

Catalogue of the annual medical museum in the Elementary Physics Laboratory, Imperial College of Science, South Kensington : open during the Annual Meeting of the Association, July 26th, 27th, 28th and 29th British Medical Association Annual Meeting, London, 1910.

Contributors

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British Medical Association.

ANNUAL MEETING, LONDON, 1910.

CATALOGUE

OF THE ANNUAL

MEDICAL MUSEUM

IN THE

ELEMENTARY PHYSICS LABORATORY,

IMPERIAL COLLEGE OF SCIENCE,

SOUTH KENSINGTON.

Open during the Annual Meeting of the Association,

July 26th, 27th, 28th and 29th.



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PREFACE.

THE Medical Museum has been organised in the present instance on a plan which differs in some respects from that followed on previous occasions. It was decided to divide the Museum up into a number of sections, to place each section under the care of an expert honorary curator, who would select a few subjects to illustrate, and to collect from all available sources such specimens as would in the most useful manner illustrate what the honorary curators wish to demonstrate.

This plan has been carried out to a large extent and, as a result, the Museum contains a large number of series of exhibits rather than a collection of miscellaneous items. Special attention has been paid to methods, and the honorary curators are, as far as this has been possible, offering to the visitor an ocular demonstration of recent advances and of the methods employed both in practice and in the laboratory for the diagnosis and treatment of disease.

The Committee wish to tender their thanks to all those who have assisted in building up the museum, including the honorary curators and the members of the medical profession both in this country and elsewhere who have so kindly sent valuable exhibits.

A second function of the museum is to house specimens required for the purpose of demonstration by the readers of papers in the sections of the Annual Meeting. These exhibits have been arranged partly in special groups and partly in association with the collections made by the honorary curators.

Attention must be called to the section dealing with anæsthetic apparatus, which would not have found a

place in former years, when the Museum was described as "pathological," but which in a museum entitled "medical" was considered to be a valuable addition. Dr. Ada M. Browne, the Honorary Curator, has collected many historical as well as modern anæsthetic apparatus, and from this collection the visitor will doubtless learn much that is of both theoretical and practical value. A second department, which is unusual, is that organised by Dr. Rice Oxley, in which engravings, prints, and other objects of medical interest are exhibited.

The Committee wish in this place to express their gratitude to Messrs. E. Leitz, of London, for their generosity in placing over 300 microscopes at the disposal of the Museum free of charge. The extraordinary number of microscopical specimens shown in the Museum necessitated an extra demand on the manufacturers, and it must be pointed out that Messrs. E. Leitz have found it possible to lend more than three times the number of instruments than have on previous occasions been supplied to the Association.

In conclusion, the Committee trust that the catalogue will be found to be of value as a permanent record of the collection, and with this end in view they have endeavoured to include as much descriptive detail of each exhibited specimen as was available and as could be introduced into a catalogue.

A number of demonstrations on the exhibits will be held. These demonstrations will be announced each day, and will serve to enhance the value of the collection.

Regulations for the Museum.

The Museum will open at 10 a.m. and close at 5 p.m. on each day.

Notice of demonstrations will be posted at the door of the Museum for each day. Demonstrators are requested not to occupy the attention of the visitors to the Museum for more than fifteen minutes, in order that the other demonstrations may not be interfered with.

Specimens can only be removed from the Museum for the purpose of illustrating papers to be read at the Sectional Meetings. A written request to have these specimens transferred to the Sections must be sent to the Honorary Secretary of the Museum Committee on the evening previous to their removal.

Visitors are not allowed to move the exhibits. The coarse adjustment of the microscopes may not be altered, and great care must be exercised with the fine adjustment, as many of the specimens cannot be replaced if damaged. If the image is not clear, an Honorary Curator or other official should be applied to.

The full "legends" of each exhibit are included in this catalogue, and the specimens should not be taken from their places for the purpose of reading the descriptions.

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Dr. E. F. BASHFORD.	Dr. C. F. HARFORD.
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Dr. M. G. BIGGS.	Mr. HUGH R. KER.
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Dr. HERBERT S. FRENCH.	Dr. F. G. SWAYNE.

Honorary Secretary :

Mr. W. H. ARMIT.

Honorary Curators :

Alimentary system	...	Dr. HERTZ, of Guy's Hospital.
Anæsthetic section	...	Dr. ADA M. BROWNE, of the Chelsea Hospital for Women.
Bacteriology	...	Dr. HENDERSON SMITH, of the Lister Institute.
Cardio-vascular system	...	Dr. T. LEWIS, of City of London Hospital.
Cancer Research	...	Dr. MURRAY, of the Imperial Cancer Research Fund.
General Surgical Pathology	...	Dr. BRAXTON HICKS, of the Westminster Hospital.
Genito-urinary system	...	Dr. SWIFT JOLY, of St. Peter's Hospital.
Gynæcology	...	Dr. HELEN CHAMBERS, of the Royal Free Hospital.
Laryngology	...	Dr. HARMER, of St. Bartholomew's Hospital.
Neurology	...	Dr. WILSON, of the Queen Square Hospital.
Ophthalmology	...	Dr. MAYOU, of the Paddington Green Children's Hospital.
Otology	...	Dr. SYDNEY SCOTT, of St. Bartholomew's Hospital.
Physiological and Patho- logical Chemistry	...	Dr. RYFFEL, of Guy's Hospital.
Protozoology	...	Miss MURIEL ROBERTSON, of the London University
Radiology	...	Dr. IRONSIDE BRUCE, of Charing Cross Hospital.
Respiratory system	...	Dr. LAKIN, of Middlesex Hospital.
Tropical Medicine	...	Dr. HUTTON, of the London School of Tropical Medicine.
Tuberculosis	...	Dr. PETRIE, of the Lister Institute.

Collection of Pictures and other Objects of Medical Interest :

Dr. A. J. RICE OXLEY.

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IN LARVAE

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I.—BACTERIOLOGY.

Hon. Curator - Dr. HENDERSON SMITH.

THE METHOD OF ISOLATING AND IDENTIFYING BACILLUS TYPHOSUS.

Lent by Dr. Henderson Smith.

Plates illustrating the various media in use for the isolation of the typhoid bacillus from mixed cultures with the growth of this and other organisms on them.

1. Typhoid bacilli growing on MacConkey's medium.
2. Idem growing on Drigalski-Conradi's medium.
3. Idem growing on Lentz-Teitz medium.
4. Idem growing on Padlewsky's medium (malachite-green).
5. Idem growing on Endo's medium.
6. Idem growing on Conradi's brilliant-green medium.
7. Idem growing on Werbitzi's Chinese-green medium.
8. B. coli growing on MacConkey's medium.
9. Idem growing on Drigalski-Conradi's medium.
10. Idem growing on Endo's medium.
11. Idem growing on Lentz-Teitz medium.
12. Idem growing on Conradi's medium.
13. Idem growing on Padlewsky's medium.
14. Idem growing on Werbitzi's medium.
15. Mixed cultures of typhoid and colon bacilli growing on MacConkey's medium.
16. Idem growing on Drigalski-Conradi's medium.
17. Idem growing on Endo's medium.
18. Idem growing on Lentz-Tietz medium.
19. Idem growing on Padlewsky's medium.
20. Idem growing on Conradi's medium.
21. Idem growing on Werbitzi's medium.

IDENTIFICATION BY THE FERMENTATION OF CARBOHYDRATES,
ETC.—Showing the action of typhoid bacilli in
comparison with other organisms.

22. Action of *B. typhosus* on 10 different substances (10 tubes).
23. Action of *B. coli* on 10 different substances (10 tubes).
24. Action of *B. dysenteriae* on 10 different substances (10 tubes).
25. Action of *B. Gaertner* on 10 different substances (10 tubes)

IDENTIFICATION BY MEANS OF "COMPLEMENT DEVIATION."—
Illustrating the technique of the Bordet-Gengou
reactions in general.

26. Twelve tubes showing the reaction with a positive serum.
27. Six tubes showing the reaction with a negative serum.

IDENTIFICATION BY MEANS OF AGGLUTINATION.

28. Five tubes showing agglutination macroscopically.
29. Microscopic slide showing agglutination.
30. *Idem.*
31. *Idem.*

TYPHOID BACILLI.—Preparations showing their micro-
scopical appearances, including motility, flagella,
etc.

32. Microscopic slide of bac. typhosus.
33. *Idem.*
34. *Idem.*
35. *Idem.*
36. *Idem.*
37. *Idem.*

PLATES MADE DIRECT FROM THE FÆCES AND URINE OF
"TYPHOID CARRIERS."—Illustrating the number
of typhoid bacilli which may be present in such
excreta.

38. A series of six plates, showing growth on MacConkey's
medium and on ordinary agar-agar.

WASSERMAN'S SYPHILIS REACTION.—Showing the technique
and the results in positive and negative cases.

39. A rack of five tubes of re-agents.
 - A.—Ox Blood cell suspension.
Hæmolytic amboceptor (serum of rabbit, pretreated
with ox blood cells).
Complement (normal guinea pig's serum).
 - B.—Extract of syphilitic liver (fœtal) = antigen.
Serum of syphilitic patient = antibody.

40. A series of 12 tubes, showing the inhibition of the hæmolysis produced by the addition of the antigen and the antibody.

THE VARIATION OF TYPHOID BACILLI.

Lent by Dr. Penfold.

New strains of bacillus typhosus got by selection on various media, viz. :—

41. Lactose.
42. Dulcitate.
43. Isodulcitate.
44. Arabinose.
45. The action of bacillus typhosus on glycerine.
Anaerobic cultures of intestinal organisms, showing chemical effects unlike those produced by aerobic growth.
46. Bacillus typhosus on (1) lactose bile salt agar (2) glycerine agar (3) glycocoll agar.
47. Bacillus coli on (1) MacConkey's medium ; (2) glycerine agar ; (3) peptone agar.

EXHIBIT OF "SOLMEDIA."

Solmedia are culture media in solid form. By adding a prescribed quantity of distilled water to the preparation, culture media ready for use are obtained without any elaborate "side-room" work.

48. "SOLMEDIA" AGAR - AGAR (solid concentrated culture media).

Lent by Mr. F. R. Chopping.

49. "SOLMEDIA" GELATINE (solid concentrated culture media).
50. "SOLMEDIA" DRIGALIKI CONRADI (Litmus-Lactose-Nutrose Agar).
51. "SOLMEDIA" BILE SALT AGAR (MacConkey).
52. "SOLMEDIA" SABOURAND'S MALTOSSE AGAR.
53. "SOLMEDIA" LITMUS GELATINE.
54. "SOLMEDIA" PEPTONE BROTH.
55. STERILE TUBES OF VARIOUS "SOLMEDIA," requiring only the addition of water and heating for a short time in water bath to render them ready for use.

