUROSES OF THE LARYNX.

Nervous affections of the larynx may give rise to interference with the movements of the vocal cords, due to disturbance in the functions of the motor nerves; or there may be an alteration in the sensibility of the laryngeal mucous membrane, the sensory nerves being involved in this case.

Under the heading of motor affections of the larynx will be considered paralysis, spasms, and troubles of co-ordination.

Altered conditions of the sensory nerves may lead to hyperæsthesia, anæsthesia, paræsthesia, or neuralgia.

29. POSITION OF VOCAL CORDS.

Before describing the different forms of laryngeal paralysis it is necessary to have a clear understanding as to positions which the vocal cords may assume. These are four in number. The first is the phonatory position, or position of adduction (*see* Plate II.). Here the cords are in the median line and almost in contact. In quiet respiration (*see* Plate I.), the cords are separated by at least twice the distance which separates them after death. This is due to reflex tonus (*see* p. 447). In forced inspiration the cords are widely apart, in extreme abduction, and almost in contact with the lateral walls of the larynx. The remaining position, the so-called cadaveric position, is that in which the cords are found after death, or after complete paralysis of the recurrent laryngeal nerves, *i.e.*, about midway between the position of adduction and that of quiet respiration.

30. PARALYSIS OF THE LARYNGEAL MUSCLES.

Absence of, or diminution in, the functional activity of the laryngeal muscles may be of neuropathic origin, or due to changes commencing primarily in the muscles themselves.

Though for the convenience of description and reference separate sections are devoted to bi- and unilateral abductor paralysis, it must be distinctly understood that, in the great majority of the cases, abductor paralysis is only the first stage of complete recurrent paralysis.

31. BILATERAL ABDUCTOR PARALYSIS.

Paralysis of the Crico-arytenoidei Postici.

Ætiology.—The causes of bilateral abductor paralysis are neuropathic (central and peripheral) and myopathic. Among the neuropathic cases of central origin has been described functional paralysis, resembling the adductor paralysis so commonly met with in hysterical females, but it is very doubtful whether there is such an affection as functional abductor paralysis.

Bulbar paralysis, disseminated cerebro-spinal sclerosis, tabes, syphilitic and other diseases of the brain, are sometimes accompanied by abductor paralysis. Burger's figures show that tabes is by far the most frequent central cause.

The peripheral causes are due to pressure on both spinal accessory, pneumogastric, or recurrent laryngeal nerves. The usual lesions giving rise to abductor paralysis are aneurysms of the arch of the aorta, cancer of the œsophagus, enlarged bronchial glands, enlargement of the thyroid gland of any nature, inflammatory, toxæmic, or other mischief implicating the trunks of the recurrent laryngeal nerves or their peripheral fibres. Of the myopathic causes, all that

can be said is, that the crico-arytenoidei postici, from their position, are extremely liable to mechanical injury during deglutition,* and they are also exposed to changes of temperature; hence, it would only be reasonable to expect that primary degenerative changes should commence in the muscles, and interfere with, or abolish, their functional activity. Bilateral abductor paralysis is almost exclusively a disease of adult life, † men being much more affected than women. A few cases have been recorded as occurring in children and infants, but the difficulty of making a satisfactory laryngoscopic examination in children of tender years prevents one arriving at a certain diagnosis in these cases.

Morbid Anatomy and Pathology.—The fact that "there is a proclivity of the abductor fibres of the recurrent nerve to become affected sooner than the adductor fibres, or even exclusively, in cases of undoubted central or peripheral injury, or disease of the roots or trunks of the pneumogastric, spinal accessory, or recurrent nerves," has been fairly established, thanks to the exertions of Semon.‡

In considering the question of bilateral abductor paralysis, the effect of an acute complete lesion of the pneumogastric or recurrent nerves has to be distinguished from the effect of an incomplete lesion, either acute or gradually progressive. In the former case, the vocal cords fall into the position termed cadaveric; in the latter, owing to the proclivity of the abductor fibres to succumb to disease before the adductor fibres, the vocal cords will be found near the median line, only separated from one another by a narrow space.

As regards the appearances found in the brain, they are

* Mackenzie, *Diseases of Throat and Nose*, vol. i., p. 453.
† Gordon Holmes, *Lancet*, vol. ii., p. 803. Semon, *ibid.*, p. 935.
‡ *Archives of Laryngology*, vol. ii., p. 197.

such as are usually seen in the diseases (bulbar paralysis, multiple cerebro-spinal sclerosis, tabes, etc.) which are the causes of the condition in question. In the cases of abductor paralysis due to direct pressure on the trunks of the pneumogastric or recurrent nerves, these nerves will be found flattened out, and at times so inextricably involved in the connective tissue that it is impossible to dissect them out. As regards the muscles themselves, they are usually found much atrophied, and represented by a few thin, pale fibres. Microscopically, the striation of the fibres is indistinct, and they are infiltrated with fatty and granular matter. Where the disease is of myopathic origin the alterations are limited to the muscles, and no changes are discoverable in the brain and nerve trunks.

Symptoms.—The symptom which first attracts the patient's attention is inspiratory dyspnœa, of a more or less paroxysmal nature, especially noticeable on exertion. This usually comes on gradually, and many months, even a year or two, may elapse before it attains its maximum. On the other hand, cases are recorded in which the onset of the dyspnœa has been acute. In severe cases, suffocative attacks occur, and the patient may be more or less cyanosed. Inspiration is attended with stridor, which is more marked at night, and it is sometimes so loud as to disturb the sleep of persons in the vicinity of the patient. There is usually no difficulty in localising the seat of the obstruction, as the patient feels that the cause of his trouble is in the larynx, and in some cases he will complain of a sense of constriction in the windpipe, or of being grasped by the throat. The voice is not markedly affected; indeed, in some cases it is almost unimpaired. Owing, however, to the dyspnœa, the patient is unable to keep up a conversation, as he is obliged to stop in order to get breath between every few words. Occasionally, hoarseness is noticeable.

On examining the patient, it will at once be seen that, while inspiration is prolonged and stridulous, expiration is comparatively easy. There is marked dilatation of the nostrils, and recession of the larynx and the supra-clavicular and epigastric regions. The larynx is seen to move up and down with respiration—the so-called "respiratory excursions" of the larynx. Laryngoscopically, the cords are seen to be sucked together during inspiration (Fig. 54), leaving between them a chink 2 or 3 millimètres in width; during expiration the glottis is wider than during inspiration. Rosenbach * contends that the inspiratory

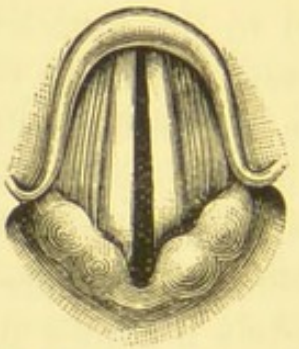


Fig. 54.—Bilateral Abductor Paralysis, Deep Inspiration.

stridor, and still greater narrowing of the glottis during the act of inspiration, is due to a perverse innervation of the adductors. Luc † supports the view of the muscular origin of the inspiratory narrowing of the glottis, on the ground that, under normal circumstances, all the muscles of the larynx contract conjointly in all laryngeal acts, and that when a patient makes an inspiratory effort, the abductors being paralysed, the adductors alone act, and consequently the glottis is narrowed. Burow, ‡ however, is of opinion that it is owing to the rarefaction of the air below, *i.e.*, to

* *Archives of Laryngology*, vol. ii., p. 364.
† *Les Névropathies Laryngées*, p. 131.
‡ *Archives of Laryngology*, vol. ii., p. 364.

negative pressure. This certainly appears the more reasonable view. The cords themselves are generally somewhat congested.

Diagnosis.—The combination of marked inspiratory dyspnœa, with comparatively free expiration and a fairly clear voice, together with the laryngoscopic appearances described above, is so characteristic that the diagnosis in uncomplicated cases is easy. The chief difficulty arises in distinguishing cases of bilateral ankylosis of the crico-arytenoid joint from the effects of paralysis. In ankylosis there is usually some alteration in the configuration of the joints, or there may be the history or other evidence of an inflammatory affection of the larynx. But at times it will be a matter of impossibility during life to differentiate between ankylosis of the arytenoids and bilateral paralysis of the crico-arytenoidei postici.*

Spasm of the adductors might, at first sight, be confounded with bilateral paralysis of the abductors, but the attack is only of very short duration, and on inquiry it will be found to have come on suddenly, and in the interval the breathing will be easy, and the vocal cords will be found to move normally. Moreover, spasm of the adductors is most frequently met with in children, whereas abductor paralysis is almost confined to adults.

Inspiratory spasm † (perverted action of the vocal cords) at first sight may suggest abductor paralysis, but on getting the patient to make the sound "*e*" for some seconds, during a laryngoscopic examination, the cords will at last be seen to separate.

The possibility of there being a double origin to the stenosis of the larynx should be remembered. The cause of the abductor paralysis may also directly bring about

* *See* p. 365.

† *See* p. 483.

stenosis of the trachea by pressure. Semon* has recorded a striking example of this, in which, in addition to causing bilateral abductor paralysis by pressure on the recurrent nerves, a (?) malignant tumour of the thyroid gland had also compressed the trachea. The author† has also reported a somewhat similar case, the compression of the trachea in this instance being due to an aneurysm of the transverse arch of the aorta. In both these cases the amount of the dyspnœa was greater than the condition of the glottis seemed to warrant, and in the latter case there was an absence of the respiratory excursions of the larynx, a circumstance pointing to tracheal obstruction.

Prognosis.—Eliminating the somewhat rare cases in which the disease is primarily myopathic and due to inflammatory and other changes in the muscles, and a few cases of peripheral neuritis (*e.g.*, lead poisoning), and cases due to pressure of enlarged glands, or of the thyroid gland on the recurrent nerves, bilateral abductor paralysis may be regarded as an incurable disease. A case‡ has, however, been recorded in which, after the symptoms had existed some years, marked improvement took place. The paralysis was probably of central origin. This case would suggest that the prognosis is not absolutely unfavourable. It should ever be borne in mind that symptoms of immediate danger to life may rapidly develop, even in cases in which the disease has been stationary for months, and in patients whose breathing is comparatively easy. Tracheotomy will, in most instances, prolong the life of the patient, but as a rule he will be unable to dispense with the canula.

The occurrence of bilateral abductor paralysis is sometimes the first intimation of the onset of tabes or bulbar paralysis.

* *Transactions of Pathological Society*, 1882.

† *Transactions of Clinical Society*, 1886, p. 80.

‡ Glasgow, *Archives of Laryngology*, vol. iii., p. 33.

Treatment.—Should there be any suspicion of lead poisoning, sulphate of magnesium with dilute sulphuric acid, followed by iodide of potassium in gradually increasing doses, in combination with the tincture of nux vomica, should be given. Sajous * has reported a case of the kind in which a permanent cure was effected in about ten weeks.

If the case be of rheumatic (myopathic) origin, the patient should be kept quiet, in a warm and uniform temperature, and he should use a soothing inhalation two or three times a day (formula No. 67, or the vapor olei pini sylvestris), and take salicylate of sodium or iodide of potassium with alkalies.

When the paralysis depends upon disease of the nerve centres, or upon pressure on the nerve trunks, iodide of potassium in large doses should be administered. Inasmuch as syphilis and aneurysm are two of the commonest causes of abductor paralysis, and as both these diseases are benefited by iodide of potassium, this drug is often given with advantage. Any other causal indication should be attended to; enlargement of the thyroid, for instance, may be treated with inunction of the red iodide of mercury ointment or of iodine ointment, or by operation. The direct application of galvanism to the affected muscles may be carried out by introducing Mackenzie's laryngeal electrode (Fig. 55) down to the œsophagus, and then drawing it up first to one side and then to the other, so as to bring the small spade-shaped electrode in contact with the muscles. Several applications should be made at each sitting, and repeated daily, or on alternate days, for some weeks, or even months. Subcutaneous injections of strychnine, gradually increased from $\frac{1}{30}$ to $\frac{1}{10}$ grain, in the neighbourhood of the larynx, may be made daily. The most important question to

* *Archives of Laryngology*, vol. iii., p. 59.

settle is the one raised by Semon*: "Under what circumstances is tracheotomy to be performed in these cases, and at what period of the disease?" The general principle he has laid down is one which nearly all laryngologists will be prepared to accept, viz., "In a case of bilateral paralysis of the posterior crico-arytenoid muscles, in which a considerable stenosis of the glottis has taken place, and marked dyspnœa is present, unless *within a short time* not only *subjective* relief, but an *actual* enlargement of the glottic opening has been obtained by whatever method might be

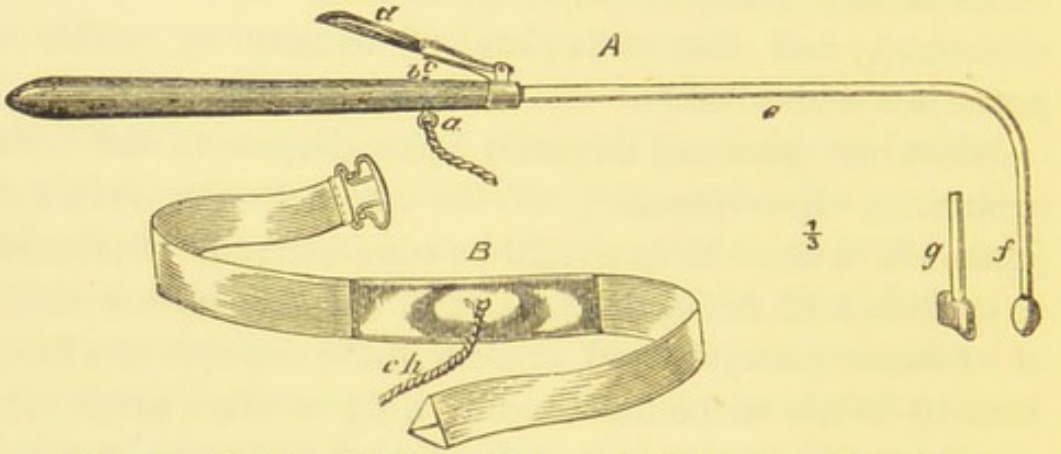


Fig. 55.—Mackenzie's Intra-laryngeal Electrode and Necklet.

employed—then tracheotomy ought to be performed without delay, not as a means of cure, but as a prophylactic measure, with a view to the subsequent removal of the tube, in case any later therapeutic efforts should produce a real cure of the affection." Unfortunately, however, as already stated, when once tracheotomy has been performed, the canula can very rarely be dispensed with.

32. UNILATERAL ABDUCTOR PARALYSIS.

Paralysis of the posterior crico-arytenoid muscle on one side.

Ætiology.—The most frequent cause of unilateral

* *Transactions of Clinical Society*, vol. xii., p. 189.

abductor paralysis is pressure upon one pneumogastric or recurrent laryngeal nerve—as, for example, by cancer of the œsophagus, aneurysm of the aorta, goitre, syphilitic gumma. The right recurrent nerve is sometimes compressed by an aneurysm of the sub-clavian, or innominate arteries, or involved in a pleural thickening at the apex of the lung. Bulbar lesions, as in tabes, neuritis of the recurrent nerve, or a primary myopathic change, are the other causes of the paralysis.

The **pathology** of the disease has already been described in treating of bilateral abductor paralysis.

The **symptoms** of unilateral abductor paralysis are often so slight that, in the absence of a laryngoscopic examination, they are doubtless frequently overlooked. The voice is usually normal, but it may be to a certain extent hoarse, rough, or feeble. The breathing is not interfered with, though there may be slight dyspnœa on exertion, due to the fundamental mischief. Laryngoscopically, the affected vocal cord will be seen immobile in the median line. This condition may be preceded by a stage of which the only sign is a defect in the outward movement of the cord. After the lapse of some time, the adductors may become paralysed also, and then the cord assumes the place it occupies in complete paralysis of the recurrent nerve, the so-called cadaveric position. This is followed by further deterioration of the voice.

Diagnosis.—Unilateral abductor paralysis has to be distinguished from complete paralysis of the recurrent nerve, and from fixation of the cord as a result of disease of the crico-arytenoid joint. The points of differentiation from the latter condition are discussed under the head of "Bilateral Paralysis."

Prognosis.—In some cases, where enlarged glands or a syphilitic growth has caused the paralysis, the absorption

of the tumour pressing on the nerve has resulted in restoration of function. In cases in which the disease is due to a neuritis, or is of myopathic origin, a more or less complete cure may be expected. If the abductor paralysis has been followed by adductor paralysis, the vocal cord becoming fixed in the cadaveric position, and if this condition has existed for any considerable time, there is not much hope of improvement.

Unilateral abductor paralysis, in itself, does not endanger life; the gravity of the condition depends upon the fact that it is so frequently due to some grave organic disease. The possibility of unilateral abductor paralysis being followed by bilateral affection of the abductor muscles has to be taken into consideration. Cases of the kind have been recorded.*

The **treatment** is the same as that for bilateral paralysis, except that tracheotomy is not required.

33. COMPLETE PARALYSIS OF THE RECURRENT LARYNGEAL NERVES.

In this affection there is loss of function in all the intrinsic laryngeal muscles,—the adductors as well as the abductors,—and the vocal cords are found in the cadaveric position. One or both nerves may be paralysed. The term "laryngoplegia" has been applied to this condition. Paralysis of the recurrent nerve is, without doubt, the most usual form of motor disturbance of the larynx.† Moritz Schmidt ‡ has collected 150 cases. Of these, 92 occurred on the left side, 46 on the right, and in 12 cases both nerves were involved; 106 men and 44 women were affected.

* Bosworth, *Diseases of the Nose and Throat*, vol. ii., p. 664.

† Schroetter, *Vorlesungen ueber die Krankheiten des Kehlkopfes*, p. 443.

‡ Luc, *Les Névropathies Laryngées*, p. 140.

Unilateral recurrent paralysis is, in the majority of cases, due to compression of the recurrent or vagus. On the left side, the recurrent is particularly liable to be pressed upon by an aneurysm of the arch of the aorta; hence, the discovery that the left vocal cord is in the cadaveric position should at once excite the suspicion of the presence of an intra-thoracic aneurysm. On the right side, the recurrent may become implicated in the pleural thickening accompanying tuberculosis of the apex of the lung. The recurrent nerve may also be compressed by a goitre, cancer of the œsophagus, tumours of the mediastinum, or enlargement of lymphatic glands. The motor nerves to the larynx may be involved in syphilitic mischief at any part of their course, from their origin to their distribution. Bilateral complete paralysis is rare; it may be due to simultaneous pressure on both recurrents (tumour of thyroid, œsophageal cancer, several aneurysms at the base of the neck, a single large aortic aneurysm, or multiple glandular enlargement). A case of bilateral paralysis due to the pressure of a pericardial effusion on both nerves has been observed. Johnson * and Baeumler have recorded cases in which pressure on one vagus has caused bilateral recurrent paralysis; the former writer has put forward the view that in these cases organic changes in the nerve centres are set up by the pressure on the pneumogastric, so that the double paralysis results from a central lesion.

Paralysis may also be due to peripheral neuritis resulting from cold,† from diphtheria, and other toxæmic conditions. Finally, bulbar lesions may give rise to recurrent paralysis, and in many of these cases the lesion is due to tabes.

If, in a case of complete recurrent paralysis, pressure on the nerves can be excluded, and if there exist, conjointly

* *Medico-Chirurgical Transactions*, vol. lviii., p. 32.

† P. S. Hutchinson, *Lancet* 1891, vol. ii., p. 120.

with the laryngeal symptoms, other paralytic manifestations in the domain of the hypoglossal or of the facial, one is led to the hypothesis of a bulbar or peribulbar lesion (for example, peribulbar syphilitic pachymeningitis). The co-existence of abductor paralysis on one side, and cadaveric position of the other, signifies a lesion of the two recurrents, or of the two vagi, or of their nuclei of origin, with more complete paralysis on the one side than the other.

Symptoms.—In complete bilateral paralysis of the recurrent nerves, there is a certain amount of dyspnœa on exertion (but not approaching in severity to that met with in

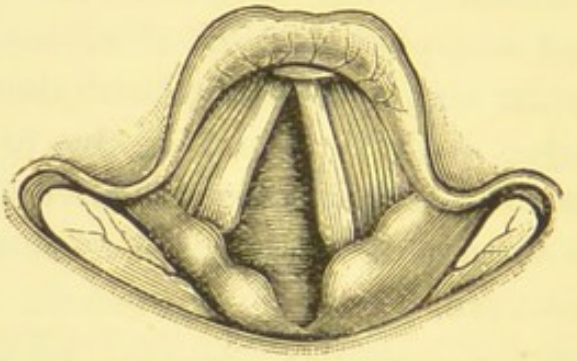


Fig. 56.—Complete Paralysis of Left Recurrent. Inspiration.

paralysis of the abductors), and the voice is feeble. On laryngoscopic examination, both cords will be found immobile in the cadaveric position.

In complete unilateral paralysis of the recurrent nerve, dyspnœa is not noticeable, and the patient is not so much aphonic as that his voice has a muffled sound. On laryngoscopic examination, the vocal cord will be found nearer the middle line (cadaveric position), than in normal quiet respiration; the free border of the cord is concave from want of tension, and there is asymmetry of the two sides of the larynx (Fig. 56). On phonation, the unaffected cord comes to the position of phonatory adduction, and sometimes even transgresses the median line so as to come

in contact with its inert fellow, the arytenoid cartilage of the sound side passing in front of the other (Fig. 57).

Diagnosis.—Complete paralysis of the recurrent nerve has to be distinguished from abductor paralysis. In the latter, the vocal cord is in the phonatory position (middle line), whereas, in complete paralysis, the vocal cord is in the cadaveric position. For the rest, what has been said of the diagnosis, prognosis, and treatment of abductor paralysis (see pp. 455—458) applies equally well to complete recurrent paralysis.

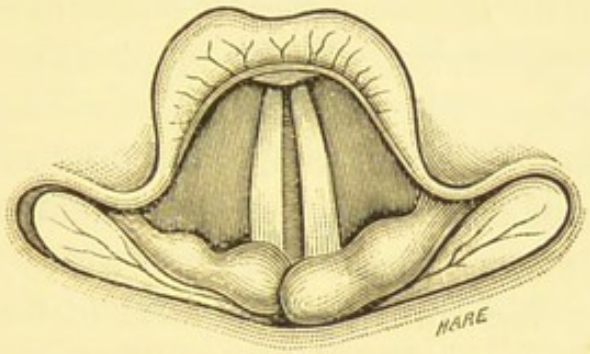


Fig. 57.—Complete Paralysis of Left Recurrent. Phonation.

34. BILATERAL ADDUCTOR PARALYSIS.

Bilateral paralysis of the crico-arytenoidei laterales and the arytenoideus; the thyro-arytenoideus is also involved.

Ætiology.—Anæmia and neurasthenia are the chief predisposing causes of bilateral adductor paralysis. Irregularity in menstruation, and pregnancy, also predispose to it. It usually occurs in women, but men may be affected, and it is not altogether unknown in children. The exciting causes are traumatism, such as removal of a tooth, emotion, especially fright, the onset of some acute diseases, such as tonsillitis, pneumonia, and exposure to cold. It may be the first evidence of hysteria, or may follow other hysterical manifestations. It occasionally occurs as a precursor of phthisis.

Morbid Anatomy and Pathology.—As this is essentially a functional disease, and does not lead to a fatal termination, no lesions have been described either in the nervous or muscular apparatus of the larnyx; it is probably due to derangement of the cortical centre for adduction. In most cases, one has to do with paresis rather than complete paralysis.

Symptoms.—*The* symptom of bilateral adductor paralysis is aphonia; it usually comes on suddenly, and disappears as suddenly. The patient may, however, cough, laugh, and sneeze quite naturally, and, if frightened, may cry out or scream involuntarily. When phonation is attempted during a laryngoscopic examination, it will be seen that, in some cases, the cords fail to approach the middle line; in others, the cords come nearly up to the middle line, leaving an opening two or three millimètres wide; and again, in others, though the cords actually meet in the middle line, nevertheless no sound is heard. The ventricular bands sometimes approach one another in a compensatory manner, so as to conceal the vocal cords. Hysterical aphonia has been observed in combination with spastic dyspnœa*—the so-called "perverse action of the vocal cords." Very frequently, a diminution or loss of sensibility in the mucous membrane of the larynx co-exists with the loss of movement.

Diagnosis.—The presence of aphonia and the laryngoscopic appearances suffice for the establishment of the diagnosis. The existence of inflammatory changes in the laryngeal mucous membrane, and conditions interfering mechanically with the approximation of the cords, will render the diagnosis of functional aphonia untenable. If diphtheria can be excluded, hysteria should be suspected. The possibility, especially in military service, of the aphonia being simulated, should always be borne in mind. A sharp

* *See* p. 483.

application of the faradic current to the vocal cords will often complete the diagnosis and cure at the same time.

Prognosis.—This affection is not attended with any risk to life, and almost invariably terminates with complete restoration of the voice. The author had, however, a patient under his care, who resisted the most persevering and energetic treatment, although the vocal mechanism was proved to be perfect by the fact that, on faradising the patient while she was under the influence of ether, she called out loudly, but immediately lost her voice on regaining consciousness.

Treatment.—The first thing to be done is to attend to the general health of the patient. If anæmia be present, iron should be administered in full doses. The addition of strychnine will improve muscular tone, and it will be found the most efficacious remedy in these cases. It should be given in doses commencing with $\frac{1}{30}$ grain, and gradually increased up to $\frac{1}{10}$ grain, three times a day, until physiological effects are produced. When the patient is in good general condition, then, and not till then, the vocal cords should be faradised by means of Morell Mackenzie's electrode (*see* Fig. 55, p. 458), or, if this be not available, by passing the current through the larynx externally. The current which is employed at the first sitting should be sufficiently strong to give a decided shock, otherwise faradisation may fail entirely. A friend of the patient should be present. Should faradisation fail, galvanism may be tried, or the static current as recommended by Fletcher Ingals.* Massage of the larynx externally has given good results in functional aphonia. Stimulating sprays, such as formulæ Nos. 62, 63, and 64, may also be employed with advantage.

Any local condition of the upper respiratory passages requiring treatment should be attended to. There are cases

* *Journal of Laryngology*, vol. iv., p. 313.

on record in which the cauterisation of hypertrophic rhinitis, the removal of hypertrophied turbinated bodies, and other nasal obstructions have been followed by cure of the aphonia. Hypnotism is said to be successful in curing functional aphonia. This is just the class of case in which one might reasonably expect to get good results from hypnotism, but it is hardly to be recommended.

35. UNILATERAL ADDUCTOR PARALYSIS.

Paralysis of the adductor muscles on one side of the larynx has been described,* but its existence from other than local causes is highly problematical, and the cases which have been reported are capable of being explained in other ways. The most probable explanation is, that in the cases in question there was complete unilateral paralysis of the recurrent nerve, the vocal cord being in the cadaveric position, and not abducted.

36. PARALYSIS OF THE ARYTENOIDEUS.

This little muscle, from its exposed situation, is extremely liable to injurious influences. It is readily involved in inflammatory mischief of the mucous membrane covering it; tuberculosis of the larynx seems especially prone to affect it, and it often succumbs in hysteria. In the two former cases, the cause of the paralysis is a myopathic process. It is frequently paralysed in combination with the other adductor muscles of the cords.

In uncomplicated cases of paralysis of the arytenoideus,

* Morell Mackenzie describes 5 cases. *Diseases of Throat and Nose*, vol. i., p. 470. Frank Donaldson, *Journal of Laryngology*, vol. i., p. 179. Schroetter, *Vorlesungen ueber des Krankheiten des Kehlkopfes*, p. 430.

the cords approximate in the anterior two-thirds, but leave a gap at the posterior third (Fig. 58).

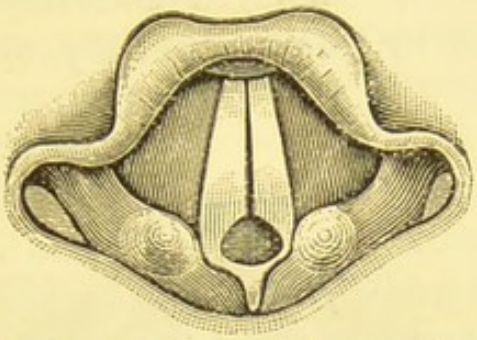


Fig. 58.—Paralysis of Arytenoideus.

The treatment is the same as that for the other forms of adductor paralysis, but the affection is sometimes very obstinate.

37. PARALYSIS OF THE INTERNAL TENSORS OF THE VOCAL CORDS.

Paralysis of the Thyro-arytenoid Muscles.

Ætiology.—Over-use of the voice, laryngeal catarrh, anæmia, and hysteria, are the chief causes of this condition. Mackenzie thinks it is probable that an actual sprain of the muscle from undue effort in vocalisation may be a cause. Some loss of power in the thyro-arytenoid muscles is frequently met with accompanying other forms of laryngeal paralysis.

Symptoms.—Feebleness of the voice, or hoarseness, is the usual symptom. The cords are generally congested and relaxed; on attempted phonation, an elliptical opening is left between them (Fig. 59). Occasionally, only one cord is affected; on attempted phonation the healthy cord will be straight in the median line, whereas the free margin of the affected cord will present a concave appearance.

Treatment.—If due to over-use or straining of the

voice, complete rest, with sedative inhalations, should be ordered. If the voice remains feeble, galvanism or faradisation should be employed endo-laryngeally, the latter form of electricity being especially useful in hysterical cases.

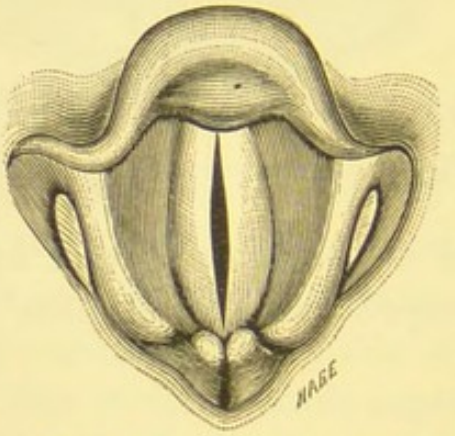


Fig. 59.—Paralysis of Thyro-Arytenoideus.

38. PARALYSIS OF THE EXTERNAL TENSORS OF THE VOCAL CORDS.

Paralysis of the Crico-Thyroid Muscles.

Ætiology.—In paralysis of these muscles the superior laryngeal nerve is affected. Diphtheria is the most frequent cause. A cold blast of air, pressure of enlarged glands on, or direct injury to, the nerves have been noted as causes. The disease may be unilateral or bilateral, but both forms are uncommon.

Symptoms.—According to Gottstein, paralysis of the external tensors gives rise to a rough, deep voice, which the patient is unable to modulate in the production of high notes. On laryngoscopic examination in bilateral cases, the glottis has a wavy outline; in unilateral cases, the affected cord will be seen to be less tense than its fellow, and lying

at a somewhat higher level. In Heymann's cases,* concavity of the free border of the vocal cords was the only objective evidence of their loss of tension.

Owing to the superior laryngeal nerve being the sensory nerve to the mucous membrane of the larynx, there will also be anæsthesia of the parts supplied by it.

Prognosis.—The danger in these cases depends upon the possibility of food and foreign bodies entering the larynx, and upon the pneumonia thereby set up.

Treatment.—The paralytic condition of the muscles is best treated by stimulating liniments or blistering over them, and by the use of faradisation. The danger of food entering the larynx may be prevented by feeding the patient through an œsophageal tube with a funnel attached to the upper part.

39. SUMMARY OF SYMPTOMS AND LARYNGOSCOPIC APPEARANCES MET WITH IN PARALYSIS OF THE NERVE TRUNKS INNERVATING THE LARYNX.†

Lesion of Pneumogastric above the Origin of the Recurrent.

In this case, in addition to the paralytic phenomena due to the implication of the recurrent fibres, there may be signs of laryngeal irritation, *i.e.*, cough and spasm.

Complete Paralysis of Vagus.

In a case of right-sided paralysis observed by Moeser,‡ the right vocal cord was in the cadaveric position; during

* Quoted by Luc, *Les Névropathies Laryngées*, p. 136.

† For these remarks I am largely indebted to Luc's excellent treatise *Les Névropathies Laryngées* 1892.

‡ *Centralblatt*, vol. ii., p. 132.

quiet respiration, the right border of the epiglottis was at a higher level than the left, due to paralysis of the muscular fibres depressing the epiglottis and innervated by the superior laryngeal; during phonation, the healthy cord was more stretched than its fellow, due to paralysis of the crico-thyroid, and the processus vocalis of the healthy side not only passed behind the corresponding part of the opposite cord, but was at a lower level. In addition to paralytic phenomena, lesion of the vagus is accompanied by loss of sensation in the laryngeal mucous membrane.

Lesion of Spinal Accessory.

Immobility of the vocal cord coinciding with paralysis of the corresponding half of the soft palate and often also of the tongue, and of the sterno-mastoid and trapezius. If there be only paralysis of the palate with paralysis of the vocal cord, one would infer a lesion of the internal branch of the spinal accessory or of the vagus, between its junction with the spinal accessory and the origin of the pharyngeal branch.

40. LARYNGEAL SPASM.

Spasm, or excessive action, may affect all the muscles of the larynx, or it may be confined to one or more muscles.

Of the first variety there is no distinct clinical evidence, though it is theoretically conceivable. Turning our attention to the three groups of muscles, viz., abductors, adductors, and tensors, there may be spasm of either of them. Only one doubtful case of spasm of the abductors is recorded. Spasm of the adductors, on the other hand, is of frequent occurrence, and is at times fatal. Spasm of the tensors sometimes occurs in connection with spasm of the adductors, producing the condition known as aphonia spastica.

41. SPASM OF THE ADDUCTORS OF THE VOCAL CORDS.

Spasmodic contraction of the crico-arytenoidei laterales and the arytenoideus, whereby the cords are approximated and the glottis closed, commonly called spasm of the glottis or laryngismus stridulus.

Ætiology.—Spasm of the adductors may occur in children or adults. Among the former it is usually met with between the ages of six months and three years; males are attacked in greater number than females. Gee has pointed out that the attacks are more frequent at the end of winter and beginning of spring, and explains the greater liability to the disease at this period of the year, as being due to the state of nervous erethism produced by the children having been kept indoors, during the winter, in warm and badly ventilated rooms. Almost all the children who suffer from laryngismus are at the same time rickety; the exact connection between the two diseases is not quite clear. A neurotic inheritance is also frequently met with. Diseased conditions of the nose, naso-pharynx, pharynx, and larynx, at times give rise to spasm of the glottis. Nasal polypi, hypertrophic rhinitis, and deflections of the septum, have all been known to do so. Lennox Browne* has directed particular attention to the connection between adenoid vegetations and laryngismus, and Mantle† has pointed out that elongation of the uvula may produce symptoms resembling laryngismus.

It must not be forgotten that spasm of the glottis may be due to a nervous lesion, which has been overlooked·

* *Journal of Laryngology*, vol. v., p. 27, and *British Medical Journal* 1890, vol. i., p. 357.

† *British Medical Journal* 1890, vol. i., p. 286.

Betz * has recorded the case of a child a year old, who died from glottic spasm; at the autopsy, a partial luxation of the atlo-occipital joint, and consequent pressure on the medulla oblongata, was discovered.

In adults, laryngismus is mostly confined to hysterical females, but cases have been recorded as occurring in males. G. Herschell,† for example, has reported the case of a man, aged thirty-six, who suffered from nocturnal spasm of the larynx.

In tabes, attacks of spasm of the adductors occur, constituting the so-called laryngeal crises; in many of these cases the affection is complicated with paresis of the abductors.‡

Morbid Anatomy and Pathology.—The disease, being essentially of functional origin, presents no *post-mortem* appearances to indicate its nature. Elsaesser attempted to explain the connection between rickets and laryngismus by attributing the symptoms to pressure on the brain, owing to the softness of the occipital bone, when the child is in the recumbent position. The most probable explanation of the relationship between these two diseases is to regard them both as the outcome of defective nutrition, producing in the one case laryngismus with hyper-excitability of the nerve centres, and in the other rickets with its osseous and other changes. According to Semon and Horsley, laryngismus is a respiratory convulsion, the nervous discharge starting from that portion of the centre which presides over the adductors of the cords. Though the unstable condition of equilibrium of the nerve centres is the prime cause of the spasm, the immediate exciting cause is often some reflex irritation, such as occurs from the

* *Centralblatt*, vol. vii., p. 26.
† *Lancet* 1893, vol. i., p. 1130.
‡ *See* p. 484.

stomach containing too much or improper food, dentition, the presence of worms, and exposure to draughts. Nasal catarrh, by occluding the nostrils and producing mouth breathing, with all its drying and irritating effect on the laryngeal mucous membrane, is not an uncommon cause. Bosworth* regards laryngismus stridulus as due to acute subglottic laryngitis. He considers that the symptoms are accounted for by inflammatory swelling, and that muscular spasm has probably little if anything to do with the condition. With this view the author cannot agree.

Symptoms.—The mode of onset varies. In children who are predisposed to laryngismus, an attack may be brought about by crying, a fit of passion, or any reflex excitement, as above mentioned. If the attack occurs at night, as is usually the case, the child wakes up with difficulty in breathing; inspiration is attended with a crowing sound, the child appears frightened, and sometimes catches hold of its throat. In cases of greater severity the breathing stops; the face, which is at first pale, soon becomes cyanosed. The accessory muscles of respiration act vigorously, but no air enters the chest. After a few seconds, a long, whistling inspiration is heard, and the breathing gradually resumes its normal character. In rare cases, the glottis remains closed, and the child dies asphyxiated. Severe cases are usually accompanied by carpo-pedal contractions (*i.e.*, spasmodic flexion of the thumb on the palm, and the hand on the wrist, the feet bent on the legs and the great toe abducted). In cases of still greater severity general convulsions occur, and may be accompanied by evacuation of urine and fæces; or, to quote Cheadle,† "Laryngismus, tetany, and general convulsions are the positive, comparative, and superlative of the convulsive

* *Diseases of the Nose and Throat*, vol. ii., p. 500.

† *Lancet* 1887, vol. i., p. 919.

state in children." This sequence of events is easily explained on the supposition of an overflow of nervous energy from the laryngeal centre to the adjacent cortical centres for the limbs.* In other cases the spasm occurs in the daytime and is only noticed when the child cries violently or gets excited. It is exceptional for only one attack to occur; they generally recur more or less frequently, increasing or decreasing in severity.

Spasm of the glottis in adults presents much the same set of symptoms as in the case of children.

Diagnosis.—Laryngismus stridulus has to be distinguished from catarrhal laryngitis. In the latter there is fever, hoarse voice and cough; and dyspnœa, if present, is more constant. In the adult, spasm of the adductors might be confounded with paralysis of the abductors; the differential diagnosis is given at p. 455.

Prognosis.—The danger to life is greater in proportion to the youth and feebleness of the patient. If all the muscles closing the glottis participate in the spasm, the attack will be shorter and less dangerous than when there is only partial closure of the glottis. In the former case, carbonic acid poisoning annihilates the excitability of the motor nerves of the adductors of the larynx before the respiratory centre is affected, whilst, in cases of incomplete closure of the glottis, there is still sufficient oxygen introduced to keep up the nervous supply to the adductors, so that the spasm continues.†

In the adult the prognosis is almost invariably good; nevertheless, the author is acquainted with one case in which tracheotomy had to be performed to avert threatened death from suffocation.

* Semon and Horsley, *British Medical Journal* 1889, vol. ii., p. 1383.

† Bresgen, *Krankheits und Behandlungslehre der Nasen, Mund, und Rachenhöhle sowie des Kehlkopfes und der Luftröhre*, p. 474.

Treatment.—At the time of the attack the child should be placed in a hot bath, and cold water may be sprinkled over the chest, or the back flapped with a wet towel. In some cases, a spank on the gluteal region will start off respiration. If the spasm does not yield to these simple measures, a whiff of chloroform will usually produce relaxation; if not, intubation or tracheotomy may be necessary. In the intervals, the general condition of the child and its hygienic surroundings should be attended to. Especial attention should be paid to the diet of the child; fresh air and cold sponging are of the utmost importance. In some cases, lancing the gums gives relief. Cod-liver oil and the syrup of the iodide of iron are the drugs on which most reliance may be placed. Bromide of potassium should be given for some time in order to diminish the tendency to spasm.

The treatment in the adult should be carried out on the same lines as in the case of children. Any abnormal condition of the nose or other organ should receive appropriate treatment, for as long as the reflex irritation exists, so long will the tendency to spasm persist. Bromide of potassium is especially useful in quieting the nervous system, and anti-spasmodics may also be given (formula No. 46).

Faradisation is sometimes effectual in stopping the spasm. In a severe case of hysterical spasm of the glottis occurring in a young woman, the spasm, which had been urgent for five hours, ceased five minutes after the application of galvanism over the larynx and in the course of the pneumogastric nerves; twenty cells being used at first, and afterwards thirty.*

* Morton, *British Medical Journal* 1891, vol. i., p. 1173.

42. INFANTILE RESPIRATORY SPASM.

Congenital Laryngeal Stridor.

In connection with laryngismus stridulus must be mentioned a curious kind of breathing met with at birth, or coming on a few weeks afterwards.

Gee * calls this condition "respiratory croaking in babies." He describes the breathing as being accompanied by a croaking noise, having more of the character of stertor than of stridor.

John Thomson † points out that, during the presence of the stridor, "inspiration begins with a croaking noise and ends in a high-pitched crow, which two of the mothers correctly described as 'very like a hen.' When the breathing is quiet, the crow does not occur, and only the croaking is heard. Expiration is accompanied by a short croak when the stridor is loud, but at other times it is noiseless." The above description exactly corresponds with a case under the author's care, in which the crowing noise was very marked.

The stridor usually increases in loudness for two or three months, and then gradually passes off. Gee knows of no case in which it lasted beyond the end of the first year. In some cases no defect in the general health can be detected, but as a rule the infants are sickly, the digestion being particularly affected.