56. TUBES OF "SOLMEDIA." (Each tube sufficient to make twelve ordinary culture tubes.)
57. CULTURES ON "SOLMEDIA." GLYCERINE AGAR.
 - Bacillus tuberculosis.*
 - Bacillus Mallei.*
 - Streptothrix actemomycosis.*
58. CULTURES ON "SOLMEDIA." GLUCOSE AGAR.
 - Streptothrix Eppingeri.*
 - Streptothrix hominis B. and L.*
 - Streptothrix hominis W. H.*
59. CULTURES ON "SOLMEDIA." AGAR-AGAR
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 - Bacillus coli communis.*
 - Bacillus dysentery (Flexner).*
 - Bacillus paratyphoid A.*
 - Bacillus paratyphoid B.*
 - Bacillus anthracis.*
 - Bacillus pestis.*
 - Sp. cholera.*
 - Bacillus pyocyaneus.*
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 - Streptococcus pyogenes.*
 - Staph. pyogenes aureus.*
60. CULTURES ON "SOLMEDIA." AGAR-AGAR (various air and water organisms).
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 - Bacillus prodigiosus.*
 - M. agilis.*
 - Sarcinae lutea.*
 - Sarcinae aurantiacus.*
 - Pink torulae.*
61. CULTURES ON "SOLMEDIA." SABOURAND.
 - Tricophyton tonsurans.*
 - Favus.*
 - Sporotrichosis.*
62. CULTURES ON "SOLMEDIA." PEPTONE BROTH.
 - Bacillus typhosus.*
 - Bacillus anthracis.*
 - Sp. cholera.*
63. CULTURES ON "SOLMEDIA." GLUCOSE BROTH.
 - Streptothrix Eppingeri.*
 - Streptothrix hominis B. and L.*
 - Streptothrix hominis W. H.*

64. CULTURES IN "SOLMEDIA." GELATINE.

Sp. cholera.
 Bacillus Finkler-Prior.
 Bacillus Friedländer.
 Bacillus pyocyaneus.
 Bacillus anthracis.
 Staph. py. aureus.

65. PLATE CULTURES ON "SOLMEDIA." DRIGALSKI-
CONRADI.

Bacillus typhosus.
 Bacillus coli.

66. PLATE CULTURES ON "SOLMEDIA." BILE SALT
AGAR (MacConkey).

Bacillus typhosus.
 Bacillus coli.

66A. CHARTS ILLUSTRATING THE USE OF VACCINES IN
THERAPEUTICS.

Lent by Dr. Freeman.

66B. MICROSCOPIC PREPARATIONS OF SPIROCHÆTES,
PHAGOCYTOSIS, ETC.

Lent by Dr. Henderson Smith.

67. ANÆROBIC METHODS OF CULTURE.

II.—TUBERCULOSIS.

Hon. Curator - Dr. PETRIE.

SPECIMENS ILLUSTRATING THE EXAMINATION OF MILK FOR TUBERCLE BACILLI.

Lent by the Lister Institute of Preventive Medicine.

68. BOTTLES FOR THE COLLECTION OF SAMPLES.

The bottles and rubber corks are sterilised before use. The special purpose of this type of bottle is the collection of milk samples from churns at the London railway stations.

SERIES OF CENTRIFUGE GLASSES each containing about 170 c.c. showing samples of milk after centrifugalization (4,000 revolutions per minute for 20 minutes).

69. A mixed milk from a dairy where the cows are milked with particular attention to cleanliness. The deposit is slight and shows practically no dirt.

70. A mixed milk taken from a churn at one of the London railway stations showing a small deposit with comparatively little dirt. This sample shows less than the average amount of dirt for milks sent into London.

71. Milk from the same source as the last specimen, but showing a large amount of dirt in the deposit.

72. Milk from a single cow showing a very large deposit, consisting mainly of "pus" cells.

73. A SERIES OF TEST GLASSES containing the deposits from centrifugalized milk samples mixed with salt solution and ready for inoculation into guinea-pigs.

74. MICROSCOPICAL PREPARATION OF THE CENTRIFUGALIZED DEPOSIT OF A SINGLE COW MILK FROM A LONDON COWSHED.

Showing numerous tubercle bacilli. The inoculation test into guinea-pigs was positive. Stained by carbol-fuchsin and methylene blue.

75. MICROSCOPICAL PREPARATION OF THE CREAM OF THE SAME MILK.

Numerous tubercle bacilli are present in the film.

76. MICROSCOPICAL PREPARATION OF THE CENTRIFUGALIZED DEPOSIT OF THE SAME MILK, which was treated by the antiformin-ligroin method.

77. MICROSCOPICAL PREPARATION OF THE CENTRIFUGALIZED DEPOSIT OF A SINGLE COW MILK.

This preparation shows some short thick acid-fast bacilli (not the tubercle bacillus). Tubercle bacilli are also present. The inoculation test in this case proved positive.

78. MICROSCOPICAL PREPARATION OF THE CENTRIFUGALIZED DEPOSIT OF A SINGLE COW MILK, showing acid-fast bacilli (not the tubercle bacillus).

The inoculation test proved negative in this case.

79. MICROSCOPICAL PREPARATION OF THE LUMBAR GLAND OF A GUINEA-PIG, which died 21 days after the inoculation of a single cow milk deposit.

Tubercle bacilli are present in exceptionally large numbers.

80. MICROSCOPICAL PREPARATION OF SPUTUM.

Shewing tubercle bacilli.

81. MICROSCOPICAL PREPARATION OF THE CENTRIFUGALIZED DEPOSIT OF THE SAME SPUTUM, which had been mixed with an equal volume of 40% antiformin.

There has evidently been a concentration of the tubercle bacilli, and this preparation is much "cleaner" than the last, owing to the solution of the cells and bacteria by the antiformin. Stained by carbol-fuchsin and methylene blue.

82. DISSECTION OF A NORMAL GUINEA PIG for comparison with the following specimens of tuberculosis and pseudo-tuberculosis in guinea-pigs.

83. DISSECTION OF A GUINEA PIG, which was killed 6 weeks after the inoculation of the centrifugalized deposit of a London mixed milk.

The tubercular lesions are similar to those seen in the next specimen.

84. DISSECTION OF A GUINEA PIG, which died 6 weeks after the inoculation of an emulsion of an enlarged tonsil removed from a patient suffering from tuberculosis of the cervical glands.

The inoculation was made into the thigh muscles on the right side. The enlarged caseous inguinal and lumbar glands have been incised. Tubercular nodules are present in the spleen and lungs.

85. DISSECTION OF A GUINEA PIG, which died of a spontaneous infection of pseudo-tuberculosis.

The lesions present a superficial resemblance macroscopically to those of tuberculosis. The causal organism of this disease is the *B. pseudo-tuberculosis rodentium*.

86. DISSECTION OF A GUINEA PIG, which died as the result of the inoculation of a culture of a bacillus belonging to the paratyphoid group.

This bacillus is found associated with a natural disease causing epizootics in guinea-pigs. The lesions in this disease present a certain resemblance to those of experimental tuberculosis in the guinea-pig.

87. EGG MEDIUM TUBES FOR GROWING TUBERCLE BACILLI.

This medium was introduced by Dorset in America and has been found very suitable for the cultivation of the tubercle bacillus.

88. FIVE CULTURES ON DORSET'S EGG MEDIUM OF "BOVINE" TUBERCLE BACILLI.

From the glands of guinea-pigs which contracted tuberculosis as the result of the inoculation of 5 different samples of mixed milks sent into London.

89. A CULTURE ON DORSET'S EGG MEDIUM OF BOVINE TUBERCLE BACILLI from the heart-blood of a guinea-pig, which died with advanced tuberculosis produced by the inoculation of the bacilli into the thigh muscles.

The heart-blood was sown on the surface of the egg medium. Only a few discrete colonies are to be seen. This culture is of interest in view of the statement that tubercle bacilli can frequently be demonstrated microscopically in the circulating blood of patients suffering from tuberculosis. This statement, however, requires confirmation. Anderson tested the point in experimental tuberculosis of the guinea-pig and rabbit. In the former he found tubercle bacilli only once out of 13 cases of advanced tuberculosis. He proved the presence of tubercle bacilli in this instance by inoculation of the heart-blood into a healthy guinea-pig, but failed to obtain direct cultures of the tubercle bacilli from the heart-blood. He found tubercle bacilli not infrequently in the heart-blood of rabbits dying with advanced tuberculosis.

90. CULTURE ON DORSET'S EGG MEDIUM OF BOVINE TUBERCLE BACILLI, obtained from same source as last specimen.

91. A CULTURE ON DORSET'S EGG MEDIUM OF BOVINE TUBERCLE BACILLI from the lumbar gland of a guinea-pig, which became tuberculous as the result of the inoculation of a "single cow" milk from a London cowshed.

92. A CULTURE ON DORSET'S EGG MEDIUM OF TUBERCLE BACILLI OF THE "HUMAN" TYPE, obtained by sowing upon the medium pus evacuated from the hip-joint of a child.

The more vigorous growth of bacilli of human origin as compared with the bovine cultures may be noted.

93. CULTURE ON DORSET'S EGG MEDIUM OF TUBERCLE BACILLI OF THE "HUMAN" TYPE obtained by sowing direct upon the medium the centrifugalized deposit of the cerebro-spinal fluid from a case of tuberculous meningitis in a child.

94. CULTURE from same source as last.

95. CULTURE ON DORSET'S EGG MEDIUM OF TUBERCLE BACILLI, obtained direct from sputum after treatment with antiformin.

The antiformin killed all the organisms in the sputum with the exception of the tubercle bacillus.

96. CULTURE IN ROUX BOTTLE OF TUBERCLE BACILLI, showing the characteristic appearance of the growth

97. CHART ILLUSTRATING THE OCCURRENCE OF TUBERCLE BACILLI IN SAMPLES OF MILK SENT INTO LONDON.

The chart represents percentages of positive samples in successive lots of 500 examined by the inoculation test into guinea-pigs, the period of examination extending from 2, vii., 1908 to 8, vi., 1910.