The child seems but little, if at all, distressed by the disorder—there is no dyspnœa and no cyanosis. The stridor is increased by anything which excites the child; during sleep the stridor is sometimes absent and sometimes present, the difference possibly depending upon the soundness of the sleep.

* *St. Bartholomew's Hospital Reports*, vol. xx., p. 15.

† *Edinburgh Medical Journal*, September 1892.

In four out of the five cases recorded by Thomson, inspiratory indrawing of the chest-wall and episternal notch was well marked; but Gee states that in his cases there was no recession of the chest-wall during inspiration.

There can be but little doubt that the explanation propounded by Thomson is the correct one, viz., that "we have evidently to do here with a central functional disorder, consisting in a slight disturbance of the co-ordination which takes place in the ordinary breathing between the thoracic muscles on the one hand and those of the larynx on the other." The immediate cause of the stridor is, in all probability, spasm of the adductors of the vocal cords, but differing from the spasm met with in laryngismus in being momentary in duration.

Diagnosis.—Infantile respiratory spasm is to be distinguished from laryngismus stridulus by the following circumstances: The former is met with at birth, or comes on a few weeks later, and there is no special condition of ill-health found in connection with it: laryngismus is pre-eminently a disease of the period of first dentition and of rickety children. As already mentioned, infantile spasm is of much shorter duration than the attack of laryngismus, but, on the other hand, it is much more constant, the spasm accompanying most of the inspiratory acts for months. In laryngismus, the attacks are comparatively infrequent, occur at long intervals, but are usually very severe, causing urgent dyspnœa and cyanosis. Crying and swallowing often start off an attack of laryngismus, but infantile spasm is diminished or even checked by crying, and is not affected by deglutition. Laryngismus frequently comes on just as the child awakes from sleep; this is not the case with infantile spasm.

Prognosis.—This is invariably good, as the disorder tends to spontaneous cure.

Treatment.—No special treatment is of any use. Attention to the general health, together with regulating the diet and hygienic surroundings of the patient, is all that requires to be done.*

43. NERVOUS LARYNGEAL COUGH.

Closely allied to spasm of the adductors is a condition to which the term "nervous laryngeal cough" has been applied.

In these cases separate spasmodic contractions of the adductors, quickly following one another, are accompanied by similar contractions of the expiratory muscles, giving rise to a cough often resembling the bark of a dog. This curious condition is generally met with in girls between the ages of sixteen and twenty; it may, however, occur in boys, and it has been noticed in young children. Sir Andrew Clark† describes a similar affection under the name of "the barking cough of puberty." It usually occurs in patients who are themselves neurotic, or who have a neurotic inheritance. Gowers‡ regards some of these cases occurring in boys as belonging to the affection known as "habit chorea" or "habit spasm," and the cough may alternate with spasmodic movement in some other part of the body. In another class of cases, also in boys, he has found it always associated with the habit of masturbation, and that treatment had little or no effect until this habit was stopped, and then the patients got rapidly well whatever treatment was employed.

No local lesions in pharynx, larynx, or chest are found

* For further particulars the reader is referred to Dr. John Thomson's excellent article in the *Edinburgh Medical Journal*, September 1892.

† *Medical Society's Transactions*, vol. xiv., p. 142.

‡ *Ibid.*, p. 150.

associated with "nervous laryngeal cough." According to Clark, over-feeding occurred in all his cases.

Schroetter * has described a series of eleven cases under the head of laryngeal chorea. From his description, they probably belong to the class of cases we are now considering.

In some cases there is a dry, hard cough coming on every few minutes, or the affection may manifest itself in paroxysms consisting of a close succession of loud, dry, clanging, convulsive coughs, varying in intensity and duration. The cough may last for months, or even years, and apparently have but little effect upon the health of the patient, but constituting an intolerable annoyance to those in his vicinity. A lady, twenty-eight years of age, who had suffered from a cough of this nature for about two years, while on a voyage to Australia in the hope of curing it, had so severe an attack of spasm of the glottis that tracheotomy became necessary, but she lost her cough. Mackenzie records a similar case. These cases show that though the disease is usually more troublesome than serious, there is, nevertheless, an element of danger in it.

Treatment.—As in all neurotic affections the patient's mode of life should be suitably regulated; early hours, regular exercise, and plain, wholesome food advised. Medicinally, nervine tonics and sedatives, such as formulæ Nos. 22 and 46, may be tried. The application of a cantharides plaster to the spine over the fourth and fifth dorsal vertebræ is beneficial in some cases. Locally, brushing the interior of the throat with a 10 per cent. solution of cocaine has been suggested, but I have not found much benefit from this method of treatment. If all other plans fail, the question of a short sea-voyage should be raised. Semon states that in six out of the seven cases in which he ordered a sea-voyage, the cough, which had

* *Archives of Laryngology*, vol. i., p. 93.

previously resisted all kinds of treatment, disappeared within a short time—three weeks at the utmost—after the commencement of the voyage, and did not return.

44. SPASM OF THE TENSORS OF THE VOCAL CORDS.

Aphonia spastica. Apthongia laryngea spastica.

A spasmodic and irregular contraction of the tensor muscles of the cords, with some associated spasm of the adductor muscles; the thoracic muscles are also frequently involved.

This affection is one of the "occupation neuroses," and analogous to "writers' cramp"; hence Morell Mackenzie suggested that it should be called "speakers' cramp." It consists of a spasm of the muscles of the larynx, together with disturbance of their co-ordinating power. The cases described by Prosser James, under the heading of "Stammering of the Vocal Cords," should be included in this category. In the most marked form the greater the effort the patient makes, the less voice he produces. In the less severe varieties the patient is able to speak a few words in his ordinary tone of voice; then he either fails to articulate, or does so in a hoarse tone; and this is, in its turn, followed by the normal voice. In some cases the spasm is so prolonged that it leads to a slight degree of cyanosis.

On laryngoscopic examination, the cords, in the severe cases, may be seen to be so closely adducted that there is no opening for the expiratory current of air; in the less severe forms the cramp-like spasm is limited to the anterior part of the cords, and it is only momentary.* In another variety of phonatory spasm the patient is unable to control

* Fritsche, *Archives of Laryngology*, vol. i., p. 185.

the pitch of his voice. This is much the same condition as occurs when the voice "breaks." It persists during life. No laryngoscopic appearances have been recorded.

Prognosis.—Up to the present time but little success has attended the treatment of these cases; in a few well-marked examples there has been improvement, but the majority have defied all the methods of treatment to which they have been submitted.

Treatment.—The first thing to be done is to enjoin prolonged rest of the voice. The soothing and tonic influence of a sea-voyage would probably aid the effect of rest. Afterwards the systematic employment of vocal gymnastics should be tried. The patient should be taught how to breathe properly and to thoroughly inflate the lungs before attempting phonation. The constant current applied to the brain and spine is said to be more useful than its local application. Nervine tonics, such as strychnine, iron, and arsenic, may be administered should the patient seem to require them. The nose, naso-pharynx, pharynx, and larynx should be carefully examined, and should any abnormal condition exist, this should be appropriately treated.

As illustrating the reflex origin of aphonia spastica, Jonquière* records a case in which cure was effected by pressure on the ovaries.

45. DIPLOPHONIA.

Diplophonia is a term employed to denote the simultaneous production, during phonation, of two tones, differing in pitch. E. C. Morgan,† who has written an able article on this affection, with a bibliography, describes it under the heading of "Diphthonia or Double Voice." Temporary

* *Journal of Laryngology*, vol. iv., p. 388.
Archives of Laryngology, vol. iii., p. 48.

diplophonia may be produced by pellets of mucus adhering to the free border of the vocal cords.

Gibb * had a case in which diplophonia resulted from a wound of the left vocal cord. It occasionally results from the presence of a nodule on the vocal cord, or it may come on from paresis, as the result of chronic laryngeal catarrh.

Treatment must be directed to the removal of any local abnormal conditions.

46. MOGIPHONIA.

Fraenkel † describes under this name an "occupation neurosis" occurring in singers, clergymen, and other professionals who require to use the voice much. It consists in a painful feeling of fatigue and failure of the voice. After using the voice for a little time, there may be inability to utter a sound, but this only occurs in the professional part of phonation, viz., the preacher for preaching, and the singer for singing. The condition is one of rapid exhaustion of the muscular contractility of the larynx. Laryngoscopically, Fraenkel describes loss of tension in the cords. Bresgen ‡ has seen similar cases associated with intra-nasal disease, and the author has seen it with enlargement of the lingual tonsil.

Treatment.—The peculiar use of the voice, such as singing, preaching, etc., which led to the trouble, must be forbidden. In his cases, Fraenkel used massage over the larynx with excellent effect, forty or fifty strokes daily on each side from above, downward. Any local abnormal condition of the nose or throat must receive appropriate treatment.

* *Diseases of Throat and Windpipe*, 2nd edition, p. 188.

† *Sajous' Annual* 1888, vol. iii., p. 306.

‡ *Krankheits und Behandlungslehre der Nasen, Mund, und Rachenhöhle*, p. 397.

47. INSPIRATORY SPASM.

Perverted Action of the Vocal Cords.

In this affection the voice remains normal, but on every attempt at inspiration, the vocal cords, instead of separating, approximate in a convulsive manner. Sometimes they come in contact and cause grave interference with respiration; at other times they take a position intermediate between the phonatory and the cadaveric, giving rise to inspiratory stridor (*see* p. 455).

Treatment.—As this is a purely neurotic condition, the general health of the patient must be seen to, and nervine tonics, antispasmodics, and the cold douche ordered.

48. LARYNGEAL CHOREA.

Under the head of laryngeal chorea * have been included cases in which not only the adductors of the larynx, but also the expiratory muscles of the chest and abdomen, are affected, producing a barking cough.† There can be no advantage in grouping these cases with chorea, from which they differ essentially, inasmuch as in every instance some particular set of muscles is called into action, and the sound produced does not vary, whereas the very essence of chorea is a disorderly involuntary movement, so that it is impossible to predicate as to what will be the next move of the patient.

The cases which may properly be called "laryngeal chorea" are those in which the muscles of the larynx are alone affected. Knight ‡ has recorded an interesting case in which there was clonic spasm of the adductors of the

* Knight, *Archives of Laryngology*, vol. iv., p. 180.

† *See* "Nervous Laryngeal Cough," p. 478.

‡ *Loc. cit.*

larynx, so that the vocal cords were drawn together with such violence that they could be heard to strike.

The difficulty of making a laryngoscopic examination in patients suffering from general chorea is so great, that it is hardly possible to say whether the laryngeal muscles also participate in the choreic condition. Luc * restricts the term "laryngeal chorea" to cases in which laryngeal inco-ordination is met with in choreic patients.

49. LARYNGEAL AFFECTIONS IN TABES.

Three kinds of affections have been met with in the larynx in connection with locomotor ataxy, viz., spasm of the adductor muscles of the larynx, paralysis of the abductors, and inco-ordination of the laryngeal muscles. To the first the term "laryngeal crisis" has been applied. In the majority of cases in which laryngeal crises occur, there is, in addition to the spasm of the adductors, some loss of power, or even paralysis of the abductor muscles, but the two conditions may be independent of one another,† or there may be mixed cases.

Paralysis of the vocal cords is not an uncommon initial symptom of tabes, and may precede other evidences by some years, so that patients may consult laryngologists on account of trouble referable to the larynx, when the existence of abductor paralysis should lead to a careful investigation, and the recognition of tabes. As a rule, laryngeal crises do not occur until the tabid symptoms are well established, but they may represent the earliest symptoms of the disease.

Morbid Anatomy and Pathology.—The changes in tabes complicated with laryngeal symptoms, are met with

* *Les Névropathies Laryngées*, p. 256.

† *Ibid.*, p. 101.

in the spinal accessory, in the vagus, and more especially in the recurrent laryngeal nerves; on the other hand, the superior laryngeal has always been found exempt. The changes consist in atrophy of the nerves and interstitial sclerosis.

Semon* explains the onset of the crises by the hypothesis of an increased latent irritability of the adductor centres. A peripheral irritation, passing along the centripetal fibres of the superior laryngeal nerve to these centres, instead of giving rise, as under ordinary circumstances, to a simple attack of cough, starts off spasmodic cough, spasm of the glottis, and general convulsions, owing to the increased irritability of the centres in question. According to Burger,† there is also present in these cases an irritation in the sensory area which can cause, either directly or indirectly, spastic contraction of the glottis-closers.

Symptoms.—The symptoms of a laryngeal crisis come on quite suddenly, and consist of fits of coughing resembling whooping-cough. Dyspnœa accompanies the attacks, and sometimes they are followed by convulsions and loss of consciousness. In exceptional cases the spasm is so intense that the patient rapidly becomes cyanosed; and death has occurred under these circumstances. During the attack, the vocal cords are in the median line; in the intervals, the larynx may be found perfectly normal, but, as already mentioned, there is usually more or less impairment of abduction. Crises can, at times, be elicited by causing the patient to drink a glass of water, by touching the larynx with a sound, or by irritating the nasal fossæ.

In the second form of tabid laryngeal affection, which is by far the most common variety, we have to do with paresis or paralysis of the vocal cords, more or less per-

* *Centralblatt*, vol. viii., p. 356.
† *Ibid.*

manent in nature. Burger* has collected 71 cases of laryngeal paralysis in tabid patients. In 43 cases there was either unilateral or bilateral paralysis of the abductors. In 8 of the cases there was unilateral abductor paralysis—five times on the left side, twice on the right, and in one case the side affected was not stated. Hence, paralysis of the abductors is *the* paralysis, *par excellence*, of tabes. Unlike the ocular palsies of tabes, the laryngeal palsies usually progress up to the death of the patient; there may, however, be a change of form, *i.e.*, a double abductor paralysis has been known to pass into a complete double paralysis and consequent cadaveric position of the vocal cords.

The remaining laryngeal affection of tabes is a true ataxy of the cords. Inco-ordination of the laryngeal muscles is, however, rare. During regular and deep respiration, irregular movements of the vocal cords have been seen, *i.e.*, the vocal cords executed two or three movements of abduction or adduction instead of one. On phonation, the cords have been seen to separate suddenly as though by a sudden shock.

Treatment.—Inasmuch as the crises may be determined in a reflex manner by irritating the mucous membrane of the upper respiratory track, drugs, such as bromide of potassium, which have a general sedative effect, and cocaine, which has a local action, should be employed.†

50. LARYNGEAL AFFECTIONS IN PARALYSIS AGITANS, DISSEMINATED SCLEROSIS, AND LABIO-GLOSSO-LARYNGEAL PARALYSIS.

In a patient suffering from paralysis agitans who was carefully examined by A. Rosenberg,‡ there was a difficulty

* *Centralblatt*, vol. viii., p. 352.

† Ira Van Gieson, in a paper read before the New York Neurological Society, November 5th, 1889, with Literature of Cases.

‡ Luc, *Les Névropathies Laryngées*, p. 260.

in emitting a prolonged sound, and, above all, in maintaining the sound at its initial pitch, the voice always tending to fall. Laryngoscopically, the cords were seen to approach promptly, but they did not maintain this position long. At another time, the cords did not appear to obey the will immediately, —there was a relatively long interval between the command and the commencement of phonatory adduction. A narrow elliptical chink was left between them, which increased or diminished in a rhythmic fashion corresponding with the movements of the head and upper extremity.

In disseminated sclerosis one of the phenomena most generally noted is the monotony of the voice, this monotony being sometimes interrupted by intervals of sudden change of pitch. The speech is slow, accented, and laboured, and it has been described as "scanning." Leube has drawn attention to the sudden alterations between tension and relaxation of the vocal cords; in other words, the cords are in a state of oscillation, assimilating the tremors of the limbs, and the movements of the vocal cords are slow.

In labio-glosso-laryngeal paralysis, Kussmaul, in two cases, discovered a loss of the pharyngeal and laryngeal reflexes some months before any paralytic affection appeared. The abolition of these reflexes may give rise to attacks of suffocation, due to the entrance of foreign bodies into the air-passages, or to patches of broncho-pneumonia.

Laryngeal symptoms do not usually appear early in the disease, nor are they very marked. Gowers* points out that though paresis of the laryngeal muscles is frequently met with, "laryngeal palsy rarely becomes complete, and it is still rarer for the power of abduction to be specially lost, common as abductor palsy is in some other forms of central degeneration." The abductors are, however, sometimes affected on both sides, but more often on one. Laryngeal

* *Diseases of the Nervous System*, 2nd edition, vol. ii., p. 566.

manifestations may be the sole clinical expression of the extension to the bulb of spinal lesions.* Laryngeal crises, which are so common in tabes, are hardly ever met with in bulbar paralysis.

51. ALTERED CONDITIONS OF THE SENSORY NERVES.

(1) *Anæsthesia*, (2) *Hyperæsthesia*, (3) *Paræsthesia*, (4) *Neuralgia*.

Of these, anæthesia is the most important. It occurs in diphtheritic and bulbar paralysis, in lead poisoning, in epilepsy, and in hysteria. Accompanying diphtheritic paralysis, it may cause serious results, as food may enter the air-passages, in consequence of the loss of sensation in the laryngeal mucous membrane. In these cases patients must be fed by means of the œsophageal tube, care being taken to ensure the tube passing down the œsophagus, and not down the larynx. Foreign bodies hardly ever enter the larynx in hysterical anæsthesia.

Anæsthesia may be produced artificially, by the inhalation of chloroform (hence the importance of administering it on an empty stomach, so as to prevent vomiting and the passage of the vomit into the larynx), and by the application of cocaine.

Morbid Anatomy and Pathology.—Ott† has observed anæsthesia of one half of the larynx caused by syphilitic degeneration of the vagus at its origin. It is also met with in disease of the superior laryngeal nerve. For instance, the anæsthesia accompanying diphtheria is due to neuritis of this nerve. The lesion causing the anæsthesia may be seated in the medulla, as in labio-glosso-laryngeal

* Luc, *Les Névropathies Laryngées*, p. 188.

† *Ibid.*, p. 67.

paralysis, or at the base of the brain, or even in the cerebral hemisphere; thus a hæmorrhage or softening in the posterior part of the internal capsule may give rise to hemi-anæsthesia of the opposite side of the body. Lennox Browne * has described anæsthesia of the pharynx and larynx as an early symptom of general paralysis of the insane.

Treatment.—In diphtheritic and hysterical cases, the administration of iron and strychnine, the latter, if necessary, subcutaneously $\frac{1}{50}$ to $\frac{1}{10}$ grain, will almost invariably have a good effect. The alternate employment of galvanic and faradic electricity will usually accelerate the cure. One electrode should be placed over the thyroid cartilage, and the other in the anterior part of the pyriform sinus, so as to get as near as possible to the course of the superior laryngeal nerve.

Hyperæsthesia. Paræsthesia.

By hyperæsthesia is understood an increased sensibility of the laryngeal mucous membrane. Sometimes there is irritation, giving rise to voluntary cough; at other times the cough is involuntary and quite irrepressible. Occasionally, hyperæsthesia only manifests itself during phonation, and then it may give occasion to a veritable phonophobia.† There is, however, a great difference, normally, in the amount of response to artificial stimulation of the laryngeal mucous membrane. The mucous membrane of the larynx is usually hyperæsthetic in carcinoma and tuberculosis of this organ.

By paræsthesia is meant a perversion of sensation, *i.e.*, a scalding, tickling, or pricking sensation. In cases of greater severity the patient complains of the sensation of the presence of a foreign body, such as a hair, or a crumb,

* *The Throat and Nose and their Diseases*, 4th edition, p. 500.

† Luc, *Les Névropathies Laryngées*, p. 59.

which he tries to expel by coughing or clearing the throat. Hyperæsthesia and paræsthesia frequently occur together, and sometimes the one alternates with the other. They affect hysterical females, anæmic patients, neurasthenics, especially those exhausted by seminal losses or venereal excess.

It must be borne in mind that there may possibly be some underlying local cause, such as granular pharyngitis, or enlargement of the lingual tonsil; these conditions giving rise to uneasy sensations, which may be referred to the larynx. Localisation of sensation in the larynx is very inexact, as patients may refer to it, pain arising in the trachea or œsophagus.

Both hyperæsthesia and paræsthesia of the larynx may be due to the immoderate use of alcohol or tea; these symptoms are aggravated by disordered conditions of the stomach, or they may be the expression of irritation reflected from other organs, *e.g.*, the uterus or ovaries.

Treatment.—Attention should be paid to the general health; stomach and other visceral disorders should be appropriately treated, and if possible any local cause of irritation removed. Bromide of potassium is usually of service. Locally, sedatives, such as cocaine or morphine, may be applied in solution. The continuous current has been employed with advantage.

Neuralgia.

A pure neuralgia of the larynx, *i.e.*, attacks of pain independent of any organic disease, is of rare occurrence; it has been observed as a result of malarial poisoning. On the other hand, pain of a neuralgic character is frequently met with in cases of cancer or tuberculosis of the larynx, and occasionally in patients of a gouty or rheumatic diathesis, or in those suffering from anæmia.

Treatment.—In cases of pure neuralgia, the general treatment must be the same as for neuralgia in other parts of the body. Lennox Browne * recommends the monobromide of camphor in 3-grain doses. The continuous current in sittings of four to five minutes, one pole inserted in the larynx, over the painful spot, and the other externally, has been found useful. Externally, menthol, or camphor and chloral, may be applied to the larynx. Any organic disease present should receive attention.

52. LARYNGEAL VERTIGO.

This term has been applied by Charcot to attacks of giddiness, with or without loss of consciousness, and preceded by coughing.

Since attention was first directed to the subject by Charcot, in 1876, cases of the kind have been from time to time recorded. In 1883, Lefferts † referred to 10 cases, viz., 4 reported by Charcot, 1 each by Grey, Krishaber, Sommerbrodt, and Gasquet, and 2 by himself. McBride,‡ in an excellent *résumé* of the subject, gives a case of his own. Dauvin § has suffered from the affection himself, and has also had two patients with it. Cartaz ‖ reports 4 cases, Huguin ¶ 1, Garel ** 1, Massei †† 3, Knight ‡‡ 1, Weill §§ 1, Armstrong ‖‖ 1, and I have had one case myself.

* *The Throat and Nose and their Diseases*, 4th edition, p. 503.
† *Archives of Larnygology*, vol. iv., p. 165.
‡ *Edinburgh Medical Journal*, March 1884.
§ *Journal of Laryngology*, vol. ii., p. 75.
‖ *Centralblatt*, vol. vii., p. 124.
¶ *Ibid.*, vol. vii., p. 320.
** *Ibid.*, vol. vi., 324.
†† *Centralblatt*, i. p. 21.
‡‡ Luc, *Les Névropathies Laryngées*, p. 72.
§§ Sajous' *Annual* 1889, vol. iv., G. 25.
‖‖ *Journal of Laryngology*, vol. iv., p. 33.

Doubtless there have been other instances which have escaped my notice.

In 21 of the 27 cases which I have collected, the sex is stated, and it is a remarkable fact that in all but two men were attacked. Reference is made to the age in 17 of the cases; in 4 the patients were under thirty-five years, in 8 between forty and fifty, in 4 between fifty and sixty, and in 1 case the patient was seventy years of age. The symptom is, therefore, one which almost exclusively affects middle-aged males.

On physical examination, no very striking or constant signs are to be detected; granular pharyngitis, enlargement of the faucial or lingual tonsils, chronic laryngeal or bronchial catarrh, are the conditions most frequently seen. Sommerbrodt's* patient had a laryngeal polypus, the removal of which put an end to the attacks. Some of the patients have been gouty or arthritic.

The exact nature of the attack has not yet been definitely settled. By some it is regarded as being due to a congestive condition of the cerebral vessels, brought about by the interference with the return of blood from the brain, consequent on the paroxysm of coughing. As a result of the cerebral congestion there is disturbance of the function of the centre of equilibrium, giving rise to giddiness. By Massei, laryngeal vertigo is placed in line with epilepsy, and he refers it to an irritation of the vagus. Charcot regards it as analogous to Menière's disease, and vertigo *à stomacho læso*, the afferent nerve being the superior laryngeal, and according to his view the term "laryngeal vertigo" should be restricted to cases in which the loss of consciousness appears independently of the passive congestion brought about by the cough. Krishaber makes use of the term "spasm of the glottis of adults," in describing the condition; and I think

* Luc, *loc. cit.*, p. 73.

that McBride,* in drawing attention to Weber's experiments, supplies what is deficient in Krishaber's explanation. Weber has shown, experimentally, that forced expiration with closed glottis causes weakening and eventually stopping of the heart's action, giving rise to vertigo and even loss of consciousness. Elsberg† points out that it is to the very completeness of the spasm of the adductors that the brief duration of the attack and the safety of the patient is due, the total spasm producing unconsciousness, which is followed by relaxation of the spasm.

Symptoms.—The attack usually commences with a feeling of discomfort or irritation, referred to the larynx; thereupon the patient starts coughing, and, after a paroxysm more or less violent, he suddenly becomes giddy, and may fall to the ground unconscious; loss of consciousness, when it does occur, is, however, only of momentary duration. Convulsive movements are sometimes present. The tongue is only rarely bitten.‡ Involuntary urination does not occur. The face is generally congested, but it may be pale. The attack is not usually followed by any appearance of heaviness, but occasionally the patient has some confusion of mind. The frequency of the attacks varies considerably. In one of Charcot's cases they amounted to fifteen in one day. Cartaz's first patient had only two attacks in all. Massei's first patient had but the one attack.

Diagnosis.—Laryngeal vertigo must be distinguished from the laryngeal crises of tabes and from *petit mal*. The loss of knee-jerk, the condition of the pupils, the lightning pains and other characteristic symptoms of tabes, will usually suffice to exclude that disease. In *petit mal*,

* *Edinburgh Medical Journal*, March 1884.

† *Centralblatt*, vol. i., p. 35.

‡ Luc, *loco cit.*, p. 74.

though there is giddiness and temporary loss of consciousness, the attack is not preceded by a paroxysm of cough. As regards the biting of the tongue in laryngeal vertigo, this has been attributed to the violence of the cough; it is, moreover, not a common symptom. The absence of involuntary urination, which has been constantly noted in laryngeal vertigo, is another distinguishing point between this disease and epilepsy. It is important that the nasal passages should be examined, as the vertigo may be of aural origin, dependent on the nasal condition.

Prognosis.—Though the attacks are somewhat alarming in appearance, they are not very dangerous. Of the twenty-seven cases to which reference has been made, death occurred in two; in one the patient died in an asthmatic paroxysm, but in the other it was directly due to the attack.

Treatment.—Should there be any affection of the pharynx, such as a granular condition, elongated uvula, enlarged lingual tonsil, or chronic laryngeal catarrh, this should receive appropriate local treatment. In my case, the symptoms disappeared after granular pharyngitis had been treated with the galvano-cautery. Counter-irritation over the larynx, and the internal administration of bromide of potassium, have usually had good results. Spraying the pharynx and larynx with a 5 per cent. solution of cocaine, as soon after the commencement of the attack as possible, is well worth a trial.

53. RHEUMATIC AFFECTIONS OF THE LARYNX.

It might have been thought that the larynx, from its exposed position, and the amount of fibrous tissue in its structure, would be particularly liable to be attacked by rheumatism. This does not, however, seem to be the case. Archibald Garrod,* for instance, makes no mention of the

* *A Treatise on Rheumatism*, 1890.

larynx being affected by rheumatism. Still, the possibility of a painful affection of the larynx, which resists treatment, being of a rheumatic origin should be borne in mind, and the salicyl compounds tried. Larauza * reports the case of a physician, aged twenty-seven, with aphonia supposed to be of rheumatic origin. Laryngoscopic examination showed general hyperæmia of the larynx, with paresis of the thyro-arytenoid muscles. After the failure of a long course of treatment, sodium salicylate was tried, with speedy success.

Ingals † believes that laryngeal rheumatism is often mistaken for neuralgia. Like other rheumatic manifestations, it occurs most frequently in men, and most commonly in spring and autumn. The pains come and go in the manner characteristic of rheumatic affections, and they are relieved by the treatment which has been found most useful in this diathesis.

Hinkel ‡ draws attention to a form of sore-throat which is characterised by sudden pain on swallowing and slight elevation of temperature. The most painful spot is seated just behind the cricoid cartilage, or outside the superior cornu of the thyroid, or in the posterior wall of the pharynx. The mucous membrane is congested in a patchy way. Alkaline gargles, warmth, and alkalies internally, effect a rapid cure. In some cases, a severe cough, of a dry and painful character, is met with.

* *Sajous' Annual* 1889, vol. iv., G. 4.
† *Ibid.*
‡ *Centralblatt*, vol. vi., p. 149.

FORMULÆ.

GARGLES.

1. ℞ Acidi Borici . . . . . gr. x
   Boracis . . . . . gr. x
   Glycerini . . . . . ♏x
   Aquam ad . . . . . ℥j
   Misce.

2. ℞ Acidi Carbolici liquefacti . . . . . ♏iij
   Glycerini . . . . . ℥j
   Aquam ad . . . . . ℥j
   Misce.

3. ℞ Acidi Tannici . . . . . gr. xij
   Spiritûs Vini Rectificati . . . . . ♏vj
   Aquam Camphoræ ad . . . . . ℥j
   Misce.

4. ℞ Acidi Tannici . . . . . ℥vj
   Acidi Gallici . . . . . ℥ij
   Aquæ . . . . . ℥j
   Misce.

5. ℞ Boracis . . . . . gr. xx
   Glycerini . . . . . ♏xx
   Aquam ad . . . . . ℥j
   Misce.

6. ℞ Liquoris Potassii Permanganatis . . . ♏xij
   Aquam ad . . . . . ℥j
   Misce.

7. ℞ Potassii Chloratis . . . . . gr. xij
   Glycerini . . . . . ℥j
   Aquam ad . . . . . ℥j
   Misce.

LOTIONS.

8. ℞ Extracti Opii Liquidi . . . . . ♏xx
Liquoris Plumbi Subacetatis diluti . . . ℥j
Misce.

9. ℞ Plumbi Acetatis . . . . . gr. ij
Acidi Acetici diluti . . . . . ♏ij
Aquæ . . . . . ℥j
Misce.

10. ℞ Liquoris Ammonii Acetatis . . . . ℥j
Spiritûs Vini Rectificati . . . . . ℥ij
Aquam ad . . . . . ℥j
Misce.

MIXTURES.

11. ℞ Liquoris Ammonii Acetatis . . . . ℥iij
Spiritûs Ætheris Nitrosi . . . . . ♏xx
Aquam Camphoræ ad . . . . . ℥j
Misce.

12. ℞ Liquoris Ammonii Acetatis . . . . ℥iij
Spiritûs Ætheris Nitrosi . . . . . ♏xx
Tincturæ Camphoræ Compositæ . . . ♏xxx
Oxymellis Scillæ . . . . . ♏xxx
Aquam Menthæ Piperitæ ad . . . . ℥j
Misce.

13. ℞ Caffeinæ Citratis . . . . . gr. ij adv
Aquæ . . . . . ℥j
Misce.
(Or the granular effervescent hydrobromate of Caffeine [gr. j in ℥j] may be ordered.)

14. ℞ Syrupi Apomorphinæ Hydrochloratis (B.P.C.) ♏xxx
Syrupi Pruni Virginianæ (B.P.C.) . . . ♏xxx
Liquoris Morphinæ Hydrochloratis . . . ♏iij
Misce.

15. ℞ Liquoris Morphinæ Hydrochloratis . . . ♏iij
Spiritûs Chloroformi . . . . . ♏iij
Glycerinum ad . . . . . ℥j
Misce.

16. ℞ Liquoris Trinitrini . . . . . ♏ ½ ad j
Spiritûs Ætheris Nitrosi . . . . . ♏xx
Tincturæ Chloroformi Compositæ . . . ♏x
Aquam ad . . . . . ℥j
Misce.

17. ℞ Tincturæ Ferri Perchloridi . . . . ♏xx
Glycerini . . . . . ♏xx
Spiritûs Chloroformi . . . . . ♏xv
Aquam ad . . . . . ℥j
Misce.

18. ℞ Ferri Sulphatis . . . . . gr. ij
Magnesii Sulphatis . . . . . ℥j
Acidi Sulphurici diluti . . . . . ♏x
Spiritûs Chloroformi . . . . . ♏x
Aquam Menthæ Piperitæ ad . . . . ℥j
Misce.

19. ℞ Ferri et Ammonii Citratis . . . . . gr. x
Liquoris Arsenicalis . . . . . ♏iij
Spiritûs Chloroformi . . . . . ♏x
Aquam ad . . . . . ℥j
Misce.

20. ℞ Quininæ Sulphatis . . . . . gr. ij
Acidi Sulphurici diluti . . . . . ♏iij
Aquæ . . . . . ℥j
Solve et adde
Potassii Iodidi . . . . . gr. v
Misce.

21. ℞ Liquoris Sodii Arseniatis . . . . . ♏iij
Sodii Hypophosphitis . . . . . gr. x
Tincturæ Chloroformi Compositæ . . . ♏x
Aquam ad . . . . . ℥j
Misce.

22. ℞ Potassii Bromidi . . . . . gr. x ad xx
Liquoris Arsenicalis . . . . . ♏iij
Tincturæ Gentianæ Compositæ. . . . ♏xxx
Aquam ad . . . . . ℥j
Misce.

23. ℞ Liquoris Hydrargyri Perchloridi . . . ʒss
Sodii Iodidi . . . . . gr. iiss.
Syrupi . . . . . ʒj
Aquam Menthæ Piperitæ ad . . . . ℥j
Misce.

24. ℞ Hydrargyri Biniodidi . . . . . gr. $\frac{1}{20}$
Potassii Iodidi . . . . . gr. v
Infusi Quassiæ . . . . . ℥j
Misce.

25. ℞ Potassii Iodidi . . . . . gr. v
Liquoris Hydrargyri Perchloridi . . . ʒj
Infusum Quassiæ ad . . . . . ℥j
Misce.

26. ℞ Potassis Iodidi . . . . . gr. v
Spiritûs Ammoniæ Aromatici . . . . ♏xx
Tincturæ Gentianæ Compositæ . . . ♏xx
Aquam ad . . . . . ℥j
Misce.

27. ℞ Magnesii Sulphatis . . . . . ʒj
Magnesii Carbonatis . . . . . gr. x
Tincturæ Chloroformi Compositæ . . . ♏xv
Aquam ad . . . . . ℥j
Misce.

28. ℞ Ammonii Carbonatis . . . . . gr. x
Sodii Bicarbonatis . . . . . gr. xv
Aquæ . . . . . ℥j
et
Acidi Citrici . . . . . gr. xvij
Aquæ . . . . . ℥j

OINTMENTS.

29. ℞ Acidi Carbolici . . . . . gr. xij
Adipis Benzoati . . . . . ℥j
Misce.

30. ℞ Liquoris Atropinæ Sulphatis . . . . . ʒj
Olei Eucalypti . . . . . ʒj
Vaselinum ad . . . . . ℥j
Misce.

31. ℞ Olei Eucalypti . . . . . ʒj
Vaselinum ad . . . . . ℥j
Misce.

32. ℞ Unguenti Hydrargyri Nitratis . . . . . ʒj
Vaselinum ad . . . . . ℥j
Misce.

PAINTS AND APPLICATIONS.

33. ℞ Acidi Chromici . . . . . gr. x
Aquæ destillatæ . . . . . ℥j
Misce.

34. ℞ Argenti Nitratis . . gr. xvj, xxiv, xxxvj, xlviij, etc
Aquæ destillatæ . . . . . ℥j
Misce.

35. ℞ Cupri Sulphatis . . . . . gr. xv ad xx
Glycerini . . . . . ʒij
Aquam ad . . . . . ℥j
Misce.

36. ℞ Ferri Perchloridi . . . . . gr. xxx ad lx
Glycerini . . . . . ʒij
Aquam ad . . . . . ℥j
Misce.

37. ℞ Ferro-Aluminis . . . . . gr. xl
Glycerini . . . . . ʒij
Aquam ad . . . . . ℥j
Misce.

38. ℞ Hydrargyri Perchloridi . . . . . gr. ¼
Spiritûs Vini Rectificati . . . . . ʒij
Aquam ad . . . . . ℥j
Misce.

39. ℞ Zinci Chloridi . . . . . gr. xv ad xxx
Acidi Hydrochlorici diluti . . . . . ♏x ad xx
Glycerini . . . . . ʒij
Aquam destillatam ad . . . . . ℥j
Misce.

40. ℞ Papain . . . . . gr. xxx
Hydronaphthol . . . . . gr. ¾
Acidi Hydrochlorici diluti . . . . . ♏iv
Aquam destillatam ad . . . . . ℥j
Misce.

41. ℞ Papain . . . . . gr. ij
Acidi Lactici . . . . . ♏ij
Aquæ . . . . . ♏xxx
Misce.
(To be freshly prepared when wanted.)

42. ℞ Menthol.
Paroleine, vel Oleum Amygdalæ (10 to 50 per cent. solution).

43. ℞ Thymol . . . . . gr. ss
Spiritûs Vini Rectificati . . . . . ʒss
Glycerini . . . . . ʒ ss
Aquam ad . . . . . ℥j
Misce.

44. ℞ Iodi . . . . . gr. v ad xx
Potassii Iodidi . . . . . gr. x ad xxx
Olei Menthæ Piperitæ . . . . . ♏iij
Glycerini . . . . . ℥j
Misce.

45. ℞ Tincturæ Iodi.
Tincturæ Catechu.
Glycerini.
Partes æquales.
Misce.

PILL.

46. ℞ Zinci Valerianatis . . . . . gr. j
Pilulæ Asafœtidæ Compositæ . . . . gr. ij
Misce.

POWDERS.

47. ℞ Iodoformi . . . . . gr. j
Acidi Borici . . . . . gr. j
Morphinæ Hydrochloratis . . . . gr. $\frac{1}{6}$
Cocainæ Hydrochloratis . . . . . gr. $\frac{1}{8}$
Misce.

48. ℞ Pulveris Galangæ . . . . . gr. xx
Pulverem Amyli ad . . . . . ℥j
Misce.

49. ℞ Pulveris Sanguinariæ . . . . . gr. xv
Pulverem Amyli ad . . . . . ℥j
Misce.

50. ℞ Pulveris Lobeliæ.
Pulveris Stramonii.
Pulveris Theæ (Black Tea).
Potassii Nitratis.
Partes æquales.*
Misce.

SOLUTION.

51. ℞ Cocainæ Hydrochloratis . . . . . gr. lxxx
Resorcin . . . . . gr. xl
Aquæ destillatæ . . . . . ℥j
Misce.

SPRAYS.

52. ℞ Sodii Bicarbonatis . . . . . gr. iiiss
Sodii Chloridi . . . . . gr. iiiss
Boracis . . . . . gr. iiiss
Sacchari Albi . . . . . gr. vij
Aquæ . . . . . ℥j
Misce.
(To be mixed with an equal quantity of hot water.)

* See *The Extra Pharmacopœia*, Martindale, 7th edition, p. 342.

53. ℞ Sodii Bicarbonatis . . . . . gr. viiss
Boracis . . . . . gr. viiss
Listerine * . . . . . ʒij
Aquam ad . . . . . ℥j
Misce.

54. ℞ Acidi Carbolici . . . . . gr. j ad ij
Sodii Bicarbonatis . . . . . gr. vj
Boracis . . . . . gr. vj
Glycerini . . . . . ♏xx
Aquam ad . . . . . ℥j
Misce.

55. ℞ Acidi Borici . . . . . gr. vj
Boracis . . . . . gr. vj
Sodii Chloridi . . . . . gr. iij
Aquæ . . . . . ℥j
Misce.

56. ℞ Sodii Chloridi . . . . . gr. v
Liquoris Potassii Permanganatis . . . ♏v
Aquam ad . . . . . ℥j
Misce.

57. ℞ Zinci Sulphatis . . . . . gr. v ad x
Aquæ . . . . . ℥j
Misce.

58. ℞ Potassii Chloratis . . . . . gr. x
Aquæ . . . . . ℥j
Misce.

59. ℞ Resorcin . . . . . gr. v
Aquæ . . . . . ℥j
Misce.

60. ℞ Liquoris Iodi . . . . . ♏vj
Acidi Carbolici Liquefacti . . . . . ♏iij
Aquam ad . . . . . ℥j
Misce.

* See p. 506.

61. ℞ Papain . . . . . gr. xvj
Acidi Lactici . . . . . ♏xvj
Aquam ad . . . . . ℥j
Misce.

62. ℞ Ferri Perchloridi . . . . . gr. iij
Glycerini . . . . . ♏x
Aquam ad . . . . . ℥j
Misce.

63. ℞ Ferro-Aluminis . . . . . gr. iij
Glycerini . . . . . ♏x
Aquam ad . . . . . ℥j
Misce.

64. ℞ Zinci Chloridi . . . . . gr. ij
Acidi Hydrochlorici diluti . . . . . ♏iij
Tincturæ Limonis . . . . . ♏xv
Aquam destillatam ad . . . . . ℥j
Misce.

65. ℞ Glycerini Acidi Tannici . . . . ♏xx ad lxx
Aquam ad . . . . . ℥j
Misce.

66. ℞ Glycerini Aluminis . . . . . ♏xxxvj
Aquam ad . . . . . ℥j
Misce.

Note.—The solutions for spraying the nostrils should be at a temperature of 100° Fahr.

INHALATIONS.

67. ℞ Tincturæ Benzoini Compositæ . . . .

68. ℞ Thymol . . . . . gr. vi
Spiritûs Vini Rectificati . . . . . ℥j
Magnesii Carbonatis Levis . . . . gr. ij
Aquam destillatam ad . . . . . ℥j
Misce.

Of either of these a teaspoonful in a pint of water at 140° Fahr. should be used for each inhalation.

The Vapor Creasoti, Vapor Olei Pini Sylvestris, and the Vapor Iodi of the B.P. may be employed as indicated in the text.

69. ℞ Balsami Peruviani . . . . . ʒvss
Spiritûs Vini Rectificati . . . . . ʒiiss
Misce.