98. SPECIMEN OF ANTIFORMIN.

Antiformin was introduced into bacteriological technique by Uhlenhuth (Berlin klin. Wochenschr., 1908, No. 29). It consists of a mixture in definite proportions of an alkaline hypochlorite and caustic soda. It is in fact the well-known Eau de Javelle to which caustic soda is added. It is a powerful oxidising agent. A 2.5 per cent. solution kills most bacteria in from 2½-5 minutes. The tubercle bacillus and other acid fast bacilli are highly resistant to antiformin. Uhlenhuth obtained pure cultures of tubercle bacilli from sputa by treating the sputum with an equal volume of 30 per cent. antiformin solution and allowing it to act for 2-5 hours. The mixture was then centrifugalised and cultures made from the deposit washed in saline. The antiformin method is useful in detecting tubercle bacilli in sputum or other material when they are present in small numbers. The antiformin quickly makes the sputum homogeneous, and a smear is made from the centrifuged deposit.

99. SPECIMEN OF LIGROIN.

Lange and Nitsche (Deutsche med. Wochenschr., 11 March, 1909), described a method for the detection of tubercle bacilli in sputum when present in small numbers. They first rendered the sputum homogeneous by the addition of normal caustic potash and then shook up the mixture with

ligroin (a petroleum ether). Tubercle bacilli if present adhere to the droplets of ligroin and are carried up into the layer of ligroin which finally forms on the top of the mixture. Smears made from this ligroin layer show the tubercle bacilli unmixed with other bacteria.

Bernhardt (Deutsche med. Wochenschrift, 19 August, 1909), modified Lange and Nitsche's method by using antiformin instead of normal caustic potash to render the sputum homogeneous.

100. (a.) SPUTUM CONTAINING TUBERCLE BACILLI.

(b.) THE SAME SPUTUM TREATED WITH ANTI-FORMIN AND RENDERED THEREBY HOMOGENOUS.

(c.) SPUTUM TREATED BY BERNHARDT'S ANTI-FORMIN LIGROIN METHOD.

The layer of ligroin is seen on the top of the mixture.

101. SLIDE OF TUBERCLE BACILLI, stained by Much's modification of Gram's method.

The bacilli were obtained from the peritoneal cavity of a guinea-pig, which had been infected with bovine tubercle bacilli. The bacilli show distinct granulation.

Lent by Dr. Much.

102. OLD TUBERCULIN (KOCH).

Lent by the Lister Institute of Preventive Medicine.

Method of Preparation.—"Human" tubercle bacilli are grown in glycerin broth for 4-5 weeks at 37°C. The culture is sterilised by steaming it for half an hour. The fluid is reduced to one-tenth of its original volume, the bacilli are filtered off and 0.5 per cent. phenol is added to the filtrate. This is allowed to stand for several weeks in a cool place during which time a separation of indifferent substances takes place. The fluid is then refiltered.

This preparation can be used for diagnosing tuberculosis. When given subcutaneously to tuberculous patients it causes a rise of temperature and a temporary increase of the severity of the symptoms. Locally it produces a reddened infiltration. von Pirquet used undiluted old tuberculin in his cutaneous tuberculin reaction. Moro's ointment which has been recommended for use in the "von Pirquet" reaction consists of equal parts of Koch's old tuberculin and anhydrous lanolin.

This and the following specimens of tuberculin are preparations made in the laboratories of Messrs. Meister Lucius, Brüning & Co., Hoechst-am-Main.

103. DRIED TUBERCULIN, GLYCERIN FREE.

Koch found that the active constituent of "old tuberculin" is insoluble in alcohol. This preparation is accordingly made by adding absolute alcohol to "old tuberculin." The precipitate is filtered off, washed with alcohol and then dried in a vacuum dessicator. The resulting product is a white powder easily soluble in water.

This substance is used to prepare the following preparation.

104. "TUBERKULOSE--DIAGNOSTIKUM" (HÆCHST).

This consists of a solution of the dried tuberculin in sterile water or saline. It is used in the diagnosis of human tuberculosis by means of the conjunctival reaction of Wolff-Eisner and Calmette.

105. "BOVINE" TUBERCULIN.

This is prepared in a similar way to the "old tuberculin," cultures of "bovine" tubercle bacilli being used.

106. RESIDUE FROM "OLD TUBERCULIN."

This consists of the residue of the "old tuberculin" preparations, *i.e.*, the intact tubercle bacilli which are filtered off during the process. The deposit of bacilli when emulsified with saline can be used in opsonic estimations.

107. T.O.A. (TUBERKULIN-ORIGINAL-ALT)

This preparation consists of a filtered broth culture of "human" tubercle bacilli and is used in the treatment of tuberculosis.

108. P.T.O (PERLSUCHT-TUBERKULIN-ORIGINAL).

This preparation consists of a Filtered Broth Culture of "Bovine" Tubercle Bacilli, and is used in the treatment of tuberculosis.

109. VACUUM-TUBERCULIN.

This is prepared from T.O.A. by concentrating it to 1/10 in volume and then keeping it in a vacuum at a comparatively low temperature.

This preparation is used in the treatment of tuberculosis.

110. "PERLSUCHT-VAKUUM-TUBERKULIN."

This is prepared from P.T.O. by concentrating it to 1/10 of its volume at a low temperature, and is used in the treatment of tuberculosis.

111. KILLED TUBERCLE BACILLI.

The bacilli are obtained by filtering broth cultures. They are freed from glycerine and then dried. They may be used for opsonin work.

112. GROUND-UP TUBERCLE BACILLI.

The bacilli are broken up by mechanical means into a fine powder. An emulsion of this preparation in saline can be used for agglutination purposes.

113. TUBERCULIN T.R.

Koch extracted ground-up tubercle bacilli with water until all the soluble products were completely removed. He called the solution T.O. He converted the residue into an extremely fine emulsion in water and called the product T.R. T.R. is used only for therapeutic purposes. 20 % glycerine is added to it to preserve it. For use it is diluted with 20 % glycerine water. 0.0002 ccm. is the most appropriate initial dose for treatment.

114. KOCH'S TUBERCLE BACILLUS EMULSION.

0.5 gramme of ground-up tubercle bacilli is mixed with 50 cc. glycerine and 50 cc. of water. The mixture is shaken till a fine emulsion results. Each ccm. of the preparation contains 5 milligrammes of bacillary substance. This preparation is used therapeutically by hypodermic injection. The requisite dilutions are made in normal saline.

115. BOVINE TUBERCLE BACILLUS EMULSION.

This preparation is made from bovine tubercle bacilli in precisely the same way as the last.

116. "TUBERKULOSE-SERO-VAKSIN" (S.B.E.)

An emulsion of sensitized tubercle bacilli.

METHOD OF PREPARATION.—Human tubercle bacilli collected on a filter are thoroughly washed with saline. They are then mixed with an appropriate amount of specific tubercle immune serum and shaken well with glass beads, until the bacilli are completely broken up. The mixture is then centrifugalized and the deposit is repeatedly washed with saline and finally made up with 50 % glycerin water. Each ccm. contains 5 milligrammes of stable substance. This method was suggested first by Fritz Meyer of Berlin, and Citron has reported favourably on its use as a therapeutic agent; one advantage it possesses being that it produces less local irritation than other similar preparations.

117. APPARATUS USED IN ELECTRICAL
EXPERIMENTS WITH BACTERIA.

Lent by Dr. Russ.

The instruments used are : a source of current (conveniently obtained from Leclanché's cells) which is distributed by means of a switchboard containing an ampère-meter, volt-meter, contact-maker, and reverser to a testing stand. This latter consists of a platform supporting a series of glass U tubes, which are held vertically in spring holders and into the upper ends of which platinum foil electrodes descend by the lowering of a moving beam fastened by a screw clamp to the required level.

By this assembly of instruments, a current is measured and directed through a series of U tubes in which suspensions of bacteria have been placed.

As an alternative to the U tube stand, the current may also be passed from the switchboard through another apparatus, which consists of two upright standards holding two adjustable electrical terminals, which are immersed in the limbs of a modified U tube, and in one of which a bacterial trap is also fixed. The above is mounted on a simple platform.

RESULTS OBTAINED.

When a constant current traverses a suspension of bacteria in certain electrolytes there ensues a migration of the organisms to one or other electrode.

This occurs whether the organisms are dead or living and motile or non-motile.

The aggregation at one electrode varies with the nature of the fluid (electrolyte) used. In certain fluids there is no movement.

This property of movement by the electric current was utilized to cause the aggregation of tubercle bacilli at one electrode placed in naturally tuberculous urine,

and by arranging the electrode at which they would arrive in the form of a bacterial trap, the bacilli were withdrawn from a series of such urines and recognised in stained films, prepared from the trap contents.

SPECIMENS ILLUSTRATING TUBERCULOSIS OF THE THROAT, THE NOSE AND THE EAR.

118. A COLLECTION OF SPECIMENS ILLUSTRATING TUBERCULOSIS OF THE THROAT, THE NOSE AND THE EAR.

The collection comprises a series of specimens demonstrating the pathogenesis of tuberculosis of the larynx, and the natural method of arrest of the disease. Upon this is based the modern surgical method of treating the disease by means of the galvano-cautery submucous puncture.

Lent by Dr. Jobson Horne.

MEANS OF COMBATING TUBERCULOSIS.

119. PREPARED CARDBOARD BOXES FOR SPUTUM, for the indoor use of consumptives.

Lent by Dr. James Niven.

120. WAXED TISSUE PAPER for consumptives to cough into, &c.

121. SPIT BOTTLE for the outdoor use of consumptives, with printed instructions as to use and cleaning.

122. COPIES OF "INSTRUCTIONS" for the guidance of consumptives in taking precautions.

123. "HANDBILLS," for general distribution.

124. LARGE WALL CHART, shaded to show the death-rate from phthisis in the Statistical Divisions.

1125-49. AN EXHIBIT OF SPECIMENS OF TUBERCULOSIS and other diseases of the lower animals, mounted in solid media by a new method.

Lent by Professor Sheridan Delépine.

III.—PROTOZOOLOGY.

Hon. Curator = Miss MURIEL ROBERTSON.

N.B.—The Specimens in this Section have been lent by Miss Muriel Robertson and Professor Minchin, and are taken from the valuable collection in the possession of the Protozoological Department of the University of London.

159. RHINOSPORIDIUM KINEALYI, a parasite of the order Haplosporidia, which produces polypus-like growths of the septum nasi of human beings in India.

Section of a nasal polypus showing the cysts of the parasite in the tissues.

- 160 RHINOSPORIDIUM KINEALYI.

Section of a cyst showing ripe spore-clusters ("spore-morulae")

161. HAEMOCYSTIDIUM SIMONDI, a pigmented amoeboid intracorpuseular parasite of the blood of Hemidactylus leschenaultii, a species of gecko found in the forests of Ceylon.