Twenty to thirty drops in a pint of water at 140° Fahr. for inhalation.

CARBOLIZED SMELLING SALTS.

70. ℞ Acidi Carbolici Liquefacti . . . . . ʒj
Ammonii Carbonatis . . . . . ʒij
Pulveris Carbonis Ligni . . . . . ʒij
Tincturæ Benzoini Compositæ . . . . ʒi
Olei Lavandulæ . . . . . ♏vj
Liquoris Ammoniæ Fortioris . . . . q. s.
Misce.

71. Liebig's original formula for essence of meat :—

Mix one pound fresh minced lean beef with one pint of distilled water, to which two to four drops of hydrochloric acid and fifty to ninety grains of common salt have been added. After standing in the cold for one hour, strain through a hair sieve without pressure, and re-strain until the filtrate be clear, adding sufficient water on the sieve to obtain one pint of essence.

Listerine* contains the essential principles of thyme, eucalyptus, baptisia, gaultheria, and mentha arvensis. Each fluid drachm also contains two grains of benzo-boracic acid. Listerine is a useful and pleasant antiseptic. It may be used in the proportion of one part to two of water.

* See formula No. 53.

INDEX OF AUTHORS.

Abel, 26.
Abercrombie, 194.
Abraham, 201.
Adams, 259.
Allen, Harrison, 303.
Alvin, 120.
Armstrong, 491.
Arnold, 190.
Asch, 204.

Baber, 3, 59.
Baeumler, 461.
Baginski, 395.
Baldwin, J. F., 375.
Ball, J. B., 300, 419.
Bandler, 112.
Baratoux, 395.
Barcilay, 91.
Barlow, 407.
Barrs, 77.
Baumgarten, 111.
Bayer, 33, 347.
Beale, Clifford, 279, 367.
Berkart, 49.
Berliner, 25, 37.
Beschorner, 381.
Betz, 472.
Billroth, 222.
Black, 163.
Blackley, 48, 49.
Bókai, 186, 188, 189.
Booker, 257.
Bosworth, 11, 12, 19, 22, 23, 24, 26, 37, 44, 47, 48, 65, 68, 75, 92, 147, 172, 174, 180, 185, 193, 201, 236, 240, 244, 246, 252, 254, 313, 377, 386, 460, 473.
Bourdillat, 424.
Boylan, 250.
Braun, 435.
Bresgen, 15, 44, 474, 482.
Bristowe, 270.
Brockbank, 316.
Bronner, 69, 70, 143, 161.
Brown, Bedford, 296.
Brown, M. R., 135, 139, 142.
Browne, Lennox, 56, 130, 133, 184, 185, 199, 202, 203, 205, 226, 250, 356, 373, 379, 417, 441, 471, 489, 491.
Burckhardt, 189.
Burger, 451, 485, 486.
Burow, 371, 454.
Butlin, 158, 214, 244, 245, 246, 247, 378, 379, 383, 385.

Cardone, 8.
Carrington, 297.
Cartaz, 93, 161, 362, 408, 491, 493.
Charazac, 348, 395.
Charcot, 491, 492, 493.
Cheadle, 473.
Cheyne, Watson, 189, 277.
Chiari, 113, 116, 122, 204, 217, 219, 292.
Clark, Sir Andrew, 56, 180, 478, 479.
Clutton, 93, 168.
Cohen, Solis, 184, 276, 278, 389, 403, 405, 415.
Collier, Mayo, 64, 63.
Cooper, 139.
Cozzolino, 41, 94.
Crawberry, 442.

Cripps, Harrison, 242.
Crocker, Radcliffe, 202.
Curtis, 60.

D'Aguanno, 129.
Dalby, 163.
Daly, 48, 117, 434.
Dauvin, 491.
De Gassicourt, 267.
De la Sota, Ramon, 203, 301.
Delavan, Bryson, 37, 63, 239.
Demme, 346.
De Santi, 238.
Désiré, 238.
Dessar, 32.
Diday, 208.
Dittrich, 351.
Dobell, 33.
Dodd, 106.
Donaldson, 245, 466.
Donkin, 320.
Dor, 246, 449.
Downes, 258.
Downie, 175.
Duckworth, Sir Dyce, 302, 303.
Dupré, 188.
Durham, 107, 293, 297, 431.

Echevarria, 122.
Ellis, 140.
Elsaesser, 472.
Elsberg, 493.
Escherich, 272.
Eve, 353.

Fagge, 111.
Fagge and Pye-Smith, 282, 283, 284.
Fauvel, 346, 378.
Ferrier, 126.
Fischer, 122.
Flint, 41.
Fournier, 29, 445.
Fowler, 184.
Fox, Colcott, 213, 301.
Fraenkel, 31, 77, 194, 287, 324, 326, 342, 343, 344, 382, 482.
Franks, Kendal, 443.
Freundenthal, 60.
Fritsche, 480.
Fronstein, 396.
Fullerton, 76.

Galen, 121.
Gané, 207.
Gann, T., 232.
Garel, 366, 449, 491.
Garrod, Sir A., 302.
Garrod, A. E., 226, 494.
Gasquet, 491.
Gaucher, 122.
Gay, 194.
Gee, 197, 269, 284, 476, 477.
Geneuil, 121.
Gerhardt, 288, 292, 351.
Gibb, 322, 346, 358, 373, 433, 434, 435, 482.
Glasgow, 456.
Gleitsmann, 198, 199, 324.
Glover, J. G., 222.
Godet, 439.
Goodhart, 284.
Goodwillie, 71.
Gottstein, 36, 43, 162, 380, 468.
Gougenheim, 347, 349, 369, 392, 429.
Gough, 321.
Gowers, 126, 130, 478, 487.
Grabower, 448.
Grant, Dundas, 124, 125, 135, 138, 163.
Grey, 491.
Groenbech, 164, 167.
Gross, 107.
Gruening, 248.
Gruenwald, 81, 87, 147, 148, 370.
Gubb, 219.
Guinier, 395.
Guttman, 291.
Guye, 60.

Habermann, 27.
Hack, 41, 42, 43.
Haddon, 270.
Hahn, 383.
Haig-Brown, 226.
Hajek, 26, 76, 77, 348.
Halford, Sir Henry, 303.
Hamilton, 117.
Harkin, 109, 121.

Hartmann, 161.
Heath, Christopher, 30, 140, 142, 144.
Helbing, 297.
Hendley, 103, 104.
Herff, Von, 290.
Herschell, G., 472.
Heryng, 21, 137, 198, 200, 218, 219, 328, 395, 397, 398, 399.
Hewetson, 72.
Heymann, 469.
Highet, 190.
Hill, Berkeley, 412.
Hill, W., 72, 227.
Hillis, 298.
Hilton, 189.
Hinkel, 495.
Hodgkinson, 327.
Hoffman, 289.
Holden, 278.
Holmes, Gordon, 331, 332, 452.
Holmes, Timothy, 444.
Hopmann, 44.
Horsley, 449, 472, 474.
Houdeville, 116.
Hovell, Mark, 158, 374.
Hubbell, 59.
Huguin, 491.
Hulke, 145, 241.
Hunt, 38, 39, 203, 205, 321.
Hutchinson, Jonathan, 75, 78, 79, 94, 205.
Hutchinson, P. S., 461.

Illingworth, 272, 274.
Ingals, Fletcher, 329, 332, 374, 465, 495.
Isambert, 194, 195.

James, Prosser, 480.
Jamison, 175.
Jarvis, 19, 59.
Jelenffy, 430.
Joal, 111.
Johnson, Sir George, 346, 373, 461.
Johnston, McKenzie, 167.
Jonquière, 481.
Juler, 145.

Kelly, 138, 142.
Kidd, Percy, 317, 365, 391, 399.
Kiesselbach, 112.
Kjellmann, 42.
Klein, 260.
Knight, C. H., 149, 242, 339, 483, 491.
Koch, 286, 353.
Korkunoff, 386.
Krause, 27, 141, 397, 399.
Krieg, 342.
Krishaber, 491, 492.
Kussmaul, 487.

Labus, 338.
Lane, Arbuthnot, 431.
Larauza, 495.
Laurent, 46.
Laveran, 304.
Lefferts, 4, 16, 22, 239, 241, 430, 444, 491.
Leube, 487.
Lichwitz, 138, 374.
Lieven, 39.
Lincoln, 166, 284.
Linderstroem, 208.
Loeri, 347.
Loewenberg, 25, 158.
Loewenstein, 35.
Louis, 289.
Loupiac, Honoré, 180.
Lublinski, 201.
Luc, 28, 152, 330, 448, 454, 469, 484, 486, 488, 489.
Luening, 352.

McBride, 44, 251, 252, 491, 493.
MacDonald, Greville, 20, 64, 74, 92, 120, 133, 140, 147, 148.
Mackenzie, Hunter, 68, 133, 141, 370, 399.
Mackenzie, J. N., 76, 212, 408.
Mackenzie, Morell, 48, 53, 57, 89, 98, 108, 129, 130, 225, 241, 249, 255, 283, 298, 302, 321, 331, 338, 346, 360, 366, 370, 377, 387, 389, 393, 400, 452, 466, 479, 480.
Mahomed, 113.
Malgaigne, 133.

Mandelstamm, 304.
Mantle, 254, 471.
Marsano, 26.
Marty, 202.
Masini, 300.
Massei, 70, 153, 276, 292, 375, 439, 491, 492, 493.
Matheson, 61.
Meyer, 152, 157, 161, 342, 344.
Michael, 251.
Michel, 23, 25.
Michelson, 97.
Mikulicz, 142.
Moeser, 469.
Montard-Martin, 304.
Moore, C. H., 42.
Moore, Norman, 301.
Morgan, E. C., 255, 481.
Morrice, 267, 269.
Morton, 475.
Mosler, 110.
Moure, 40, 70, 96, 176.

Natier, 210.
Newman, 89, 90, 245, 247, 352, 380, 382, 385, 418.
Noquet, 31.

Obermeier, 111.
O'Dwyer, 419, 425, 426.
Oertel, 262.
Onodi, 448.
Ott, 488.

Paget, Sir James, 144.
Paget, Stephen, 190, 191.
Pargamin, 248, 249.
Parker, 436.
Parker, W. R., 277.
Paulsen, 150.
Payne, 99.
Pick, 440.
Pins, 33.
Pitts, 427.
Plicque, 90.
Pollak, 400.
Pollard, 189.
Poore, Vivian, 428.
Porcher, W. P., 224.
Porter, 293, 326.
Potter, 39.
Poulet, 221.

Raulin, 38.
Ravenel, 439.
Rendu, 304.
Réthi, 225.
Rice, 235, 339, 340.
Rivington, 220.
Robertson, 25, 37, 59, 87, 99, 136.
Roe, J. O., 103, 219, 432.
Rose, H. Cooper, 117.
Rosenbach, 454.
Rosenberg, 345, 486.
Rosenfeld, 77.
Rosenthal, 65.
Rossbach, 374.
Ruault, 35, 237.
Russell, Risien, 448.

Sajous, 9, 16, 51, 55, 107, 252, 297, 320, 338, 358, 456.
Salter, 130.
Schaeffer, Max, 147.
Schech, 23, 31, 141, 144, 147, 183, 185, 253.
Scheinmann, 344.
Schmidt, 138, 395, 399, 460.
Schmiegelow, 47, 133.
Schneider, 42.
Schnitzler, 382, 387, 389, 391, 411.
Schrakamp, 263.
Schroetter, 347, 358, 415, 417, 449, 460, 466, 479.
Schuster, 98, 288.
Schwabach, 149.
Schwartz, 366.
Sedziak, 67, 386.
Seeligmann, Max, 101, 102.
Seifert, 38.
Semeleder, 433.
Semon, 45, 83, 99, 111, 135, 206, 238, 255, 293, 334, 335, 344, 363, 366, 376, 379, 396, 405, 410, 418, 439, 447, 449, 452, 456, 458, 472, 474, 479, 485.
Senator, 291.
Sestier, 344, 353.
Sevestre, 304.

Sewill, H., 133, 134.
Shelly, 286.
Sidlo, 35.
Silk, 158.
Slaton, 106.
Smith, Eustace, 270.
Smith, Thomas, 71.
Sokoloff, 185.
Sokolowski, 432.
Sommerbrodt, 340, 341, 394, 491, 492.
Spicer, Scanes, 61, 154, 250.
Stein, Von, 42.
Stern, 424.
Stevenson, 222.
Stewart, W. R. H., 148.
Stockton, 326.
Stoerk, 312, 370, 389.
Strassmann, 200.
Struebing, 245.
Symonds, Charters, 423.

Tauber, 437.
Taylor and Stevenson, 438.
Terillon, 249.
Thomson, 476, 477, 478.
Thorner, 216, 303, 427, 442.
Thorne-Thorne, 257, 285.
Thrasher, 251.
Tissier, 369, 392.
Tornwaldt, 149, 151.
Trautmann, 152.
Trendelenberg, 418.
Treves, 242.
Trousseau, 23, 27.
Tuerck, 389, 401.
Turner, 188.

Valentin, 25.
Vanderpoel, 218.
Van Gieson, Ira, 486.
Verneuil, 109, 110, 121.
Vierordt, 337.
Virchow, 135, 291, 302, 340, 341, 342, 367.
Volkmann, 92.
Voltolini, 45, 375.
Vouwiller, 288.

Wagner, Clinton, 126.
Wagnier, 41.
Wagret, 221.
Walsham, 64, 65, 70, 164, 167.
Warden, 165.
Watson, Spencer, 25, 96, 133.
Watson, Sir Thomas, 302.
Waxam, 423.
Weber, 493.
Weill, 491.
West, Charles, 283.
West, Samuel, 273.
Wheelock, 187.
Whistler, 404, 416.
Wilks, 289.
Williams, R., 146.
Woakes, 81.
Wolfenden, 190, 287, 366, 400, 419.
Wolkowitsch, 99, 100.
Wood, H. S., 434.
Wright, 238, 243.

Zaufal, 22, 24.
Zaverthal, 400.
Ziemssen, Von, 314, 353.
Zuckerkandl, 63, 76.
Zwaardemaker, 125, 126, 127, 128.
Zwillinger, 337.

INDEX.

Abductor fibres, proclivity to disease, 452.
— paralysis, bilateral, 451.
— — unilateral, 458.
Abscess in brain from suppuration of frontal sinus, 145.
— of larynx, 359.
— peri-tonsillar, 229.
— retro-pharyngeal, 185.
Acne, reflex nasal origin of, 42.
Adductor paralysis, bilateral, 463.
— — unilateral, 466.
Adductors of cords, spasm of, 455, 471.
Adenoid vegetations, 152.
Adenoma, nasal, 80.
— of naso-pharynx, 167.
Adhesion of palate to pharynx, 215.
Albuminuria in diphtheria, 265.
— in tonsillitis, 231.
Alcoholic spray in treatment of polypi, 87.
Anæmia of larynx, 388.
Anæsthesia in removal of adenoids, 158.
— of larynx, 469, 488.
— of pharynx, 224.
Angina Ludovici, 293.
Angioma, nasal, 88.
— of larynx, 367.
— of pharynx, 190.
Angio-neurotic œdema of larynx, 345, 348.
Animals as a cause of diphtheria, 260.
Ankylosis of crico-arytenoid joint, 363.
Ankylosis of crico-arytenoid joint from inherited syphilis, 410.
Anosmia, 124.
— congenital, 125.
— from injuries, 127.
— from syphilis, 126.
— from tobacco smoking, 126.
— unilateral, 128.
Anthoxanthum odoratum as a cause of hay fever, 49.
Antifebrin in hay fever, 54.
Antipyrin in hay fever, 54.
Antrum, cystic disease of, 143.
— disease of, and ozæna, 25.
— empyema of, 132.
— of Highmore, 130.
Aphonia due to bilateral adductor paralysis, 464.
— of rheumatic origin, 495.
— spastica, 480.
Aphthongia laryngea spastica, 480.
Apoplexy and epistaxis, 115.
Aprosexia, 42, 60.
Aristol in atrophic rhinitis, 35.
Arsenic in hay fever, 54.
Arteries pulsating, 185.
Arthritis, crico-arytenoid, 360.
Arytenoideus, paralysis of, 466.
Asthma, due to hay fever, 47.
— in nasal polypi, 82.
— in nasal stenosis, 62.
— perennial, 47.
— reflex nasal origin of, 42.
Ataxy of cords, 486.
Atomisers, oil, 36.
Aura, olfactory, 127.

Bacilli in nasal tuberculosis, 92.
Bacillus fœtidus, 26.
— of diphtheria, 261.
Barking cough of puberty, 478.

Bellocq's canula, 118.
Blepharospasm, reflex nasal origin of, 42.
Blisters in treatment of epistaxis, 121.
Bright's disease in epistaxis, 113.
— — as a cause of œdema of larynx, 346.
Bursa, pharyngeal, 151.

Cadaveric position of cords, 450.
Caffeine citrate in hay fever, 58.
Calculi of tonsils, 248.
Carbolic acid, effect of on sense of smell, 33.
— in treatment of polypi, 87.
Carbolized smelling salts in hay fever, 57.
Carcinoma nasal, 89.
— of larynx, 377.
— of pharynx, 191.
Carotid, hæmorrhage from, 211.
— ligature of, 242.
Carpo-pedal contractions, 473.
Cartilage of Santorini, 312.
— of Wrisberg, 312.
Catarrh, acute laryngeal, 313.
— chronic laryngeal, 329.
— acute nasal, 8.
— purulent nasal, 11.
Chancre, tonsillar, 208.
Chill, 9.
Chloroform in the treatment of maggots in the nose, 108.
Chorditis tuberosa, 339.
— vocalis inferior hypertrophica, 336.
——diagnosis from rhinoscleroma, 101.
Chorea, laryngeal, 483.
— reflex nasal origin of, 42.
Chromic acid in treatment of—
enchondromata of larynx, 374.
epistaxis, 116.
lingual tonsil, 252.
granular pharyngitis, 184.
hypertrophic rhinitis, 21, 22.
polypi, 87.
prolapse of ventricle, 430.
sub-glottic laryngitis, 338.
Clergyman's sore throat, 179.
Cocaine in hay fever, 56.
— in hypertrophic rhinitis, 15.
— in removal of rhinoliths, 104.
— in vaso-motor rhinitis, 15.
Concretions, calcareous, in tonsils, 236.
Condom for nasal plugging, 118.
Condyloma of larynx, 402, 405.
Conjunctivitis, reflex nasal origin of, 42.
Constant current in atrophic rhinitis, 37.
Contra-respirator, 161.
Convulsions, 473.
— epileptiform, reflex nasal origin of, 42.
— in nasal stenosis, 61.
Cooper Rose's inflating bag, 117.
Corrosive sublimate lotion in hay fever, 54.
Coryza, 8.
Cotton-wool holder, 2.
Cough, barking, of puberty, 181.
— nasal, 44.
Cramp, speakers', 480.
Creasote in tuberculosis, 394.
Creolin in atrophic rhinitis, 35.
Crests of septum, 62.
Crico-arytenoid joint, ankylosis of, 363.
— — arthritis, 360.
Crico-thyroid articulation, luxation of, 435.
Crico-thyroideus, paralysis of, 468.
Cricoid cartilage, fracture of, 431.
Croup, 316.
— membranous, 257.
Cupping in treatment of epistaxis, 121.
Curette, for laryngeal polypi, 375.
— Gottstein's, 162.
— Hartmann's, 161.
— Heryng's, 398.
— in tertiary syphilis of larynx, 412.
Curetting in laryngeal tuberculosis, 397.
Cysts, nasal, 88.
— of larynx, 366, 367, 369.
— of naso-pharynx, 167.

Deafness in enlarged tonsils, 237.
— in nasal polypi, 82.
— in nasal stenosis, 61.
Dermoid tumours of pharynx, 189.
Deviations of septum, 62.
Diabetes as a cause of œdema of larynx, 347.
Dilator, cutting, Whistler's, 416.
— nasal, Hewetson's, 72.
— — Hill's, 72.
Diphtheria, 257.
— and scarlet fever, 285.
— bacillus of, 261.
— causing recurrent paralysis, 461.
— incubation of, 263.
— laryngeal, 265, 317.
— nasal hæmorrhage in, 265.
— paralysis in, 266.
— prophylaxis of, 280.
— tracheotomy in, 277.
Diphtheritic exudation in influenza, 287.
Diphthonia, 481.
Diplococcus, Fraenkel's, 8.
— Hajek's, 26.
Diplophonia, 481.
Dislocation of thyro-hyoid articulation, 433.
Disseminated sclerosis, laryngeal affections in, 487.
Douches, effect of on sense of smell, 125.
Douche, nasal, 32.
— Pins', 33.