The preparation shows a male and female individual in the same field; note the abundant pigment in the body of the parasite.

162. ADELEA OVATA.

Stage showing association of the mother-cells of the gametes ("gametocytes"). The small body is the microgametocyte (male), which will produce later four microgametes; one of these will fuse with, and fertilize, the macrogamete.

163. HISTOPLASMA CAPSULATUM Darling, a parasite of human beings in Central America.

The preparation is a smear from the lung-tissue, and shows a number of parasites in a macrophage. The parasites,

which are very minute, are believed by their discoverer to be allied to the Leishman-Donovan bodies of Kala-Azar, etc., but they do not show definite nuclear structures. (*Vide* Maryland Medical Journal, April, 1907; Arch. Inter. Med., Sept. 1908.)

164. *LEISHMANIA TROPICA* ("Wright's bodies"), parasite of Oriental Sore.

Culture of the parasites after 48 hours showing a large mass of banana-shaped organisms in which the flagella are not as yet formed.

165. *ADELEA OVATA*.

Smear preparation from the wall of the intestine of *Lithobius forficatus*, showing a late stage of the reproduction of the parasite by a process of multiple fission ("schizogony").

166. *HÆMOGREGARINA NICORLÆ*.

Late stage of sporogony in the wall of the intestine of the leech. The minute daughter-individuals, "sporozoites," can be observed lying inside the capsule or "oocyst" formed originally round the mother-cell before fission took place.

167. *ADELEA OVATA*, a coccidian parasite from the alimentary canal of a common species of centipede (*Lithobius forficatus*).

The preparation shows a group of young parasites in the trophic phase (trophozoites).

168. *HÆMOGREGARINA BALFOURI*, an intracorpuseular parasite of the red blood-corpuscles of the Jerboa.

The preparation shows stages of multiple fission ("schizogony") of the parasite in the liver of the Jerboa.

169. *LEISHMANIA TROPICA* ("Wright's bodies"), parasite of Oriental sore.

Smear from an ulcer showing a macrophage full of the parasites.

170. *LEUCOCYTOZOA ZIEMANNI*.

Preparation showing a male gametocyte, with relatively clear cytoplasm and large pale nucleus.

171. *ICHTHYOSPORIDIUM* Sp.

View of a full-grown parasite under a high power. Note the many small nuclei.

172. ICHTHYOSPORIDIUM Sp.

Group of young forms under a high power.

173. MONOCYSTIS MAGNA, a gregarine parasitic in the seminal vesicle of the common earthworm.

The preparation shows a full-grown parasite, covered with a fur of broken down spermatozoa. In the young state the parasite penetrates into a spermatocyte in which it grows at the expense of the cell, ultimately destroying it.

174. MONOCYSTIS MAGNA.

Preparation showing the spores, each containing eight sporozoites.

175. DIPLODINA IRREGULARIS, a gregarine parasitic in the blood-vessels of the "Cotton-spinner" (*Holothuria nigra*).

Section of a cyst showing various stages of the conjugation of the gametes. Note that the gametes show no visible differentiation.

176. DIPLODINA IRREGULARIS.

Early stage in the development of the spores. Four nuclei are seen at this stage in each spore. Later each of these nuclei divides into two, and eight sporozoites are formed as in Monocystis.

177. HÆMOGREGARINA NICORLÆ.

Early stage of multiplication of the parasite to form spores ("sporogony"), after sexual conjugation in the wall of the intestine of the leech (*Ozobranchus shipleyi*).

178. MYXIDIUM (species undetermined), a parasite of the order Myxosporidia, which infests the gall-bladder of a fish (*Gadus virens*).

The preparation shows the spores of the parasite. It was for spores of parasites of this order that the term "psorosperms" was originally coined by the great naturalist and anatomist, Johannes Müller.

179. HÆMOGREGARINA NICORLÆ.

Free sporozoite escaping through the membrane at the base of the intestinal cells. The sporozoites penetrate into the blood-stream of the leech,

180. **TRYPANOSOMA RAJÆ.**
Crithidial and early trypaniform stages from the intestine of the leech (*Pontobdella muricata*).
181. **AMŒBA COLI.**
Encysted specimen from human fæces, showing the characteristic eight nuclei of the ripe cyst. The cyst-wall is very delicate.
182. **AMŒBA COLI.**
Stage with single nucleus.
183. **HÆMOGREGARINA NICORLÆ**, a species of hæmogregarine parasitic in the red blood-corpuscles of a Ceylon tortoise (*Nicoria trijuga*).
Preparation showing a bean-shaped stage in the blood.
184. **HÆMOGREGARINA NICORLÆ.**
Preparation showing a recurved vermiform individual from the blood.
185. **HÆMOGREGARINA NICORLÆ.**
Section of the lung of the tortoise showing a late stage of non-sexual reproduction of the parasite by multiple fission ("schizogony"). The small daughter-individuals ("merozoites") are now completely formed.
186. **HÆMOGREGARINA NICORLÆ.**
Blood-film showing the last stage of schizogony in the bloodstream. This type of schizogony probably gives rise to the gametocytes.
187. **HÆMOGREGARINA NICORLÆ.**
Motile individuals, free in the lumen of the intestine of the leech (*Ozobranchus shipleyi*), which transmits the parasites from one tortoise to another.
188. **HALTERIDIUM** from the blood of the chaffinch.
Preparation showing a male gametocyte throwing off the slender thread-like microgametes.
189. **ICHTHYOSPORIDIUM** (species undetermined), a parasite belonging to the group Haplosporidia of the Sporozoa. The species of this genus are found infesting the tissues of marine fishes, such as flounders, haddocks, and sea-trout. The parasites cause a disease which is often fatal to the fish.
The preparation gives a general view of a strongly infected liver.

190. HALTERIDIUM from the blood of the chaffinch.

Preparation showing the fusion of a microgamete (male) and a macrogamete (female) in fertilisation.

191. CHLOROMYXUM LEYDIGI, a parasite of the order Myxosporidia (Sporozoa) from the gall-bladder of the dogfish.

The preparation shows a young growing parasite ("trophozoite") in which no spores are as yet formed.

192. LEISHMANIA TROPICA ("Wright's bodies"), parasite of Oriental Sore.

Flagellate stage from 72 hours culture.

193. LAMBLIA INTESTINALIS from the intestine of the mouse.

Preparation stained with Heidenhain's Iron-Hæmatoxylin, the stain but slightly extracted, in order to show the flagella distinctly.

194. CYSTOBIA HOLOTHURIAE, a gregarine parasitic in the blood-vessels of a holothurian.

The preparation shows association of two individuals during the trophic phase, previous to encystation. When growth is complete, a cyst is formed round the two associated individuals, each of which then produces numerous gametes, which conjugate, as in *Diplodina irregularis* in another preparation.

195. HERPETOMONAS MUSCÆ - DOMESTICÆ, a parasitic flagellate from the intestine of the common house-fly.

196. CYCLOSPORA CARYOLYTICA, a coccidian parasite of the mole. It attacks the nuclei of the epithelial cells of the intestine.

Section of the intestine showing both microgametes and macrogametes.

197. EUCCOCCIDIUM EBERTHI, a parasite of the intestinal epithelium of Sepia (the cuttlefish).

The section shows a cyst containing many spores, each of which contains three sporozoites.

198. TRYPANOSOMA RALE.

A species parasitic in the blood of the skate.

199. *TRYPANOSOMA* RALÆ.

Developmental forms from the intestine of the intermediate host (*Pontobdella muricata*), a marine leech which feeds upon the blood of skate.

200. *TRYPANOSOMA* RALÆ.

Rounded resting form from the intestine of the leech (*Pontobdella muricata*).

IV.—TROPICAL MEDICINE.

Hon. Curator - Dr. HUTTON.

(N.B.)—The specimens in this section with the exception of Dr. Row's series (Nos. 266-278) have been lent by the London School of Tropical Medicine.

MALARIA.

Series of blood films showing the three varieties of malarial parasites.

201. BENIGN TERTIAN PARASITE OF MALARIA.

This parasite takes 48 hours for full development. The specimen shown is about half grown. Note that the corpuscle containing it, besides being enlarged and paler than the average, shows Schffüner's dots.

202. SUB-TERTIAN PARASITE OF MALARIA.

This parasite takes just under 48 hours for development. The specimen shows the youngest forms "rings." The further development takes place in the capillaries of the internal organs and consequently cannot be seen in the peripheral blood. The corpuscles containing the "rings" are unaltered in appearance. The specimen shows sub-tertian gametocytes or "crescents" which do not develop further in man, but become actively sexual in the stomach of the mosquito.

203. QUARTAN. PARASITE OF MALARIA.

The length of the cycle in this form is 72 hours. The parasite is less actively amœboid than the benign tertian, and is frequently seen stretching across one diameter of the corpuscle containing it. This is called the "equatorial parasite." The infected corpuscle is smaller and darker than normal.

204. SECTION OF HUMAN BRAIN, of a fatal case of sub-tertian malaria.

The presence of the parasite in the corpuscles causes them to become sticky and they adhere to the walls of the capillaries. This causes a temporary blood stasis and if this occurs to any extent in the capillaries of the brain it gives rise to pernicious

or malignant attacks of fever. The parasite is thus frequently called the "malignant" tertian parasite. This specimen shows the capillaries filled with corpuscles infected with parasites undergoing schizogony.

205. SECTION OF MALARIAL SPLEEN.

As the malarial parasite grows, it lives on the protoplasm of the blood corpuscles; it digests hæmoglobin to form a pigment (hæmozoin) which is therefore the excreta of the parasite. When schizogony takes place this pigment is set free in the blood plasma from which it is taken up by the leucocytes (especially the large mononuclear leucocytes) by which it is deposited in the spleen and other internal organs. This specimen shows the pigment deposited between the spleen cells.

206. TEMPERATURE CHARTS OF CASES OF—

Benign tertian fever.

Sub-tertian fever.

Quartan fever.

Mixed infection of benign, tertian and quartan fever.

These charts show the typical periodicity of the particular parasite depending on the length of time the parasite takes for full development.

SERIES OF SPECIMENS SHOWING DEVELOPMENT OF THE MALARIAL PARASITE IN THE MOSQUITO.

207. Stomach of mosquito showing zygotes 48 hours old.

208. Stomach of mosquito showing zygotes 3 days old.

209. Stomach of mosquito showing zygotes 15 days old.

210. Stomach of mosquito showing empty zygotes.

MOSQUITOS WHICH CARRY MALARIA.

211. *Anopheles maculipennis*—Europe.

212. *Myzomyia funesta*—India.

213. *Pyretophorus costalis*—Africa.

214. *Cellia argyrotarsus*—America.

These are by no means the only mosquitoes which carry malaria, but they are typical specimens of the sub-family anophelinæ to which the malarial-carrying mosquitoes belong.

TRYPANOSOMIASIS.

215. Blood films from a case of human trypanosomiasis (sleeping sickness) showing the trypanosoma gambiense which causes it. Note the shape, the macro-nucleus, the micro-nucleus and the flagella.

216. *Section of human brain of a case of sleeping sickness showing the characteristic peri-vascular small-celled infiltration.*
217. *Temperature chart of a typical case of trypanosomiasis. Glossina palpalis.* This is one of the tsetse flies and is the fly which acts as the carrier of the disease.

KALA-AZAR.

218. *Section of human spleen from a fatal case of the disease. It shows the Leishman-Donovan bodies in the spleen cells.*

RELAPSING FEVER.

219. *Blood films showing the spirochæta duttoni, the cause of the African type of relapsing fever. The spirochæta obermeyer, the cause of the Indo-European type does not differ morphologically from the spirochæta duttoni. The spirochætes appear in the blood during the height of the fever.*
220. *Typical temperature chart of a case of Indo-European relapsing fever.*
221. *Temperature chart of a case of African relapsing fever.*
222. *Ticks. Ornithodoros moubata, carrier of African relapsing fever.*
- | | | |
|-------------------|---|--|
| Cimex lectularius | } | Carriers of Indo-European relapsing fever. |
| Argas persicus | | |

YELLOW FEVER.

223. *Section of livers of fatal cases of yellow fever showing fatty degeneration.*
224. *Stegomyia Fasciata, the mosquito which carries the disease.*

BLACKWATER FEVER.

225. *Section of the kidney of a man who died of the disease on the third day of the attack. This shows the blocking of the urinary tubules with hæmoglobin infarcts. Note that there is no evidence of a true hæmorrhage from the kidney.*

PELLAGRA.

226. *Photographs of case of pellagra, showing the characteristic rash on the exposed surfaces of the body.*
227. *Idem.*
228. *Idem.*
229. *Idem.*

BERI-BERI.

230. *Specimen of cured rice.*
231. *Specimen of uncured rice.*
232. *Section of liver of a fatal case of beri-beri, showing small-celled infiltration and hæmorrhages.*

- 233. Photographs of a case of the dry or atrophic variety, showing extreme wasting.
- 234. Photograph of a case of the wet or dropsical variety, showing universal œdema.

CHOLERA.

- 235. Film of the "comma" bacillus (Koch).

PLAGUE.

- 236. Smear from the blood of a rat showing the bacillus pestis.
- 237. Photograph of inguinal bubo.
- 238. Photograph of parotid bubo.

DYSENTERY.

- 239. Film of bacillus dysenteriae.
- 240. Amœba coli.
- 241. Intestine of case of amœbic dysentery showing the characteristic lesions.

LIVER ABSCESS.

- 242. Liver showing abscess cavity. This is from the case, the intestine of which is shown in No. 241.

SPRUE.

- 243. Specimen of the tongue in a case of sprue, showing denudation of the epithelium and small ulcerations.
- 243A. Section of intestine from a fatal case of sprue. Note the thinning of the mucosa.

LEPROSY.

- 244. Film of bacillus lepræ.
- 245. Film of bacillus lepræ from a case which has been treated for two years with nastin. Note the degenerative changes in the bacilli.
- 246. Section of the skin of a leper showing the characteristic arrangement of the bacilli and their enormous number.
- 247. Album of photographs of lepers. (*Lent by Dr. Turner.*)

YAWS.

- 247A. Section of a typical yaw showing the granulomatous appearances.
- 248. Photograph of a case of yaws.
- 249. Idem.

MALTA FEVER.

- 250. Micrococcus melitensis from a culture.
- 251. Temperature chart of a typical case of Malta fever.

FILARIASIS.

- 251A. Photograph (elephantiasis of leg).
- 252. Photograph (elephantiasis of scrotum).
- 253. Photograph (elephantiasis of mamma).
- 254. *Filaria bancrofti* larvæ in the lung of a patient who died at midday. At this time the larvæ were absent from the general circulation.

DEVELOPMENT OF THE FILARIA LARVÆ IN THE MOSQUITO.

- 255. Larva in the stomach of a mosquito twelve hours after feeding on an infected patient.
- 256. Larva in the thoracic muscles of a mosquito three days after feeding on an infected patient.
- 257. Larva in the thoracic muscles of a mosquito eleven and three-quarter days after feeding on an infected patient.
- 258. Larva in the proboscis and palps of mosquito ready to escape when the mosquito bites again.
- 259. Specimen of elephantiasis of leg showing the enormous size these cases may obtain.

BILHARZIASIS.

- 260. Bladder of a case of bilharziasis showing the typical sandy appearance and papillomata due to the presence of the eggs.
- 261. Section of bladder showing the eggs *in situ*.

SCHISTOSOMUM JAPONICUM.

- 262. Section of mesenteric gland of a case infected with *schistosomum japonicum* showing eggs *in situ*.

MADURA FOOT.

- 263. Specimen of madura foot removed by operation showing ulceration and the typical appearance.
- 264. Section of above case, showing the fungus.

MICROSCOPIC SMEARS.

- 265. *Leishmania tropica*, of the oriental sore of Cambay. Parasites packed in macrophage, from the human lesion direct. Stained with Giemsa.

Lent by Dr. R. Row.

- 266. Early development of the parasite (*Leishmania tropica*), 24 hours in human blood serum (dilute) at 26—30° c., early preflagellate stage.
- 267. 40 hours' culture of the parasite (*Leishmania tropica*) in human blood serum (diluted) at 25—28° C. mature preflagellate and young flagellates in clusters. Giemsa stain.

268. Fully formed flagellates, 4 days culture in human blood serum (dilute) at 25—30° C.
269. Parasites seen in the lesion of the monkey (*Macacus sinicus*). Artificial sore induced by infection with the parasites seen in No. 265. Macrophage packed with parasites. Stain Giemsa.
270. Some cluster of the parasite (from the lesion of *Macacus sinicus*) in culture in human blood serum 5 days. At. At 25—30° C. Stain Giemsa.

LANTERN SLIDES.

271. Illustrating the parasite *Leishmania Tropica* seen in smears of the discharge of the oriental sore of Cambay, stained by Giemsa. The parasites are elongated and torpedo-shaped. The blepharoplast is quite in opposition to the nucleus.
272. Changes the parasite undergoes before entering into cultural stages. This is a smear of the discharge left intact for three days in vitro at 26° C.—28° C. Stain Giemsa.
273. The parasites seen packed in a macrophage seen in a smear from the discharge from the "sore." Stained with Giemsa.
274. Parasites seen in a 24 hours culture in human blood serum at 28°. Stained with Giemsa.
- N.B.—Increase in size and alteration in shape. Some are oval and ovoid in shape. Others are pear-shaped, pointed at one extremity. The nucleus is one condensed mass of the blepharoplast and nucleus.
275. A composite plate illustrating the various stages of development from the early preflagellate stage into mature preflagellate stage. Culture 48 hours old with human blood serum at 25°—28° C. Stained with Giemsa.
276. A rich growth 48 hours old in human blood serum at —25-28° C.—cultural masses of curved bananalike bodies, in the mature preflagellate stage. Stain Giemsa.
277. A group of young flagallates seen in culture in human blood serum at 25-28° C. 72 hours culture. Stain Giemsa.
278. Fully formed flagallates in 72 hours culture in human blood serum at 25-28° c. Stain Giemsa.

ARTHROPODS.

Lent by the London School of Tropical Medicine.

279. TABANUS.

Fly belonging to the family Tabanidæ. It is commonly called a "horse fly." Only the females suck blood. They are suspected of carrying trypanosomes. Various species are found all over the world.

280. STOMOXYS.

This belongs to the blood-sucking Muscidae. It carries *Trypanosoma evansi*, the cause of surra. It is found all over the world.

281. GLOSSINA PALPALIS.

Is one of the tsetse-flies. It transmits the *Trypanosoma* of sleeping sickness. Other tsetse-flies are suspected in addition especially *Glossina fusca*. *Glossina morsitans* carries *Trypanosoma brucei* the cause of Nagana. *Glossina* does not lay eggs but brings forth larvæ which pupate within an hour afterwards.

282. MOSQUITOES.

The mosquitoes which carry malaria belong to the sub-family Anophelinae of the family Culicidae. The Anophelinae are distinguished by having a simple scutellum and the palps as long as the proboscis in both sexes. Examples are (a) *Anopheles maculipennis*, (b) *Myzomyia funesta*, (c) *Pyretophorus costalis* and (d) *Cellia argyrotarsus*.

The sub-family Culicinae contains mosquitoes which carry filaria *bancrofti* from one case to another such as (e) *Culex fatigans*, but practically all the culicinae mosquitoes carry filariasis except (b) *Stegomyia fasciata* which carries yellow fever.

THE LARVÆ of the two families are distinguished from each other as follows: anophelinae larvæ have no respiratory syphons and they have palmate hairs on the abdominal segments; culicinae larvæ have a long respiratory syphon and no palmate hairs.

283. CERATOPOGON.

This is a midge which, though it is not known to carry any disease, bites viciously giving rise to much irritation. It can pass through ordinary mosquito netting.

284. SIMULIUM.

This fly has recently been accused of carrying pellagra.

285. PHLEBOTOMUS.

Carries the organism giving rise to phlebotomus fever.

286. ORNITHODORUS MOUBATA.

A tick belonging to the family Argasidæ. It carries the spirochæta of African relapsing fever.

287. ARGUS PERSICUS.

Also belongs to the argasidæ. It carries *Spirochæta marchouxi*

288. PEDICULUS. }
 289. PHTHIRIUS. } Examples of lice.
 290. HÆMATOPINUS. }

291. HIPPOBOSCA.

This fly belongs to the family of Pupipara. It is parasitic on horses, cattle and dogs all over the world and is thought to be capable of transmitting galzielte in South Africa

292. MELOPHAGUS.

This is a fly belonging to the family of Pupipara. It is parasitic on sheep.

293. ACARUS SCABEI.

This belongs to the Sarcoptidae. It lives in burrows in the skin and gives rise to scabies.

294. SCARCOPSYLLA PENETRANS (Jigger).

One of the Siphonaptera or Fleas. It lives in the human skin and gives rise to ulceration. It is commonly known as the jigger.