Ear troubles in atrophic rhinitis, 28.
— — in nasal stenosis, 61.
Electric light for trans-illumination, 137.
Electricity in adductor paralysis, 465.
— in aphonia spastica, 481.
— in chronic laryngitis, 335.
— in crico-arytenoid arthritis, 362.
— in spasm of adductors, 475.
Electrode, laryngeal, 458.
Electrolysis in granular pharyngitis, 183.
— in hypertrophic rhinitis, 20.
Electrolysis in malignant disease of nose, 91.
— in nasal deviations, 70.
— in nasal tumours, 88.
— in naso-pharyngeal new growths, 167.
Emphysema from ulceration of larynx, 289.
Empyema of antrum, 132.
Enchondroma, nasal, 88.
— of naso-pharynx, 164.
Endocarditis in tonsillitis, 230.
Enteric fever causing laryngeal perichondritis, 352.
— — laryngeal stenosis after, 357.
— — throat affections of, 287.
Enuresis, nocturnal, in nasal stenosis, 61.
Epiglottis, destruction of, in lupus, 203, 204.
— — of, from syphilis, 403.
— traumatic inflammation of, 292.
Epiglottitis, acute, 321.
Epilepsy in nasal polypi, 82.
— reflex nasal origin of, 42.
Epistaxis, 108.
— following removal of adenoids, 160.
— from adenoids, 156.
— in diphtheria, 269.
— in malignant disease of nose, 89.
— in syphilitic hepatitis, 122.
— site of predilection, 77.
— treatment of, 115.
Epithelioma of larynx, 377.
— of nose, 89.
— of tonsil, 245.
Erysipelas from abscess of septum, 74.
— due to galvano-cautery, 18.
— due to scrofulous rhinitis, 292.
— of pharynx and larynx, 291.
Erythema of pharynx, 171.
Ethmoidal cells, diseases of, 147.
Ethmoiditis, necrosing, 81.
— purulent, 147.
— — with empyema of frontal sinus, 144.
Eustachian tube, 6.

Excision of larynx, 383.
Eye affections due to galvano-cautery, 18.
— — in atrophic rhinitis, 28.

Fauces, gouty inflammation of, 302.
— irritability of, 310.
Feeding patients in laryngeal tuberculosis, 400.
Fenestrated tubes for removing laryngeal polypi, 374.
Fibroma, nasal, 80, 88.
— of larynx, 366, 367.
— of naso-pharynx, 164.
— of pharynx, 190.
Flaying vocal cords, 338.
Follicular tonsillitis due to galvano-cautery, 18.
Forceps, Durham's flexible, 442.
— Krause's cotton-wool, 397.
— Loewenberg's, 159.
— Mark Hovell's, 159.
— for seizing polypus, 86.
— laryngeal, Fauvel's, 372.
— — Mackenzie's, 372.
— — Schroetter's, 373.
Foreign bodies in the larynx, 435.
— — in the nose, 105.
— — — Dodd's plan for removing, 106.
— — — Slaton's plan for removing, 106.
— — — stream of water for removing, 107.
— — in the pharynx, 219.
Fossa, hyoid, 312.
Fossæ, nasal, 6.
Fractures of larynx and hyoid bone, 431.
Frontal sinus, diseases of, 144.
Functions of larynx, 446.

Galanga, 37.
Galvano-caustic apparatus, 84.
— — loop in enlarged tonsils, 243.
— — — for nasal polypi, 83.
— — — for nasal tumours, 88.
— — — for removal of uvula, 254.
Galvano-caustic loop in removal of malignant growths of pharynx, 193.
— — — use of, 18.
— — treatment of naso-pharyngeal new growths, 166.
— cautery apparatus, 17.
— — causing membranous rhinitis, 38.
— — in atrophic rhinitis, 37.
— — in follicular tonsillitis, 235.
— — in hæmorrhage after uvulotomy, 256.
— — in hay fever, 55.
— — in laryngeal hæmorrhage, 328.
— — for laryngeal polypi, 375.
— — in laryngeal tuberculosis, 400.
— — for lingual tonsil, 251.
— — in lupus of pharynx and larynx, 206.
— — in malignant disease of nose, 91.
— — in nasal lupus, 95.
— — in nasal tuberculosis, 93.
— — in pachydermia laryngis, 344.
— — in pharyngomycosis, 219.
— — in prolapse of ventricle, 430.
— — in removal of nasal spurs, 70.
— — in sub-glottic laryngitis, 338.
— — in tertiary syphilis of larynx, 412.
— — in tonsillar calculi, 249.
— — in treatment of enlarged tonsils, 243.
— — in treatment of epistaxis, 116.
— — in treatment of granular pharyngitis, 182.
— — in treatment of polypi, 87.
Gastrostomy in malignant disease of tonsil, 248.
Glacial acetic acid in hay fever, 55.
Glanders of nose, 13.
— of pharynx and larynx, 291.
Glaucoma, reflex nasal origin of, 42.
Globus hystericus, 223.
— — with lingual tonsil, 250.
Glottis, œdema of, 344.

Glottis, spasm of, 471.
Goitre exophthalmic, nasal origin of, 42.
Gout and tonsillitis. 227.
Gouty affections of throat, 301.
— ankylosis of crico-arytenoid joint, 364.
Grave's disease from intra-nasal treatment, 45.
— — and nasal polypi, 83.
Guaiacol in tuberculosis, 394.
Guard, leather, Dundas Grant's, 163.
Gumma of larynx, 403.
— of nose, 96.
— of pharynx, 210.

Hallucinations, olfactory, 127.
Hæmatemesis simulated by epistaxis, 114.
Hæmophilia in tonsillotomy, 339.
Hæmoptysis simulated by epistaxis, 114.
Hæmorrhage after tonsillotomy, 238.
— after uvulotomy, 255.
— cerebral and epistaxis, 115.
— following removal of laryngeal polypus, 370.
— from angioma of larynx, 368.
— from carotid, 211.
— from operations for polypi, 87.
— from pharynx, 176.
— from scraping nasal fossæ, 98.
— from syphilitic ulceration of larynx, 402.
— from throat in scarlet fever, 285.
— in diphtheria, 266.
— in malignant disease of larynx, 378, 382.
— in malignant disease of tonsil, 246.
— in new growths of naso-pharynx, 165.
— in tonsillitis, 232.
— laryngeal, 324.
— nasal, in diphtheria, 265.
— nasal, site of predilection, 112.
— tonsillar after use of thermo-cautery, 243.
Hay asthma, 47.
— fever, 42, 46.
Headache, frontal, 15.
— in epistaxis, 113.
— in nasal stenosis, 61.
— tempero-occipital, 176.
Heart, fatty degeneration of, in new growths of naso-pharynx, 166.
Hemi-anæsthesia of larynx, 489.
Hemi-anosmia, 126.
Hernia in nasal stenosis, 61.
Herpes in hay fever, 52.
— of pharynx, 304.
Hiatus semilunaris, 131.
Hoarseness, causes of, in laryngeal tuberculosis, 388.
Hodgkin's disease and the larynx, 367.
Hook for seizing polypus, Baber's, 85.
Hospital sore throat, 227.
Hyoid bone, fracture of, 431.
Hyperæsthesia of larynx, 489.
— of pharynx, 224.
Hyperidrosis in rhinoliths, 103.
Hyperosmia, 124, 126.
Hypnotism in functional aphonia, 466.
Hypochondriasis in nasal stenosis, 61.

Ice bag in nasal lupus, 95.
Infantile respiratory spasm, 476.
Inflating bag, Cooper Rose's, 117.
Influenza causing empyema of frontal sinus, 144, 145.
— — inflammation of pharyngeal tonsil, 150.
— — œdema of larynx, 345.
— throat affections of, 286.
Innervation of larynx, 446.
Inspiratory spasm, 455, 483.
Insufflator, Kabierski's, 86.
Intubation, advantages of, 423.
— after tracheotomy, 427.
— dangers of, 423.
— death after, 427.
— for laryngeal polypi, 375.
— for œdema of larynx, 350.

Intubation for spasm of adductors, 475.
— for sub-glottic laryngitis, 338.
— for tertiary syphilis of larynx, 411.
— in chronic stenosis of the larynx, 425.
— in erysipelas of larynx, 297.
— in leprosy of larynx, 301.
— instruments, 420.
— method of performing, 421.
— of larynx, 419.
— tubes, nasal, 71.
Iodoform in laryngeal tuberculosis, 396.

Jacobson's organ, 77.
Jaw, dislocation of, 309.

Keloid, diagnosis from rhinoscleroma, 100.
Keratitis, reflex nasal origin of, 42.
Kerosene in the treatment of maggots in the nose, 108.
Klebs-Lœffler bacillus, 261.
Knee-jerk in diphtheria, 270.

Labio-glosso-laryngeal paralysis, laryngeal affections in, 487.
Lachrymation, reflex nasal origin of, 42.
Lactic acid in laryngeal tuberculosis, 397.
— — in laryngeal tumours, 374.
— — in lupus of pharynx and larynx, 207.
— — in nasal lupus, 95.
— — in nasal tuberculosis, 93.
— — in sub-glottic laryngitis, 338.
— — in tuberculosis of pharynx, 198.
Lameness of vocal cord, 390.
Laminaria tents, 22.
Lamp, electric, 307.
Laryngeal affections in disseminated sclerosis, 487.
— — in labio-glosso-laryngeal paralysis, 487.
— — in paralysis agitans, 486.
— — in tabes, 484.
Laryngeal brush, 334.
— catarrh, acute, 313.
— — chronic, 329.
— changes at puberty, 445.
— chorea, 483.
— cough, nervous, 478.
— crises, 484.
— diphtheria, 265, 317.
— electrode, Mackenzie's, 458.
— forceps, Fauvel's, 372.
— — Mackenzie's, 372.
— — Schroetter's, 373.
— lancet, Mackenzie's, 350.
— mirror, 307.
— muscles, paralysis of, 451.
Laryngeal obstruction in perichondritis, 355.
— paralysis in tabes, 486.
— phthisis, 385.
— snare, Lennox Browne's, 373.
— spasm, 470.
— stridor, congenital, 476.
— tuberculosis, 385.
— — simulating abductor paralysis, 365.
— ulceration in enteric fever, 289.
— vertigo, 491.
Laryngismus stridulus, 317, 471.
— — from adenoids, 155.
— — from elongated uvula, 254.
Laryngitis, acute, 313.
— atrophic, 331.
— causing bilateral paralysis, 317.
— causing inflammation of crico-arytenoid joint, 317.
— causing suppuration, 317.
— chronic, 329.
— — rheumatic, 329, 332.
— — sub-glottic, 336.
— follicular, 331.
— glandular, 331.
— gouty, 303.
— hæmorrhagic, 324.
— hypoglottica, 337.
— in children, treatment of, 320.
— in enteric fever, 288.
— in influenza, 287.
— in professional vocalists, 319.
— membranous, 322.
— — in measles, 283.

Laryngitis, sicca, 330.
— — treatment of, 336.
— traumatic, 315.
— — treatment of, 321.
— tubercular, 385.
Laryngoplegia, 460.
Laryngorrhœa, 331.
Laryngoscleroma, 337.
Laryngo-tracheal ozæna, 330.
Laryngo-typhus, 289, 353.
Larynx, abscess of, 359.
— angioma of, 367.
— carcinoma of, 377.
— cysts of, 366, 367.
— erysipelas of, 291.
— — of intubation in, 297.
— — tracheotomy in, 297.
— examination of, 306.
— excision of, 383.
— fibroma of, 366, 367.
— foreign bodies in, 435.
— fracture of, 431.
— functions of, 446.
— hæmorrhage of, 315.
— injuries to, 433.
— innervation of, 446.
— intubation of, 419.
— leprosy of, 298.
— lupus of, 201.
— lymphoma of, 367.
— malignant new growths of, 376.
— neuroses of, 450.
— non-malignant new growths of, 366.
— œdema of, 315-17, 344.
— — in Bright's disease, 346.
— — in influenza, 287.
— — in small-pox, 282.
— papilloma of, 366, 367.
— pemphigus of, 304.
— perichondritis of, 351.
— respiratory excursions of, 454.
— rheumatism of, 494.
— sarcoma of, 377.
— sensory neuroses of, 488.
— stenosis of, 412.
— syphilis of, 400.
— tubercular tumours of, 391.
— tuberculosis of, 385.
Leeches causing epistaxis, 109.
Legal's disease, 176.
Leprosy of pharynx, larynx, and nose, 298.
Limelight, 306.
Listerine, 34, 506.
Lobelia in hay fever, 58.
London paste in granular pharyngitis, 183.
Lupus of larynx, 201.
— of nasal mucous membrane, 94.
— of pharynx, 201.
Lymphoma of larynx, 367.
Lympho-sarcoma of tonsil, 244.

Maggots in the nose, 108.
Malignant growths of nose, 89.
Massage of larynx in functional aphonia, 465.
— in mogiphonia, 482.
Maxillary sinus, diseases of, 132.
Measles affecting throat, 283.
— as a cause of rhinitis, 13.
— German, of throat, 284.
Melancholia in nasal stenosis, 61.
Membrane, cicatricial, of larynx, 428.
— congenital, of larynx, 428.
Menière's disease, 177, 492.
Meningitis, cerebro-spinal, causing disease of sphenoidal sinus, 147.
— due to galvano-cautery, 18.
— from abscess of frontal sinus, 146.
— from abscess of septum, 74.
— in malignant disease of the nose, 91.
Menthol in laryngeal tuberculosis, 396.
— in nasal tuberculosis, 94.
Mercury in treatment of diphtheria, 274.
Micrococcus of Loewenberg, 25.
Migraine, in epistaxis, 113.
— reflex nasal origin of, 42.
Milk origin of diphtheria, 260.
Mogiphonia, 482.
Myasis, 108.
Mycosis aspergillus, 217.

Mycosis leptothricia, 217.
— sarcinica, 217.
Myxoma, nasal, 80.
— of naso-pharynx, 164.

Nail, steel, Dalby's, 163.
Naphthol in atrophic rhinitis, 35.
Nares, posterior, 7.
Nasal calculi, 101.
— hæmorrhage, site of predilection, 112.
— intubation tubes, Goodwillie's, 22.
— mucous membrane, condition of in anosmia, 125.
— reflexes, 41.
— vein transverse, 154.
Naso-pharyngeal catarrh, 151.
Necrosis of bones of nose, 96.
Needle for transfixing nasal mucous membrane, 19.
Nervous laryngeal cough, 478.
Neuralgia of larynx, 490.
— of pharynx, 225.
Neuroses, motor, of pharynx, 223.
— of larynx, 450.
— sensory, of pharynx, 224.
Neurosis, cardiac, reflex nasal origin of, 42.
New growths, malignant, of larynx, 376.
— — — of naso-pharynx, 168.
— — non-malignant, of larynx, 366.
— — — of naso-pharynx, 164.
Nightmare in nasal polypi, 82.
Nitric acid in hypertrophic rhinitis, 22.
Nitro-glycerine in hay fever, 58.
Nose, bleeding from, 108.
— examination of, 1.
— foreign bodies in, 105.
— gumma of, 96.
— leprosy of, 298.
— lupus of, 94.
— maggots in the, 108.
— malignant growths of, 89.
— non-malignant growths of, 79.
— polypi of, 79.
— saddleback, 29, 97.
Nose, syphilis of, 95.
— tuberculosis of, 91.

Occlusion of nares, congenital, 59.
Œdema of larynx, 344.
— — in influenza, 287.
— — in tonsillitis, 232.
— of lungs from erysipelas, 294.
Oidium albicans, 216.
— lactis, 216.
Olfactometer, Zwaardemaker's, 127.
Olfactory region of nose, 124.
Orchitis in tonsillitis, 230.
Osteoma, nasal, 88.
Ostium maxillare, 131.
Otitis media after operation for adenoids, 160, 161.
— — due to galvano-cautery, 18.
— — from operations for polypi, 86.
— — from plugging nostril, 119.
— — from water entering Eustachian tube, 107.
— — in nasal stenosis, 62.
— — in perforation of septum, 76.
— — in scarlet fever, 285.
— — in pharyngitis, 172.
— — in tonsillitis, 230.
— — with antral disease, 136.
Ovaritis in tonsillitis, 230.
Oxyhæmoglobin in relation to nasal stenosis, 60.
Ozæna, 23, 27.
— laryngo-tracheal, 330.
— tracheal, 28.

Pachydermia diffusa, 341.
— laryngis, 340.
— verrucosa, 341.
Palate, tumours of, 190.
Papilloma, nasal, 88.
— of larynx, 366, 367.
— of pharynx, 190.
Paræsthesia of larynx, 489.
— of pharynx, 224.
Paralysis agitans, laryngeal affections in, 486.
— bilateral abductor, 451.
— — adductor, 463.

Paralysis in diphtheria, 266.
— laryngeal, in tabes, 486.
— myopathic, of larynx from syphilis, 403.
— of arytenoideus, 466.
— of external tensors of cords, 468.
— of internal tensors of cords, 467.
— of laryngeal muscles, 451.
— of pharynx, 223.
— of recurrent laryngeal nerves, 460.
— unilateral abductor, 458.
— — adductor, 466.
Parosmia, 124, 127.
Pemphigus of pharynx, 304.
Perforation of fauces, 184.
Pericarditis in tonsillitis, 230.
Perichondritis of larynx, 351.
— — syphilitic, 402.
Peritonitis in tonsillitis, 231.
Perverse action of vocal cords, 464.
Petit mal, 493.
Pharyngeal tonsil, anatomy of, 149.
— — diseases of, 150.
Pharyngitis, acute, 170.
— chronic, 174.
— — atrophic, 176.
— — hypertrophic, 175.
— granular, 179.
— infectious, 171.
— lateralis hypertrophica, 180.
— phlegmonous, 291.
— — in influenza, 286.
— sicca, 175.
Pharyngocele, 184.
Pharyngomycosis, 216.
Pharyngotomy for malignant disease of tonsil, 247.
— for removal of foreign bodies, 222.
— sub-hyoidean, in carcinoma of pharynx, 193.
— — for foreign bodies in larynx, 444.
— — in lupus, 207.
Pharynx, adhesion of palate, 215.
— anæsthesia of, 224.
— angioma of, 190.
— carcinoma of, 191.
Pharynx, dilatation of, 184.
— erysipelas of, 291.
— examination of, 169.
— fibroma of, 190.
— foreign bodies in, 219.
— herpes of, 304.
— hyperæsthesia of, 224.
— inherited syphilis of, 212.
— leprosy of, 298.
— lupus of, 201.
— malignant growths of, 191.
— neuralgia of, 225.
— neuroses of, 223.
— non-malignant growths of, 189.
— papilloma of, 190.
— parasitic affections of, 216.
— paræsthesia of, 224.
— pemphigus of, 304.
— sarcoma of, 191.
— spasm of, 223.
— syphilis of, 207.
— — secondary of, 209.
— — tertiary of, 210.
— tuberculosis, 194.
— urticaria of, 304.
Phlebectasis laryngea, 331.
Phlebitis in tonsillitis, 231.
Phlegmon of pharynx, 293.
Phonetic imperfections from adenoids, 161.
Phonophobia, 489.
Phthisis ab hæmoptoë, 327.
— and syphilis of larynx, 404.
— laryngeal, 385.
— pseudo-polypoid, 370.
Pigeon-breast in enlarged tonsils, 236.
Pleurisy in tonsillitis, 231.
Plugging nasal anterior, 117.
— — posterior, 118.
Pneumococcus, Friedlaender's, 8, 100.
Pneumogastric, lesion of, 469.
Politzer's bag in removal of foreign bodies from nose, 106.
Polypi, nasal, 79.
— — in empyema of antrum, 133.
— — in relation to suppuration in sinuses, 81.
— in antrum, 144.

Polypi in frontal sinuses, 145.
Polypus, congenital hairy, of naso-pharynx, 168.
Potassium iodide causing œdema of larynx, 344, 345, 348.
Potato treatment of foreign bodies swallowed, 222.
Probang, expanding, 221.
Prolapse of ventricle, 428.
Puberty, barking cough of, 478.
— laryngeal changes at, 445.
Pulsus paradoxus in acute laryngitis, 316.
Pyæmia from abscess of frontal sinus, 146.
— from plugging, 119.

Quinsy, 226.
— causing œdema of larynx, 346.

Rag weed as a cause of hay fever, 49.
Rarefaction of air in deviations of septum, 64.
Rectified spirit spray in hay fever, 57.
Reflector, 307.
Reflex symptoms in atrophic rhinitis, 29.
Reflexes, nasal, 41.
Resection of larynx for stenosis, 418.
Resorcin in laryngeal tuberculosis, 396.
Respiratory excursions of larynx, 454.
— region of nose, 124.
Retro-pharyngeal abscess, 185.
Rheumatic affections of larynx, 494.
— laryngitis, chronic, 329, 332.
Rheumatism and tonsillitis, 226.
Rhinitis, acute, 8.
— caseous, 41.
— chronic atrophic, 22.
— — hypertrophic, 13.
— croupous, 38.
— due to glanders, 13.
— — measles, 13.
— — scarlet fever, 12.
Rhinitis, fibrinous, 38.
— gonorrhœal or leucorrhœal, 11.
— hyperæsthetic, 51.
— in infants, 8.
— membranous, 38.
— purulent, 11.
— — a cause of atrophic rhinitis, 24.
— scrofulous, as a cause of erysipelas, 292.
— vaso-motor, 46.
Rhinobyon, St. Ange's, 120.
Rhinoliths, 31, 101.
Rhinoscleroma, 99, 337, 338.
Rhinoscope, 4.
Rhinoscopy, anterior, 1.
— posterior, 4.
Ring-knife, Meyer's, 162.
Rosenmüller's fossa, 6.
Rötheln of throat, 284.