295. (a) PULEX IRRITANS.

The common human flea.

(b) PULEX CHEOPIS.

The common rat flea.

(c) CTENOCEPHALUS.

The common cat flea.

These are concerned in the spread of plague from rats to man.

(e) CTENOPHTHALMUS. } These are not usually found on
 (d) CTENOPSYLLA. } man but may be accidental
 parasites.

296. MAGGOTS OF OESTRIS.

This lives in the nasal cavities of domestic animals and occasionally accidentally infects man.

297. MAGGOTS OF MUSCID.

This is usually found in decaying meat and vegetable matter.
 It has been found in human wounds.

298. POROCEPHALUS.

This is normally a parasite of snakes but cases are on record of human infection.

299. SPECIMEN OF POISONOUS SNAKE.

Head of poisonous snake dissected to show poison gland.

HELMINTHES.

300. *FASCIOLA HEPATICA*.

This is usually found in cattle and sheep causing liver rot. It may infect man. It was formerly known as *distomum hepaticum*.

301. *FASCIOLA ANGUSTA*.

Is found in cattle. It is closely related to *F. hepatica*.

302. *FASCIOLOPSIS BUSKI*.

This lives in the duodenum of man in India, China, and the East generally. It is believed to cause dysenteric diarrhœa.

303. *HETEROPHYES HETEROPHYES*.

Is found in the duodenum of man in Egypt. It probably does not cause any pathological changes.

304. *CLONORCHIS SINENSIS*.

This parasite has not yet been found in man, but it is common in China and Japan. It causes biliary cirrhosis.

305. Eggs of same found in the faeces.

306. *OPISTHORCHIS NOVERCA*.

Is normally a parasite of dogs, but occasionally infects man. Its pathogenesis is not known.

307. *PARAGONIMUS WESTERMANI*.

This lives in the lung and causes a disease resembling phthisis.

308. Eggs of same found in the sputum.

309. *GASTRODISCUS HOMINIS*.

This trematode belongs to the family of paramphistomidæ. It is not known whether they cause disease.

310. *SCHISTOSOMUM HÆMATOBIUM*.

This is the cause of endemic hæmaturia in Africa. Its eggs below are found in the urine.

311. Eggs of same found in the urine.

312. *SCHISTOSOMUM JAPONICUM*.

This causes hatayama disease in Japan.

313. Eggs from the worm.

314. *TÆNIA SOLIUM*.

A tapeworm found all over the world. It is spread by eating infected pork.

315. Eggs from the worm.

316. *TÆNIA SAGINATA.*

A tapeworm found all over the world spread by eating infected beef.

317. Eggs from the worm.

318. *HYMENOLEPIS NANA.*

A tapeworm occasionally found in man. The intermediate host is probably some insect.

319. Eggs from the worm.

320. *DIPYLIDIUM CANINUM.*

A tapeworm normally present in dogs. The dog flea is the intermediate host by which it is spread to children through their accidentally swallowing a flea.

321. Eggs from the worm.

322. *DIBOTHRIOCEPHALUS LATUS.*

This tapeworm causes severe anæmia in affected patients. The intermediate host is fish.

323. Eggs from the worm.

324. *ANKYLOSTOMUM DUODENALE.*

This causes severe anæmia, the disease being known as ankylostomiasis. It is found in warm countries and also in mines in this country, such as the tin mines of Cornwall.

325. Eggs of same found in the fæces.

326. *NECATOR AMERICANUS.*

This worm is closely allied to the ankylostome. It is found in Africa and America. The disease caused by it is often known as "hook worm disease."

327. *ASCARIS LUMBRICOIDES.*

The common round worm found all over the world.

328. Eggs of same found in the fæces.

329. *OXYURIS VERMICULARIS.*

The common thread worm found all over the world, especially in children, giving rise to much irritation.

330. *TRICOCEPHALUS TRICHIURIS.*

The common whip worm which is usually harmless, but may give rise to intestinal invitation.

331. Eggs of same found in the fæces.

332. *TRICHOSTRONGYLUS PERGRACILIS*.

One of the parasites which cause grouse disease.

333. *TRIONTOPHORUS*.

A worm resembling superficially the ankylostome, but living in the large intestine.

334. *ŒSOPHAGOSTOMUM*.

This worm has been reported in man. It gives rise to definite lesions in the intestine.

V.—CANCER RESEARCH.

Hon. Curator - Dr. J. A. MURRAY, M.D.

Exhibit of the Imperial Cancer Research Fund.

The exhibit consists (1) of wall charts illustrating statistical investigations, the phenomena of immunity induced against propagable tumours, and the development of sarcoma during the propagation of two transplantable mammary carcinomata of the mouse; (2) of lantern slides illustrating ethnological and zoological distribution of cancer, the reproduction of the lesions of spontaneous cancer by transplanted tumours, the phenomena of growth and the histological features of propagation in *normal* and in *immune* animals; (3) bottle specimens illustrating malignant new growths in the cow, spontaneous and transplanted tumours in mice and rats; (4) microscopical preparations of malignant new growths in mice.

STATISTICS—WALL CHARTS.

- 335. Percentage distribution of deaths from malignant disease in
- 336. England and Wales 1901-1907 classified according to age and sex.
- 337. Percentage distribution of cases of cancer in hospitals classified according to age and sex for comparison with preceding.
- 338. Deaths from malignant disease of alimentary canal (England and Wales, 1901-1907) classified according to sex and part affected.
- 339. Incidence of carcinoma of alimentary canal (hospital cases) classified according to sex and part affected.

IMMUNITY—WALL CHARTS.

SPECIFICITY OF IMMUNITY REACTION.

- 340. Rats previously vaccinated with mouse and cat sarcoma are not protected against inoculation of rat sarcoma.

341. Rats previously vaccinated with mouse and cat sarcoma are not protected against inoculation of rat carcinoma.
342. Immunity to squamous-celled carcinoma and mammary carcinoma of the mouse cannot be induced by vaccination with rat skin (last column mice 66—75), but is easily induced with mouse skin (third column mice 38—47).

TISSUE SPECIFICITY OF IMMUNITY REACTION.

343. Immunity to the inoculation of squamous-celled carcinoma of the mouse is better induced by vaccination with mouse skin than with the rest of the embryo.
344. Immunity to the inoculation of squamous-celled carcinoma is induced better by vaccination of mouse skin than of mouse mamma.
345. Absorption of a primary inoculation of mammary carcinoma (r=right axilla) protects completely against a second inoculation of the same tumour (l=left axilla).
346. Absorption of squamous-celled carcinoma does not protect against subsequent inoculation of spindle-celled sarcoma.
347. Importance of dose of vaccinating inoculation. Secondary inoculation is more and more successful as the dose of the primary or vaccinating inoculation is diminished.
348. Instead of immunity, hypersensitiveness may be induced by absorption of tissue of strange species (Mice 40—46).
349. Hypersensitiveness may also be induced by absorption of tissue of same species. (Vide col. 3 mice 22—30).
350. Immunity induced by auto-inoculation of spleen.
351. Tumour tissue ground at temperature of liquid air does not give rise to tumours and does not produce immunity. On the contrary it usually produces hypersensibility.
352. Normal tissues treated in the same way also lose power of inducing immunity and produce hypersensibility.
353. Tumour tissue killed by exposure to radium also loses power to produce immunity.
354. Mice bearing transplanted tumours can be immunised against a second inoculation (*i.e.*, artificial metastasis), and the growth of the primary tumour may be arrested by inoculation of large doses of tumour giving only temporary growth. The same effect can be produced by normal tissues.

SARCOMA DEVELOPMENT—WALL CHARTS.

355. Chart of propagation of tumour 37 to show strains in which sarcoma development occurred. Note rarity and irregularity of change in this strain.

356. Chart of propagation of tumour 100 to show strains in which sarcoma development occurred. Note constancy of change under definite conditions.

ETHNOLOGICAL DISTRIBUTION OF CANCER.

357. Dinkas of White Nile. Uncivilised Central African race.
 358. Dinka. Epithelioma of lip and gland metastases.
 359. Sudanese Woman, Bahr-el-Gazel. Carcinoma of breast.
 360. Ashantee woman and child. Child with congenital orbital sarcoma.
 361. Native of Northern Nigeria. Chondro-sarcoma of shoulder girdle.

MALIGNANT NEW GROWTHS occurring in Natives of India, living mainly on vegetable diet, but never eating flesh.

362. Hindu woman. Epithelioma of lip.
 363. Hindu woman. Cystic sarcoma of breast.
 364. Epithelioma of floor of mouth. Result of chewing betel.
 365. Malignant goitre. Goitre is quite common in some of the valleys of India (Punjab), as in Switzerland.
 366. Sarcoma of femur.
 367. Sarcoma of chest wall.
 368. Sarcoma of upper jaw.
 369. Same case from side.
 370. Kangri, charcoal fire-basket of Kashmir.
 371. Kashmiris wearing and using Kangri.
 372. Kangri ulcer. Squamous-celled carcinoma.
 373. Metastasis of Kangri carcinoma in inguinal lymph gland.
 374. Sarcoma of frontal bone in Negro boy.
 375. Sarcoma of frontal bone in cat.
 376. Squamous-celled carcinoma of œsophagus in cat.

CARCINOMA OF SKIN IN VERTEBRATE SERIES.

377. Squamous-celled carcinoma of lip in man.
 378. Squamous-celled carcinoma of floor of mouth in fowl.
 379. Adeno-carcinoma of skin-glands of frog.
 380. Squamous-celled carcinoma of skin of fish (Gasterosteus).
 381. Fish with growth (same case).
 382. Transverse section of fish showing infiltration of muscles down to vertebral column (same case).

OCCURRENCE OF CANCER IN INTERNAL ORGANS OF VERTEBRATES.

383. Trout. Carcinoma of thyroid.
 384. Gurnard. Intraperitoneal adeno-carcinoma.
 385. Trout. Carcinoma of liver.
 386. Frog. Adeno-carcinoma of adrenal invading kidney.

MALIGNANT NEW GROWTHS IN MICE.