Saddle-back nose, 97.
St. Ange's rhinobyon, 120.
Sanguinaria, 37.
Santorini, cartilage of, 312.
Sarcoma, nasal, 89.
— of larynx, 377.
— of naso-pharynx, 164, 168.
— of pharynx, 191.
— of tonsil, 244.
Saw, nasal, 68.
Scarification in œdema of uvula, 296.
Scarlet fever and diphtheria, 285.
— — as a cause of rhinitis, 13.
— — due to galvano-cautery, 18.
— — throat affections of, 284.
Schroetter's tubes, 415.
Septicæmia in abscess of septum, 74.
— in diphtheria, 266.
— in tonsillitis, 231.
Septum, abscess of, 73.
— crest of, 62.
— hæmatoma of, 72.
— malformation of, 65.
— nasal, 6.
— perforation of, 75.
— sigmoid, deviation of, 65.
— spurs of, 62.

Septum, zigzag deviation of, 65.
Sinus, ethmoidal, 132.
— — diseases of, 147.
— frontal, 131.
— — diseases of, 144.
— maxillary, 130.
— — diseases of, 132.
— pyriform, 312.
— sphenoidal, 132.
— — diseases of, 147.
Small-pox affecting nose, 13.
— — throat, 281.
Smell, centre for, 126.
Snare, Jarvis's, 19.
— laryngeal, Lennox Browne's, 373.
— MacDonald's, 20.
— polypus, 84.
— — Woakes's, 85.
Sneezing, 14.
— paroxysmal, 42.
Snoring in nasal stenosis, 61.
Snuffles, 97.
Spasm of adductors, 455, 471.
— — in tabes, 472.
— infantile respiratory, 476.
— inspiratory, 455, 483.
— laryngeal, 470.
— of glottis, 471.
— — from elongated uvula, 254.
— — in adults, 492.
— of pharynx, 223.
— of tensors of cords, 480.
Speakers' cramp, 480.
Speculum, Duplay's, 2.
— Fraenkel's, 1.
— Gruber's, 2.
— nasal, Jurasz's, 69.
— — Loewenberg's, 69.
— Thudichum's, 1.
Spinal accessory, lesion of, 469.
Spirit lotion, effect on sense of smell, 125.
Sponge method of removing polypi, 375.
Spray, alcoholic, 87.
— apparatus, 16.
Sprays, medicated, 16.
Spurs of septum, 62.
Stammering in nasal stenosis, 61.
Stammering of vocal cords, 480.
— reflex nasal origin of, 42.
Staphylococci in tonsillitis, 228.
Staphylococcus aureus et albus, 8.
— pyogenes aureus as a cause of membranous rhinitis, 39.
— — — as a cause of perforation of septum, 77.
Stenosis, chronic, of larynx, intubation in, 425.
— double, of air passage, 414, 455.
— from wound of larynx, 418.
— nasal, 15, 58.
— — in malignant disease, 89.
— of larynx, 412.
— — treatment by dilatation, 415.
Stertor, hen cluck, 187.
Streptococci in tonsillitis, 228.
Streptococcus erysipelatosus, 294.
— pyogenes, 8.
— — as a cause of perforation of septum, 77.
Syphilis and phthisis of larynx, 404.
— as a cause of anosmia, 126.
— of larynx, 400.
— of naso-pharynx, 150.
— of nose, inherited, 97.
— — primary, 95.
— — secondary, 96.
— — tertiary, 96.
— of pharynx, 207.
— — inherited, 212.
— — secondary, 209.
— — tertiary, 210.
— inherited, 407.
Syphilitic ulceration, a basis for tuberculosis, 386.
Syringes, anterior and posterior, 33.

Tabes, laryngeal, affections in, 484.
Taste, loss of, 128.
Tetanus from plugging, 119.
Tetany, 473.
Throat affections of specific infectious diseases, 281.
Thrush, 216.
Thymol in atrophic rhinitis, 35.

Thyro-arytenoideus, paralysis of, 467.
— hyoid articulation, dislocation of, 433.
Thyroid cartilage, fracture of, 432.
Thyrotomy for foreign bodies in larynx, 443.
— for malignant disease of larynx, 383.
— in laryngeal perichondritis, 358.
— in prolapse of ventricle, 430.
Tinnitus in rhinoliths, 103.
Tobacco smoking as a cause of anosmia, 126.
Tongue depressor, Fraenkel's, 5.
— — Tuerck's, 169, 170.
Tonsil, calculi of, 248.
— chancre of, 208.
— epithelioma of, 245.
— lingual, 153, 249.
— lympho-sarcoma of, 244.
— malignant growths of, 244.
— of Luschka, 149.
— sarcoma of, 244.
— tuberculosis of, 200.
Tonsillitis, 226.
— follicular, 226.
— — after operation for adenoids, 161.
— gouty, 303.
— parenchymatous, 226.
Tonsillotome, Fahnestock's, 240.
— Mackenzie's, 240.
Tonsillotomy, 238.
— hæmorrhage after, 238.
Tonsils, chronic enlargement of, 235.
Tonus, reflex, of abductor muscles, 447.
Tracheal ozæna, 28.
Tracheotomy for congenital laryngeal tumours, 374.
— for diphtheria, 277.
— for erysipelas of larynx, 297.
— for foreign bodies in larynx, 443.
— for fracture of larynx, 432.
— for laryngeal hæmorrhage, 328.
— for laryngeal perichondritis, 358.
Tracheotomy for laryngeal tuberculosis, 388, 399.
— for leprosy of larynx, 301.
— for malignant disease of larynx, 385.
— for malignant disease of tonsil, 248.
— for œdema of larynx, 350.
— for spasm of adductors, 474, 475.
— for sub-glottic laryngitis, 338.
— for tertiary syphilis of larynx, 411.
— for traumatic laryngitis, 321.
Trachoma of the vocal cords, 339.
Transformation of benign into malignant growths, 375.
Trans-illumination by electric light, 137.
Traumatism in deviations of septum, 64.
Trephine, 68.
Tubes for dilatation, Schroetter's, 415.
Tuberculosis of larynx, 385.
— of pharynx, 194.
— of nose, 91.
— tonsils, 200.
Tumours, tubercular, of larynx, 391.
Turbinal, 3.
— inferior, hypertrophy of, 19.
Turbinated body, 3.
— — middle, cyst of, 148.
Typhus fever, throat affections of, 290.
Urticaria in hay fever, 52.
— in pharynx, 304.
Uvula, amputation of, 254.
— destruction of, in lupus, 204.
— diseases of, 252.
— elongation of, 253.
— — of, as a cause of anosmia, 130.
— — of, causing laryngismus, 471.
— gouty œdema of, 302.
— growths of, 256.
— malformations of, 256.
— œdema of, 172.
— — of, from urticaria, 304.

Uvula, œdema of, in scarlet fever, 284.
— — of, scarification in, 296.
— paralysis of, 257.
— tuberculosis of, 195.
Uvulitis, 253.
Uvulotomy, indications for, 255.

Varicella affecting throat, 282.
Varicose veins of tongue, 250.
Vertigo, laryngeal, 491.
Ventricle, prolapse of, 428.
Ventricular band, gouty inflammation of, 302.
Vocal cords, ataxy of, 486.
— — fixation of, in laryngeal tuberculosis, 390.
— — lameness of, 390.
— — perverted action of, 455, 464, 483.
Vocal cords, position of, 450.
— — position of, in respiration, 447.
— — removal of, for abductor paralysis, 418.
— — spasm of tensors of, 480.
— — stammering of, 480.
Voice in nasal stenosis, 61.
Volkmann's spoon, 98.
Vomiting in diphtheria, 269.

Water, hot, in treatment of epistaxis, 120.
— ice-cold, in treatment of epistaxis, 120.
Web of larynx, 415.
Whooping cough, 290.
Wrisberg, cartilage of, 312.



SELECTED LIST
OF
NEW AND RECENT WORKS
PUBLISHED BY
H. K. LEWIS,
136 GOWER STREET, LONDON, W.C.
(ESTABLISHED 1844)

*** For full list of works in Medicine and Surgery published by H. K. Lewis see complete Catalogue sent post free on application.*

RUBERT BOYCE, M.B., M.R.C.S.
Assistant Professor of Pathology in University College, London.

A TEXTBOOK OF MORBID HISTOLOGY FOR STUDENTS AND PRACTITIONERS. Royal 8vo, with 130 coloured figures, 31s. 6d.

SIDNEY COUPLAND, M.D., F.R.C.P.
Physician to the Middlesex Hospital, and Lecturer on Practical Medicine in the Medical School, etc.

NOTES ON THE CLINICAL EXAMINATION OF THE BLOOD AND EXCRETA. Third Edition, 12mo, 1s. 6d. [*Now ready.*

JAMES F. GOODHART, M.D. ABERD., F.R.C.P.
Physician to Guy's Hospital, and Consulting Physician to the Evelina Hospital for Sick Children.

ON COMMON NEUROSES; OR THE NEUROTIC ELEMENT IN DISEASE AND ITS RATIONAL TREATMENT. Second edition, crown 8vo, 3s. 6d.

A. C. ABBOTT, M.D.
First Assistant, Laboratory of Hygiene, University of Pennsylvania.

THE PRINCIPLES OF BACTERIOLOGY. A Practical Manual for Students and Physicians. With Illustrations, post 8vo, 7s. 6d.

LOUIS C. PARKES, M.D. LOND., D.P.H.
Lecturer on Public Health at St. George's Hospital, &c.

INFECTIOUS DISEASES, NOTIFICATION AND PREVENTION. Fcap. 8vo, roan, 4s. 6d.

H. ALDER-SMITH, M.B. LOND., F.R.C.S.
Resident Medical Officer, Christ's Hospital, London.

RINGWORM: ITS DIAGNOSIS AND TREATMENT. Third Edition, rewritten and enlarged, with Illustrations, fcap. 8vo, 5s. 6d.

HARRISON ALLEN, M.D.
Consulting Physician to Rush Hospital for Consumption.

A HANDBOOK OF LOCAL THERAPEUTICS. General Surgery by R. H. HARTE, M.D., Surgeon to the Episcopal and St. Mary's Hospitals; Diseases of the Skin by A. VAN HARLINGEN, M.D., Professor of Diseases of the Skin in the Philadelphia Polyclinic; Diseases of the Ear and Air Passages by H. ALLEN, M.D.; Diseases of the Eye by G. C. HARLAN M.D., Surgeon to Wills Eye Hospital. Edited by H. ALLEN, M.D. Large 8vo, 14s. *nett.*

E. CRESSWELL BABER, M.B. LOND.
Surgeon to the Brighton and Sussex Throat and Ear Hospital.

A GUIDE TO THE EXAMINATION OF THE NOSE WITH REMARKS ON THE DIAGNOSIS OF DISEASES OF THE NASAL CAVITIES. With Illustrations, small 8vo, 5s. 6d.

FANCOURT BARNES, M.D., M.R.C.P.
Physician to the Chelsea Hospital; Obstetric Physician to the Great Northern Hospital, &c.

A GERMAN-ENGLISH DICTIONARY OF WORDS AND TERMS USED IN MEDICINE AND ITS COGNATE SCIENCES. Square 12mo, Roxburgh binding, 9s.

H. CHARLTON BASTIAN, M.A., M.D., F.R.S.
Examiner in Medicine at the Royal College of Physicians; Physician to University College Hospital, etc.

I.

PARALYSES: CEREBRAL, BULBAR, AND SPINAL. A Manual of Diagnosis for Students and Practitioners. With numerous Illustrations, 8vo, 12s. 6d.

II.

VARIOUS FORMS OF HYSTERICAL OR FUNCTIONAL PARALYSIS. Demy 8vo, 7s. 6d.

DRS. BOURNEVILLE AND BRICON.

MANUAL OF HYPODERMIC MEDICATION. Translated from the Second Edition, and Edited, with Therapeutic Index of Diseases, by ANDREW S. CURRIE, M.D. Edin., etc. Crown 8vo, 3s. 6d.

CHARLES H. BURNETT, A.M., M.D.

Clinical Professor of Otology in the Woman's Medical College of Pennsylvania; Aural Surgeon to the Presbyterian Hospital, Philadelphia.

SYSTEM OF DISEASES OF THE EAR, NOSE AND THROAT. By 45 Eminent American, British, Canadian and Spanish Authors. Edited by CHARLES H. BURNETT. With Illustrations, in two imperial 8vo vols., 48s. *nett.* [*Now ready.*

HARRY CAMPBELL, M.D., B.S. LOND., M.R.C.P.

Physician to the North-West London Hospital.

I.

THE CAUSATION OF DISEASE. An exposition of the ultimate factors which nduce it. Demy 8vo, 12s. 6d.

II.

FLUSHING AND MORBID BLUSHING, THEIR PATHOLOGY AND TREATMENT. With plates and wood engravings, royal 8vo, 10s. 6d.

III.

DIFFERENCES IN THE NERVOUS ORGANISATION OF MAN AND WOMAN, PHYSIOLOGICAL AND PATHOLOGICAL. Royal 8vo, 15s.

IV.

HEADACHE AND OTHER MORBID CEPHALIC SENSATIONS. Royal 8vo, 12s. 6d. [*Just Published.*

R. E. CARRINGTON, M.D., F.R.C.P.

NOTES ON PATHOLOGY. With an Introductory Chapter by J. F. GOODHART, M.D., F.R.C.P., Physician to Guy's Hospital. Edited by H. E. CROOK, M.D. Lond., F.R.C.S. Eng., and G. MACKESON, L.R.C.P., M.R.C.S. Cr. 8vo, 3s. 6d.

ALFRED H. CARTER, M.D. LOND.

Fellow of the Royal College of Physicians; Physician to the Queen's Hospital, Birmingham, &c.

ELEMENTS OF PRACTICAL MEDICINE. Sixth Edition, crown 8vo, 9s.

FRANCIS HENRY CHAMPNEYS, M.A., M.B. OXON., F.R.C.P.
Physician Accoucheur and Lecturer on Obstetric Medicine at St. Bartholomew's Hospital; Examiner in Obstetric Medicine in the University of London, &c.

LECTURES ON PAINFUL MENSTRUATION. Royal 8vo, 7s. 6d.

W. BRUCE CLARKE, M.A., M.B. OXON., F.R.C.S.
Assistant Surgeon to, and Senior Demonstrator of Anatomy and Operative Surgery at St. Bartholomew's Hospital, &c.

THE DIAGNOSIS AND TREATMENT OF DISEASES OF THE KIDNEY AMENABLE TO DIRECT SURGICAL INTERFERENCE. Demy 8vo, with Illustrations, 7s. 6d.

WALTER S. COLMAN, M.B. LOND.
ogist and Registrar to the National Hospital for the Paralysed and Epileptic.

SECTION CUTTING AND STAINING: A Practical Guide to the Preparation of Normal and Morbid Histological Specimens. Illustrations, crown 8vo, 3s.

W. H. CORFIELD, M.A., M.D. OXON., F.R.C.P. LOND.
Professor of Hygiene and Public Health in University College, London.

DWELLING HOUSES: their Sanitary Construction and Arrangements. Third Edition, with Illustrations, crown 8vo., 3s. 6d. [*Now ready*

EDWARD COTTERELL, M.R.C.S. ENG., L.R.C.P. LOND.

ON SOME COMMON INJURIES TO LIMBS: their Treatment and After-Treatment including Bone-Setting (so-called). Imp. 16mo, with Illustrations, 3s. 6d.

CHARLES CREIGHTON, M.D.

ILLUSTRATIONS OF UNCONSCIOUS MEMORY IN DISEASE, including a Theory of Alteratives. Post 8vo, 6s.

H. RADCLIFFE CROCKER, M.D. LOND., B.S., F.R.C.P.
Physician for Diseases of the Skin in University College Hospital.

DISEASES OF THE SKIN: THEIR DESCRIPTION, PATHOLOGY, DIAGNOSIS, AND TREATMENT. Second edition, with Illustrations, 8vo, 24s.

EDGAR M. CROOKSHANK, M.B. LOND., F.R.M.S.
Professor of Bacteriology, King's College, London.

I.

MANUAL OF BACTERIOLOGY. Third Edition, coloured plates and wood engravings, 8vo, 21s.

II.

HISTORY AND PATHOLOGY OF VACCINATION. 2 vols., royal 8vo, coloured plates, 36s.

HERBERT DAVIES, M.D., F.R.C.P.
Late Consulting Physician to the London Hospital, and formerly Fellow of Queen's College, Cambridge.

THE MECHANISM OF THE CIRCULATION OF THE BLOOD THROUGH ORGANICALLY DISEASED HEARTS. Edited by ARTHUR TEMPLER DAVIES, B.A., M.D. Cantab., M.R.C.P. Crown 8vo, 3s. 6d.

HENRY DAVIS, M.R.C.S. ENG.
Teacher and Administrator of Anæsthetics at St. Mary's Hospital, and Assistant Anæsthetist at the Dental Hospital of London.

GUIDE TO THE ADMINISTRATION OF ANÆSTHETICS. Second edition, fcap. 8vo, 2s. 6d.

ARTHUR W. EDIS, M.D. LOND., F.R.C.P.
Senior Physician to the Chelsea Hospital for Women; Late Obstetric Physician to the Middlesex Hospital.

STERILITY IN WOMEN: including its Causation and Treatment. With 33 Illustrations, 8vo, 6s.

ALEXANDER S. FAULKNER.
Surgeon-Major, Indian Medical Service.

A GUIDE TO THE PUBLIC MEDICAL SERVICES. Compiled from Official Sources. Demy 8vo, 2s.
[Just Published.

J. MILNER FOTHERGILL, M.D.

I.

INDIGESTION AND BILIOUSNESS. Second Edition, post 8vo, 7s. 6d.

II.

GOUT IN ITS PROTEAN ASPECTS. Post 8vo, 7s. 6d.

III.

THE TOWN DWELLER: HIS NEEDS AND HIS WANTS. Post 8vo, 3s. 6d.

ERNEST FUCHS.

Professor of Ophthalmology in the University of Vienna.

TEXTBOOK OF OPHTHALMOLOGY. Translated from the Second German Edition by A. DUANE, M.D., Assistant Surgeon, Ophthalmic and Aural Institute, New York. Large 8vo, with 190 Illustrations, 21s.

SIR DOUGLAS GALTON, K.C.B., HON. D.C.L., LL.D., F.R.S.,

Formerly, Secretary Railway Department Board of Trade; Assistant Inspector-General of Fortifications, &c.

HEALTHY HOSPITALS. OBSERVATIONS ON SOME POINTS CONNECTED WITH HOSPITAL CONSTRUCTION. With Illustrations, 8vo, 10s. 6d.

[*Now ready.*

JOHN HENRY GARRETT, M.D.

Licentiate in Sanitary Science and Diplomate in Public Health, Universities of Durham and Cambridge, &c.

THE ACTION OF WATER ON LEAD: being an inquiry into the cause and mode of the action and its prevention. Crown 8vo, 4s. 6d.

ALFRED W. GERRARD, F.C.S.

Examiner to the Pharmaceutical Society; Teacher of Pharmacy and Demonstrator of Materia Medica to University College Hospital, etc.

ELEMENTS OF MATERIA MEDICA AND PHARMACY. With the New Official Remedies, 1890. Crown 8vo, 8s. 6d.

JOHN GORHAM, M.R.C.S.

Fellow of the Physical Society of Guy's Hospital, etc.

TOOTH EXTRACTION: A manual of the proper mode of extracting teeth. Fourth edition, fcap. 8vo, 1s. 6d.

[*Just published.*

GEORGE M. GOULD, A.M., M.D.
Ophthalmic Surgeon to the Philadelphia Hospital, etc.

I.

A NEW MEDICAL DICTIONARY. A compact concise Vocabulary, convenient for reference, based on recent medical literature. Small 8vo, 12s. 6d.

II.

A POCKET MEDICAL DICTIONARY, giving the Pronunciation and Definition of about 12,000 of the Principal Words used in Medicine and the Collateral Sciences. 32mo, 4s. *nett.*

LANDON C. GRAY, M.D.
Professor of Nervous and Mental Diseases in the New York Polyclinic; Visiting Physician to St. Mary's Hospital, &c.

A TREATISE OF NERVOUS AND MENTAL DISEASES FOR STUDENTS AND PRACTITIONERS OF MEDICINE. With 168 Illustrations, 8vo, 21s.

DR. JOSEF GRUBER.
Professor of Otology in the University of Vienna, &c.

A TEXT-BOOK OF THE DISEASES OF THE EAR. Translated from the second German edition, and Edited with additions by EDWARD LAW, M.D., C.M. EDIN., M.R.C.S. ENG., Surgeon to the London Throat Hospital for Diseases of the Throat, Nose and Ear; and COLEMAN JEWELL, M.B. LOND., M.R.C.S. ENG. Second edition, with 165 Illustrations, and 70 coloured figures on 2 lithographic plates, royal 8vo, 28s.