- 387. Squamous-celled carcinoma.
- 388. Squamous-celled carcinoma.
- 389. Squamous-celled carcinoma of floor of mouth. Invasion and destruction of mandible. Incisor tooth imbedded in growth on diseased side, in normal position in socket on unaffected side.
- 390. Squamous-cell carcinoma—same case. Metastasis in lymph gland.
- 391. Squamous-cell carcinoma. Metastasis. in lung.
- 392. Squamous-celled carcinoma of stomach. The cardiac end of the mouse's stomach is lined by squamous epithelium.
- 393. Semi-diagrammatic section of preceding case, showing relation of growth to spleen, pancreas and liver.
- 394. Adeno-carcinoma of small intestine—transverse section.
- 395. Carcinoma of ovary.
- 396. Chondro-sarcoma of vertebral column. Disruption of neural arch—pressure on cauda equina and infiltration of trunk muscles.
- 397. Osteo-chondro-sarcoma.
- 398. Spindle-celled sarcoma of kidney.
- 399. Spindle-celled sarcoma.
- 400. Melanotic sarcoma of ear.
- 401. Lympho-sarcoma of mediastinum. Metastasis in lungs.
- 402. Mouse with generalised lymphoma.

MICE WITH MALIGNANT NEW GROWTHS OF MAMMA.

- 403. Distribution of normal mamma on ventral and dorsal aspects of the mouse. Nipples shown as circles, tumours as black dots.
- 404. Live mouse showing multiple tumours as seen from right and left sides.
- 405. Same case dissected, from dorsal aspect.
- 406. Transverse section through chest of mouse with carcinoma of mamma in axilla. Invasion of muscles—metastases in both lungs and in lymph gland of opposite shoulder.
- 407. Metastases in lungs and in pericardium.
- 408. Metastasis in lymph gland.
- 409. Metastasis in liver.
- 410. Transverse section through pelvic girdle. Invasion and destruction of muscles of thigh. Metastasis in aortic lymph gland.
- 411. Diagrammatic view of same case.
- 412. Aortic lymph gland of same case under higher magnification.
- 413. Adeno-carcinoma—solid or alveolar type.
- 414. Adeno-carcinoma—papilliferous cystic type.

- 415. Adeno-carcinoma—adenomatous type, invasion of muscle.
- 416. Adeno-carcinoma—metastasis in lung.
- 417. Clinical course of mammary growths in mice. Results of surgical removal—rapid and late recurrence.

REPRODUCTION OF LESIONS OF SPONTANEOUS CANCER BY TRANSPLANTED TUMOURS.

- 418. Transplanted tumour reproducing hæmorrhagic character of primary growth from which it was derived.
- 419. Site of inoculation (graft) after 24 hours—commencing degeneration of stroma—continued growth of parenchyma.
- 420. Same after 48 hours.
- 421. Same after four days. New stroma and blood vessels being supplied by host.
- 422. Young tumour 11 days after inoculation.
- 423. Three mice with large tumours. One with ulcerated tumour shows emaciation by prominence of tail vertebræ.
- 424. Infiltration of pseudo-capsule of transplanted tumour.
- 425. Infiltration of muscle.
- 426. Infiltration of thoracic wall and vertebral column. Mouse had paraplegia—metastases in lungs.
- 427. Metastases in lungs 25 days after inoculation.
- 428. Metastases in lungs—showing umbilication.
- 429. Metastases in lung—embolus in pulmonary artery, infiltration of lung tissue, invasion of bronchus.
- 430. Metastasis in lungs and in lymph gland of opposite shoulder.
- 431. Sagittal section of whole mouse showing general dissemination of mixed tumour. Lung metastases, mixed metastases in kidney and intestine, pure carcinoma.
- 432. Invasion of small intestine from abdominal wall. Compare with next slide of a primary carcinoma of the small intestine.
- 433. Primary carcinoma of small intestine. Cf. with preceding slide.

PHENOMENA OF GROWTH.

- 434. Clinical course of primary tumour and of the first transplantation into 81 normal mice.
- 435. Comparison of results of auto-transplantation and homologous transplantation of spontaneous growths.
- 436. Comparison of number of tumours obtained in different generations and speed of growth as compared with primary tumour. No marked increase in the rate of growth in this instance.

- 437. Comparison of percentage of successful inoculations and speed of growth in first and 19th generations of a transplantable tumour. Great improvement in both respects in later generation due to adaptation and selection of suitable cells.
- 438. Influence of age on success of inoculation. Better result in young than in old mice.
- 439. Influence of dose on success of inoculation. Dose may be too large—0.1 c. c. did not give progressively growing tumours whilst 0.05 c. c. did.
- 440. Influence of race on success of inoculation. Bad result of inoculating English tumour into German mice.
- 441. Ditto for Italian mice.
- 442. Extreme type of rapidly growing tumour giving high percentage of progressively growing tumours.
- 443. Extreme type of tumour in which all mice develop tumours which after transitory growth undergo spontaneous healing as a result of concomitant immunisation.
- 444. Contrast between slowly growing and rapidly growing tumours of same tumour strain.
- 445. Alternating rise and fall in the percentage of successful inoculations.

IMMUNITY.

- 446. Site of inoculation of rat carcinoma into a mouse. The mouse supplies a new stroma for the rat tumour and temporary growth for a week is followed by absorption and active immunity.
- 447. Site of inoculation of mouse tumour in normal rats (control) at 24, 48 and 72 hours, for comparison with secondary inoculations into rats which had been inoculated with mouse tumour 6 and 9 days previously. Commencing immunity at 6 days, strong immunity at 9 days with rapid destruction of graft.
- 448. Site of inoculation of mouse tumour into rat immunised against mouse tissue. Destruction of mouse cells.
- 449. Site of inoculation of rat tumour into mouse immunised against mouse tissue. Destruction of rat cells.
- 450. Site of inoculation of mouse tumour into normal mouse after four days. Provision of new stroma and vessels by host.
- 451. Absence of provision of new stroma and vessels by immune mouse, after same interval; due to paralysis of chemiotactic powers of cancer cells.
- 452. Spontaneous healing. Islands of cancer cells surrounded by reaction tissue consisting of plasma cells, lymphocytes, etc.
- 453. Spontaneous healing—later stage. Formation of scar tissue.

SPONTANEOUS CANCER IN THE COW.

BOTTLE SPECIMENS.

454. Cow's liver. Multiple nodular hypertrophy associated with biliary cirrhosis. This condition is closely related to adenoma and carcinoma of the liver and probably precedes it in most cases.
455. Cow's liver. Multiple adenoma.
456. Cow's liver. Malignant adenoma bile-stained (upper large tumour). Lower smaller tumour spindle cell sarcoma probably arising in adrenal.
457. Cow's liver. Adeno-carcinoma. Dissemination to all parts of the liver by the portal vein.
458. Cow's liver. Adeno-carcinoma. Dissemination to all parts of liver by the portal vein. Lymph gland metastases in hilum.
459. Cow's lung. Branch of pulmonary artery occluded by embolic growth from carcinoma of liver. Many small nodules throughout the lung.
460. Cow's stomach. Squamous-celled carcinoma. Cauliflower growth. Metastasis were present in adjacent lymphatic glands.
461. Cow's small intestine. Spindle cell sarcoma of gut wall bulging into lumen causing slight ulceration of mucous membrane and projecting outwards as a large lobulated tumour.
462. Cow's ovary. Hæmorrhagic alveolar carcinoma.
463. Cow's ovary. Alveolar carcinoma (lutein cell). Arisen from corpus luteum.
464. Cow's kidney. Mixed cell sarcoma growing into and distending renal vein,
465. Cow's adrenal. Hæmorrhagic alveolar sarcoma (angio-sarcoma). Small tumour distending one part of the gland,
466. Cow's adrenal. Hæmorrhagic alveolar sarcoma (angio-sarcoma). The gland is reduced to a small cap stretched over the upper pole of the tumour.

SPONTANEOUS CANCER IN MICE.

467. Mouse. Carcinoma of mamma ; multiple small metastases in lungs.
468. Mouse. Multiple pulmonary metastases.
469. Mouse. Large pulmonary metastases.
470. Mouse. Large pulmonary metastases.
471. Mouse. Multiple large metastases in liver.
472. Multiple lymphomata of superficial and anterior mediastinal lymph glands.

- 473. Carcinoma of mamma. Intraperitoneal auto-transplantation giving large growths.
- 474. Carcinoma of mamma. Intraperitoneal auto-transplantation giving large growths.

TRANSPLANTED CANCER IN MICE AND RATS.

- 475. Large transplanted carcinoma in right flank, metastases in lung.
- 476. Large transplanted squamous-celled carcinoma in right flank, which has grown through the abdominal wall and fungated into the peritoneal cavity. Metastasis in right lung.
- 477. Intraperitoneal inoculation of carcinoma, large growth in mesentery.
- 478. Intraperitoneal inoculation of spindle-celled sarcoma of rat, large and small growths in mesentery and omentum.
- 479. Mouse with multiple pulmonary nodules of mammary carcinoma from intravenous injection in vein of tail. No growth at the site of inoculation.
- 480. Multiple pulmonary nodules of spindle-celled sarcoma of mouse resulting from inoculation into vein of tail. No growth at site of inoculation.
- 481. Multiple pulmonary nodules of spindle-celled sarcoma of rat resulting from inoculation into vein of tail. No growth at site of inoculation.
- 482. Transplanted squamous-celled carcinoma 13 days after inoculation in normal mouse ; for comparison with 483.
- 483. Absence of growth after same interval in a mouse protected by a preliminary inoculation of embryonic mouse skin.

MICROSCOPICAL PREPARATIONS.

- 484. Transplantable squamous-celled carcinoma, in 9th generation, as used in immunity experiments.
- 485. Another tumour from same series.
- 486. High power view of part marked in figure to show perfect reproduction of structure of skin.
- 487. Transverse section of mouse's head showing squamous-celled carcinoma of floor of mouth invading the lower jaw.
- 488. Same case—metastases in lymph gland.
- 489. Mixed tumour stage of sarcoma development. The carcinoma alveoli are separated by thick strands of sarcomatous tissue.

Exhibit of the Cancer Research Department, Cancer Hospital, Brompton.

SPECIMENS SHOWING MALIGNANT DISEASE (SPONTANEOUS AND EXPERIMENTAL) IN THE MOUSE.

Lent by Drs. Paine and Nicholson.

490. SPONTANEOUS MAMMARY CARCINOMA.

The growth, which is of the acinous-type, occupies the right gluteal region. First generation on transplantation gave 1·7 per cent. positives; no metastatic deposits are to be seen macroscopically.

491. SPONTANEOUS MAMMARY CARCINOMA.

The dissection shows a portion of a large inoperable growth which occupied the right inguinal and gluteal regions almost encircling the hind leg. Macroscopically the growth showed the characters of a duct carcinoma. Disseminated nodules are seen in the lungs, and a few isolated nodules on the intestines. First generation on transplantation gave 2·7 per cent. positives.