BERKELEY HILL, M.B. LOND., F.R.C.S.
Professor of Clinical Surgery in University College,

AND

ARTHUR COOPER, L.R.C.P., M.R.C.S.
Surgeon to the Westminster General Dispensary, &c.

I.

SYPHILIS AND LOCAL CONTAGIOUS DISORDERS. Second Edition, entirely re-written, royal 8vo, 18s.

II.

THE STUDENT'S MANUAL OF VENEREAL DISEASES. Fourth Edition, post 8vo, 2s. 6d.

BERKELEY HILL, M.B. LOND., F.R.C.S.
Professor of Clinical Surgery in University College; Surgeon to University College Hospital, and to the Lock Hospital.

THE ESSENTIALS OF BANDAGING. For Managing Fractures and Dislocations; for administering Ether and Chloroform; and for using other Surgical Apparatus. Sixth Edition, with Illustrations, fcap. 8vo, 5s.

PROCTER S. HUTCHINSON, M.R.C.S.
Assistant Surgeon to the Hospital for Diseases of the Throat.

A MANUAL OF DISEASES OF THE NOSE AND THROAT; including the Nose, Naso-pharynx, Pharynx, and Larynx. With Illustrations, cr. 8vo, 3s. 6d.

NORMAN KERR, M.D., F.L.S.
President of the Society for the Study of Inebriety; Consulting Physician, Dalrymple Home for Inebriates, etc.

INEBRIETY: ITS ETIOLOGY, PATHOLOGY, TREATMENT, AND JURISPRUDENCE. Third Edition, 8vo [*Nearly ready.*

F. CHARLES LARKIN, F.R.C.S. ENG.
Surgeon to the Stanley Hospital,
AND
RANDLE LEIGH, M.B., B.SC. LOND.
Senior Demonstrator of Physiology in University College, Liverpool.

OUTLINES OF PRACTICAL PHYSIOLOGICAL CHEMISTRY. Second Edition, with Illustrations, crown 8vo, 2s. 6d. *nett.*

J. WICKHAM LEGG, F.R.C.P.
Formerly Assistant Physician to Saint Bartholomew's Hospital, and Lecturer on Pathological Anatomy in the Medical School.

A GUIDE TO THE EXAMINATION OF THE URINE. Seventh Edition, edited and revised by H. LEWIS JONES, M.D., Medical Officer in charge of the Electrical Department in St. Bartholomews' Hospital. With Illustrations, fcap. 8vo, 3s. 6d. [*Now ready.*

LEWIS'S POCKET CASE BOOK FOR PRACTITIONERS AND STUDENTS. Roan, with pencil, 3s. 6d. *nett.*

LEWIS'S POCKET MEDICAL VOCABULARY.
Second Edition, 32mo, limp roan, 3s. 6d. [*Now ready.*

LEWIS'S PRACTICAL SERIES.

In Crown 8vo Volumes, all with Illustrations.

DISEASES OF THE NOSE AND THROAT.
By F. de HAVILLAND HALL, M.D., F.R.C.P. Lond., Physician to Out-patients, and in Charge of the Throat Department at the Westminster Hospital, &c. [*Just ready.*

PUBLIC HEALTH LABORATORY WORK.
By H. R. KENWOOD, M.B., D.P.H., F.C.S., Instructor in the Hygienic Laboratory, University College, London, &c. 10s. 6d.

MEDICAL MICROSCOPY.
By FRANK J. WETHERED, M.D., M.R.C.P., Medical Registrar to the Middlesex Hospital. 9s.

MEDICAL ELECTRICITY.
By W. E. STEAVENSON, M.D., and H. LEWIS JONES, M.A., M.D., M.R.C.P., Medical Officer in charge of the Electrical Department in St. Bartholomew's Hospital. 9s.

HYGIENE AND PUBLIC HEALTH.
By LOUIS C. PARKES, M.D., D.P.H. Lond. Univ., Lecturer on Public Health at St. George's Hospital, etc. Third Edition, 10s. 6d.

MANUAL OF OPHTHALMIC PRACTICE.
By C. HIGGENS, F.R.C.S., Lecturer on Ophthalmology at Guy's Hospital Medical School, &c. Illustrations, crown 8vo, 6s.

A PRACTICAL TEXTBOOK OF THE DISEASES OF WOMEN. By ARTHUR H. N. LEWERS, M.D. Lond., M.R.C.P. Lond., Obstetric Physician to the London Hospital; etc. Fourth Edition, 10s. 6d.

ANÆSTHETICS, THEIR USES AND ADMINISTRATION.
By DUDLEY W. BUXTON, M.D., B.S., M.R.C.P., Administrator of Anæsthetics at University College Hospital, etc. Second Edition, 5s.

TREATMENT OF DISEASE IN CHILDREN.
By ANGEL MONEY, M.D., F.R.C.P., late Assistant Physician to the Hospital for Sick Children, Second Edition, 10s. 6d.

ON FEVERS: THEIR HISTORY, ETIOLOGY, DIAGNOSIS, PROGNOSIS, AND TREATMENT. By ALEXANDER COLLIE, M.D. (Aberdeen). 8s. 6d.

HANDBOOK OF DISEASES OF THE EAR.
By URBAN PRITCHARD, M.D. (Edin.), F.R.C.S., Professor of Aural Surgery at King's College, London, etc. Second Edition, 5s.

A PRACTICAL TREATISE ON DISEASES OF THE KIDNEYS AND URINARY DERANGEMENTS. By C. H. RALFE, M.A., M.D. Cantab., F.R.C.P. Physician to the London Hospital. 10s. 6d.

DENTAL SURGERY FOR GENERAL PRACTITIONERS AND STUDENTS OF MEDICINE. By ASHLEY W. BARRETT, M.B. Lond., M.R.C.S., L.D.S., Dental Surgeon to the London Hospital. Second Edition, 3s. 6d.

BODILY DEFORMITIES AND THEIR TREATMENT.
By H. A. REEVES, F.R.C.S. Ed., Senior Assistant Surgeon and Teacher of Practical Surgery at the London Hospital. 8s. 6d.

*** *Further Volumes will be announced in due course.*

WILLIAM THOMPSON LUSK, A.M., M.D.
Professor of Obstetrics and Diseases of Women in the Bellevue Hospital Medical College, &c.

THE SCIENCE AND ART OF MIDWIFERY. Fourth Edition, rewritten, with numerous Illustrations, 8vo, 18s.
[*Just published.*

JEFFERY A. MARSTON, M.D., C.B., F.R.C.S., M.R.C.P. LOND.
Surgeon General Medical Staff (Retired).

NOTES ON TYPHOID FEVER: Tropical Life and its Sequelæ. Crown 8vo, 3s. 6d.

WILLIAM MARTINDALE, F.C.S.
AND
W. WYNN WESTCOTT, M.B. LOND.

THE EXTRA PHARMACOPŒIA with the additions introduced into the British Pharmacopœia 1885 and 1890; and Medical References, and a Therapeutic Index of Diseases and Symptoms. Seventh Edition, limp roan, med. 24mo, 7s. 6d.

ANGEL MONEY, M.D., F.R.C.P.
Assistant Physician to University College Hospital, and to the Hospital for Sick Children, Great Ormond Street.

THE STUDENT'S TEXTBOOK OF THE PRACTICE OF MEDICINE. Fcap. 8vo, 6s. 6d.

A. STANFORD MORTON, M.B., F.R.C.S. ENG.
Assistant Surgeon to the Moorfields Ophthalmic Hospital, &c.

REFRACTION OF THE EYE: Its Diagnosis, and the Correction of its Errors, with Chapter on Keratoscopy. Fourth Edition. Small 8vo, 3s. 6d.

C. W. MANSELL MOULLIN, M.A., M.D. OXON., F.R.C.S. ENG.
Surgeon and Lecturer on Physiology at the London Hospital, &c.

SPRAINS; THEIR CONSEQUENCES AND TREATMENT. Second Edition, crown 8vo, 4s. 6d.

WILLIAM MURRAY, M.D., F.R.C.P. LOND.
Consulting Physician to the Children's Hospital, Newcastle-on-Tyne, &c.

ILLUSTRATIONS OF THE INDUCTIVE METHOD IN MEDICINE. Crown 8vo, 3s. 6d.

WILLIAM MURRELL, M.D., F.R.C.P.
Lecturer on Materia Medica and Therapeutics at Westminster Hospital

I.

MASSOTHERAPEUTICS; OR MASSAGE AS A MODE OF TREATMENT. Fifth Edition, crown 8vo, 4s. 6d.

II.

WHAT TO DO IN CASES OF POISONING. Seventh Edition, royal 32mo, 3s. 6d. [*Now ready.*

G. OLIVER, M.D., F.R.C.P.

I.

ON BEDSIDE URINE TESTING: a Clinical Guide to the Observation of Urine in the course of Work. Fourth Edition, fcap. 8vo, 3s. 6d.

II.

THE HARROGATE WATERS: Data Chemical and Therapeutical, with notes on the Climate of Harrogate. Crown 8vo, with Map of the Wells, 3s. 6d.

K. W. OSTROM.
Instructor in Massage and Swedish Movements in the Philadelphia Polyclinic.

MASSAGE AND THE ORIGINAL SWEDISH MOVEMENTS. Second Edition, With Illustrations, 12mo, 3s. 6d. *nett.*

R. DOUGLAS POWELL, M.D., F.R.C.P.,
Physician Extra-ordinary to H.M. the Queen; Physician to the Middlesex Hospital; Consulting Physician to the Hospital for Consumption and Diseases of the Chest at Brompton.

DISEASES OF THE LUNGS AND PLEURÆ INCLUDING CONSUMPTION. Fourth Edition, with coloured plates and wood-engravings, 8vo, 18s. [*Now ready.*

DR. THEODOR PUSCHMANN.
Public Professor in Ordinary at the University of Vienna.

HISTORY OF MEDICAL EDUCATION FROM THE MOST REMOTE TO THE MOST RECENT TIMES. Translated by Evan H. Hare, M.A. (Oxon.), F.R.C.S. (Eng.), F.S.A. Demy 8vo, 21s.

FRANCIS H. RANKIN, M.D.
President of the Newport Medical Society.

HYGIENE OF CHILDHOOD: Suggestions for the care of children after the period of infancy to the completion of puberty. Crown 8vo, 3s.

SAMUEL RIDEAL, D.SC. (LOND.), F.I.C., F.C.S., F.G.S.
Fellow of University College, London.

I.

PRACTICAL ORGANIC CHEMISTRY. The detection and properties of some of the more important organic compounds. 12mo, 2s. 6d.

II.

PRACTICAL CHEMISTRY FOR MEDICAL STUDENTS, Required at the First Examination of the Conjoint Examining Board in England. Fcap. 8vo, 2s.

J. JAMES RIDGE, M.D., B.S., B.A., B.SC. LOND.
Medical Officer of Health, Enfield.

ALCOHOL AND PUBLIC HEALTH. Second Edition, Crown 8vo, 2s. [*Now ready.*

SYDNEY RINGER, M.D., F.R.S.
Professor of the Principles and Practice of Medicine in University College, Physician to, and Professor of Clinical Medicine in, University College Hospital.

A HANDBOOK OF THERAPEUTICS. Twelfth Edition, revised, 8vo, 15s.

FREDERICK T. ROBERTS, M.D., B.SC., F.R.C.P.
Examiner in Medicine at the University of London; Professor of Therapeutics in University College; Physician to University College Hospital; Physician to the Brompton Consumption Hospital, &c.

I.

A HANDBOOK OF THE THEORY AND PRACTICE OF MEDICINE. Eighth Edition, with Illustrations, large 8vo, 21s.

II.

THE OFFICINAL MATERIA MEDICA. Second Edit., entirely rewritten in accordance with the latest British Pharmacopœia, with the Additions made in 1890, fcap. 8vo, 7s. 6d.

ROBSON ROOSE, M.D., F.R.C.P. EDIN.

I.

LEPROSY, AND ITS TREATMENT AS ILLUSTRATED BY NORWEGIAN EXPERIENCE. Crown 8vo, 3s. 6d.

II.

GOUT, AND ITS RELATIONS TO DISEASES OF THE LIVER AND KIDNEYS. Seventh Edition, crown 8vo. [*In preparation.*

III.

NERVE PROSTRATION AND OTHER FUNCTIONAL DISORDERS OF DAILY LIFE. Second Edition, demy 8vo, 18s.

WILLIAM ROSE, B.S., M.B. LOND., F.R.C.S.
Professor of Surgery in King's College, London, and Surgeon to King's College Hospital, &c.

ON HARELIP AND CLEFT PALATE. Demy 8vo, with Illustrations, 6s.

BERNARD ROTH, F.R.C.S.
Fellow of the Medical Society of London.

THE TREATMENT OF LATERAL CURVATURE OF THE SPINE. Demy 8vo, with Photographic and other Illustrations, 5s.

ALEXANDER J. C. SKENE, M.D.
Professor of Gynæcology in the Long Island College Hospital, Brooklyn.

TREATISE ON THE DISEASES OF WOMEN. Second Edition, with 251 engravings and 9 chromo-lithographs, medium 8vo, 28s.

JOHN KENT SPENDER, M.D. LOND.
Physician to the Royal Mineral Water Hospital, Bath.

THE EARLY SYMPTOMS AND THE EARLY TREATMENT OF OSTEO-ARTHRITIS, commonly called Rheumatoid Arthritis. With special reference to the Bath Thermal Waters. Small 8vo, 2s. 6d.

LOUIS STARR, M.D.
Physician to the Children's Hospital, Philadelphia.

HYGIENE OF THE NURSERY. Including the General Regimen and Feeding of Infants and Children; Massage, and the Domestic Management of the Ordinary Emergencies of Early Life. Third edition, with illustrations, crown 8vo, 3s. 6d.

LEWIS A. STIMSON, B.A., M.D.
Professor of Clinical Surgery in the Medical Faculty of the University of the City of New York, etc.

A MANUAL OF OPERATIVE SURGERY. With three hundred and forty-two Illustrations. Second Edition, post 8vo, 10s. 6d.

ADOLF STRÜMPELL.
Professor and Director of the Medical Clinique at Erlangen.

A TEXT-BOOK OF MEDICINE FOR STUDENTS AND PRACTITIONERS. Second edition translated from the German by Dr. H. F. VICKERY and Dr. P. C. KNAPP, with Editorial Notes by Dr. F. C. SHATTUCK, Visiting Physician to the Massachusetts General Hospital, &c. Complete in one large vol., with 119 Illustrations, imp. 8vo, 28s.

JUKES DE STYRAP, M.K.Q.C.P.
Physician-Extraordinary, late Physician in Ordinary to the Salop Infirmary
Consulting Physician to the South Salop and Montgomeryshire Infirmaries, etc.

I.

THE YOUNG PRACTITIONER: With practical hints and instructive suggestions, as subsidiary aids, for his guidance on entering into private practice. Demy 8vo, 7s. 6d. *nett.*

II.

A CODE OF MEDICAL ETHICS: With general and special rules for the guidance of the faculty and the public in the complex relations of professional life. Third edition, demy 8vo, 3s. *nett.*

III.

MEDICO-CHIRURGICAL TARIFFS. Fourth edition, revised and enlarged, fcap. 4to, 2s. *nett.*

IV.

THE YOUNG PRACTITIONER: HIS CODE AND TARIFF. Being the above three works in one volume. Demy 8vo, 10s. 6d. *nett.*

C. W. SUCKLING, M.D. LOND., M.R.C.P.
Professor of Materia Medica and Therapeutics at the Queen's College, Physician to the Queen's Hospital, Birmingham, etc.

I.

ON THE DIAGNOSIS OF DISEASES OF THE BRAIN, SPINAL CORD, AND NERVES. With Illustrations, crown 8vo, 8s. 6d.

II.

ON THE TREATMENT OF DISEASES OF THE NERVOUS SYSTEM. Crown 8vo, 7s. 6d.

JOHN BLAND SUTTON, F.R.C.S.
Lecturer on Comparative Anatomy, and Assistant Surgeon to the Middlesex Hospital.

LIGAMENTS: THEIR NATURE AND MORPHOLOGY. Wood engravings, post 8vo, 4s. 6d.

HENRY R. SWANZY, A.M., M.B., F.R.C.S.I.
Examiner in Ophthalmic Surgery in the Royal University of Ireland
Surgeon to the National Eye and Ear Infirmary, Dublin, etc.

A HANDBOOK OF DISEASES OF THE EYE AND THEIR TREATMENT. Fourth Edition, Illustrated with Wood Engravings, Colour Tests, etc., large post 8vo, 10s. 6d.

ALBERT TAYLOR.
Associate Sanitary Institute; Chief Sanitary Inspector to the Vestry of St. George, Hanover Square, etc.

THE SANITARY INSPECTOR'S HANDBOOK. Cr. 8vo, with Illustrations, 5s. [*Just published.*

A. J. WALL, M.D. LOND., F.R.C.S. ENG.
Medical Staff of H.M. Indian Army (Retired List).

ASIATIC CHOLERA: ITS HISTORY, PATHOLOGY, AND MODERN TREATMENT. Demy 8vo, 6s. [*Now ready.*

E. G. WHITTLE, M.D. LOND., F.R.C.S. ENG.
Senior Surgeon to the Royal Alexandra Hospital, for Sick Children, Brighton.

CONGESTIVE NEURASTHENIA, OR INSOMNIA AND NERVE DEPRESSION. Crown 8vo, 3s. 6d.

JOHN WILLIAMS, M.D., F.R.C.P.
Professor of Midwifery in University College, London, &c.

CANCER OF THE UTERUS: BEING THE HARVEIAN LECTURES FOR 1886. Illustrated with Lithographic Plates, royal 8vo, 10s. 6d.

E. T. WILSON, M.B. OXON., F.R.C.P. LOND.
Physician to the Cheltenham General Hospital, &c.

DISINFECTANTS AND ANTISEPTICS: HOW TO USE THEM. In Packets of one doz. price 1s., by post 1s. 1d. [*Just thoroughly revised.*

BERTRAM C. A. WINDLE, M.A., M.D. DUBL.
Professor of Anatomy in the Queen's College, Birmingham; Examiner in Anatomy in the Universities of Cambridge and Durham.

A HANDBOOK OF SURFACE ANATOMY AND LANDMARKS. Illustrations, post 8vo, 3s. 6d.

DAVID YOUNG, M.C., M.B., M.D.
Fellow of, and late Examiner in Midwifery to, the University of Bombay, etc.

ROME IN WINTER AND THE TUSCAN HILLS IN SUMMER. A Contribution to the Climate of Italy. Small 8vo, 6s.

OSWALD ZIEMSSEN, M.D.
Knight of the Iron Cross, and of the Prussian Order of the Crown.

THE TREATMENT OF CONSTITUTIONAL SYPHILIS. Post 8vo, 3s. 6d.

LEWIS'S DIET CHARTS. A Suggestive set of Diet Tables for the use of Physicians, for handing to Patients after Consultation, modified to suit Individual Requirements; for Albuminuria, Alcoholism, Anæmia and Debility, Constipation, Diabetes, Diarrhœa, Dyspepsia, Fevers, Gout, Nervous Diseases, Obesity, Phthisis, Rheumatism (chronic); with Blank Chart for other diseases. 6s. 6d. per packet of 100 charts, by post, 6s. 10½d.

LEWIS'S FOUR-HOUR TEMPERATURE CHART. This form has been drawn up to meet the requirements of a chart on which the temperature and other observations can be recorded at intervals of four hours. They will be found most convenient in hospital and private practice. Each chart will last a week. Prices, 20, 1s.; 50, 2s.; 100, 3s. 6d.; 500, 14s.; 1000, 25s.

CHART FOR RECORDING THE EXAMINATION OF URINE. These Charts are designed for the use of medical men, analysts and others making examinations of the urine of patients, and afford a very ready and convenient method of recording the results of the examination. Prices, 10, 1s.; 100, 7s. 6d.; 250, 15s.; 500, 25s.; 1000, 40s.

CLINICAL CHARTS FOR TEMPERATURE OBSERVATIONS, ETC. Arranged by W. RIGDEN, M.R.C.S. Price 1s. per doz., 7s. per 100, 15s. per 250, 28s. per 500, 50s. per 1000.

Each Chart is arranged for four weeks, and is ruled at the back for making notes of cases; they are convenient in size, and are suitable both for hospital and private cases.

LEWIS'S CLINICAL CHART, SPECIALLY DESIGNED FOR USE WITH THE VISITING LIST. This Temperature Chart is arranged for four weeks, and measures 6 × 3 inches. 30s. per 1000, 16s. 6d. per 500, 3s. 6d. per 100, 1s. per 25, 6d per 12.

LEWIS'S NURSING CHART. 25s. per 1000, 14s. per 500, 3s. 6d. per 100, 2s. per 50, or 1s. per 20.

*** MR. LEWIS is in constant communication with the leading publishing firms in America and has transactions with them for the sale of his publications in that country. Advantageous arrangements are made in the interests of Authors for the publishing of their works in the United States.

MR. LEWIS'S publications can be procured of any Bookseller in any part of the world.

Complete Catalogue of Publications post free on application.

Printed by H K. Lewis, Gower Street, London, W.C.