492. EXPERIMENTAL MAMMARY CARCINOMA.

Showing the appearance of a graft 14 days after inoculation. The graft is seen as a small slightly raised nodule the size of a large millet seed attached to the reflected skin, which covered the lateral aspect of the right thoracic region, as indicated by the arrow.

493. EXPERIMENTAL MAMMARY CARCINOMA.

Showing the appearance of the graft 4 weeks after inoculation; the tumour occupies a similar site as the above.

494. EXPERIMENTAL MAMMARY CARCINOMA.

Showing the appearance of the graft 6 weeks after inoculation, the tumour occupies the right loin.

495. EXPERIMENTAL MAMMARY CARCINOMA.

Showing the appearance of the graft 2 months after inoculation.

496. EXPERIMENTAL MAMMARY CARCINOMA.

Showing the appearance of the graft 3 months after inoculation.

Tumours No. 492, 493, 494, 495, and 496, show macroscopically no evidence of dissemination, the growth being localized.

497. EXPERIMENTAL MAMMARY CARCINOMA.

This specimen shows a graft (subcutaneous), in the right lateral aspect of the body, of 6 weeks' growth, with secondary deposits in the right lobe of the liver. One of 12 successful grafts produced in 84 inoculations from the original spontaneous tumour.

498. EXPERIMENTAL MAMMARY CARCINOMA.

Showing a graft of 3 months' growth in the right loin, with large masses of secondary deposits occupying the right upper and lower lobes of the liver.

499. EXPERIMENTAL MAMMARY CARCINOMA.

Shows the appearance presented after spontaneous absorption of a graft. The mouse died 13 weeks after inoculation. At the end of 5 weeks the tumour which was situated in the right thoracic region attained the size of a large filbert, after which it became gradually absorbed and is now seen to be represented by dense fibrous masses, a portion of the latter was removed for microscopic examination.

500. EXPERIMENTAL MAMMARY CARCINOMA.

Shows a graft of 9 weeks' growth of the hæmorrhagic type of mammary cancer in the mouse. First generation in transplantation from the original tumour gave 16 per cent. positives, and the second generation 5 per cent.

501. SPONTANEOUS LYMPHO-SARCOMA.

The specimen shows a growth, which, microscopically presented the structure of a lympho-sarcoma, occupying the upper part of the thoracic cavity, and spreading through the mediastinal space to the diaphragm.

Exhibit of Cancer Research Department of Middlesex Hospital.

- 502 A SERIES OF PHOTOGRAPHIC PLATES, showing the
TO silver deposition caused by various animal and
531. other substances under conditions of complete
darkness (skotographs). The silver deposition
is unrecognisable until the plate has been
developed.

Lent by Dr. Lazarus-Barlow.

532. A SERIES OF MICROSCOPIC SLIDES, showing the
TO absence of Altmann's granules from sarcoma and
543. malignant growths generally, and their presence
in inflammatory tissue, non-malignant growths
and normal tissues.

Lent by Dr. Beckton.

Exhibit of the Pathological Department Cancer Hospital, Brompton.

SPECIMENS OF MALIGNANT DISEASE OF VARIOUS HUMAN ORGANS.

Lent by Dr. Kettle.

544. TONGUE.

On the right side there is a large malignant ulcer. There were metastases in the cervical glands in the same side. Removed by operation.

545. SQUAMOUS-CELLED CARCINOMA OF THE LOWER JAW.

Metastasis in lymph gland of sub-maxillary region. Removed by operation.

546. SQUAMOUS-CELLED CARCINOMA OF TONGUE.

With numerous secondary deposits in pharynx.

547. SQUAMOUS-CELLED CARCINOMA OF LOWER LIP.

548. SQUAMOUS-CELLED CARCINOMA OF LOWER END OF ŒSOPHAGUS.

The growth has extended into the stomach forming a secondary tumour over which the mucous membrane has ulcerated.

549. ADENO-CARCINOMA OF CARDIAC END OF STOMACH.

550. ADENO CARCINOMA OF PYLORIC END OF STOMACH, partial gastrectomy.

551. DIFFUSE SCIRRHUS CARCINOMA OF STOMACH.

552. ADENO CARCINOMA OF STOMACH.

There were extensive peritoneal deposits which obstructed the ureters, producing double hydro-nephrosis and uræmia.

553. ADENO-CARCINOMA OF PYLORIC END OF STOMACH.

554. COLLOID CARCINOMA OF STOMACH, with extensive peritoneal dissemination.

555. STOMACH WITH AN ADENO-CARCINOMA IN THE PYLORIC REGION.

The growth has perforated the anterior wall, producing a fatal general peritonitis. The autopsy was made on March 2nd, 1910. On May, 19th, 1909, the patient's tongue was amputated for a squamous-celled carcinoma.

556. CHRONIC GASTRIC ULCER, producing hour glass contraction of the stomach and giving rise to fatal hæmorrhage.

557. CHRONIC GASTRIC ULCER, giving rise to fatal hæmorrhage.

558. PORTION OF STOMACH AND GREAT OMENTUM.

The omentum is thickly infiltrated with secondary growth, the primary tumour being a papiliferous cystadenoma of the ovary. The transverse colon is surrounded and constricted by the growth.

559. COIL OF SMALL INTESTINE, showing numerous peritoneal deposits. (From the same case No. 558.)

560. COIL OF SMALL INTESTINE AND MESENTARY.

The peritoneum is covered with secondary growths closely resembling miliary tuberculosis. In one place the lumen of the gut is constricted. The primary growth was an adeno-carcinoma of the uterus.

561. SPINDLE-CELLED SARCOMA OF THE SMALL INTESTINE.

562. ADENO-CARCINOMA OF TRANSVERSE COLON, producing an almost complete stricture.

563. ADENO-CARCINOMA OF SPLENIC FLEXURE OF LARGE INTESTINE.

564. A SMALL POLYPOID SPINDLE-CELLED SARCOMA OF THE TRANSVERSE COLON.

A small gland at the attachment of the mesentery contains growth.

565. CARCINOMA OF RECTUM.

The glands in the mesocolon are infected.

566. EXTENSIVE MALIGNANT DISEASE OF THE RECTUM.

There are also several benign papillomata, and some which appear to be undergoing malignant change.

567. CARCINOMA OF THE RECTUM INVADING THE PELVIC TISSUES.

VI.—PHYSIOLOGICAL AND PATHOLOGICAL CHEMISTRY.

Hon. Curator - Dr. RYFFEL.

568. DERIVATIVES OF HÆMOGLOBIN.

Acid methæmoglobin, alkaline methæmoglobin, alkaline hæmatin, reduced alkaline hæmatin, acid hæmatoporphyrin, alkaline hæmatoporphyrin.

Lent by Dr. J. H. Ryffel.

569. FORMATION OF ACID HÆMATIN AS A TEST FOR BLOOD.

To the watery material containing blood an equal volume of glacial acetic acid is added and mixed. Ether is then added and water until the ether separates. The ether extracts acid hæmatin which shows a characteristic spectrum if sufficiently concentrated.

570. GUIAICUM TEST applied to ether solution of acid hæmatin obtained as in No. 569.

571. HALDANE AND LORRAIN SMITH'S METHOD OF DETERMINING THE PERCENTAGE SATURATION OF BLOOD WITH CARBON MONOXIDE. (Journ. Physiol. xxxiii. p. 493).

The blood containing carbon monoxide is diluted until its depth of colour is equal to that of 0·7 per cent. normal blood. A solution of carmine is then run from a burette into the normal blood until it and the C O blood are of exactly the same tint. Finally the C O blood is saturated with coal gas and carmine solution is further added to the normal blood until the tints are equal. From the amount of carmine solution required the percentage saturation of the specimen of C O blood is calculated. The carmine solution used is adjusted so that 6 c.c. added to 5 c.c. of 0·7 per cent. normal blood give the tint of saturated carbon monoxide blood. A contains normal blood, B blood saturated with carbon monoxide, C normal blood and carmine solution.

SAMPLES OF BLOOD ILLUSTRATIVE OF C O POISONING.

Lent by Dr. J. S. Haldane.

572. SAMPLE from the jugular vein of a collier found dead after the explosion at Tylorstown Colliery, 27th January, 1896.

Hæmoglobin found on titration with carmine to be 79 per cent. saturated with C O. The blood is laked, but still shows the colour and spectrum of C O hæmoglobin.

573. SAMPLE OF NORMAL OX-BLOOD, sealed up about the same time. Shows colours and spectrum of reduced hæmoglobin.

574. BLOOD from a man found dead by the firemen, after a small fire in a house in Oxford.

He was sitting on a chair in a sleeping position and had evidently died without being waked by the fire. Blood about 80 per cent. saturated with CO.

575. AMYL ALCOHOL EXTRACT OF UROBILIN.

Obtained from febrile urine after acidifying with acetic acid, to which saturated alcoholic solution of zinc acetate has been added. The liquid shows a characteristic fluorescence, and an absorption spectrum consisting of a band between the green and the violet.

576. FOLIN'S METHOD OF ESTIMATING CREATININE IN URINE. (Zeitscher. f. Physiol. chen. xli. p. 223).

10 c.c. urine, 5 c.c. 10 per cent. caustic soda, and 15 c.c. saturated picric acid solution are mixed, allowed to stand for five minutes and diluted to 500 c.c. The amount of picramic acid that results is estimated colorimetrically by comparison with standard bichromate solution (24.55 grm. per litre). If a mm. of the of the liquid gives the same depth of colour as 8 mm. of the standard, then the creatinine in 10 c.c. urine $= \frac{10 \times 8.1}{a}$ mg.

577. ESTIMATION OF TOTAL ACIDITY AND AMMONIA IN URINE.

25 c.c. urine are diluted with an equal volume of water. 15 grm. neutral potassium oxalate, and 5 to 10 drops of 1 per cent. alcoholic phenol phthalein are added. $\frac{N}{10}$ caustic soda is run in from a burette until a pink colour develops. This measures the acidity. 5 c.c. formalin are diluted with an equal volume of water. A few drops of phenol phthalein are added, and caustic

soda run in till the liquid is just pink. This liquid is then added to the result of the first titration. The formaldehyde combines with the ammonia present, thus rendering the liquid acid. $\frac{N}{10}$ caustic soda is again run in until a pink colour is obtained. The second reading measures the ammonia present. Amino acids, if present, form a source of error.

578. SHAFFER'S METHOD OF ESTIMATING AMMONIA IN URINE. (Amer. Journ. Physiol. viii. p. 330.)

The urine is rendered alkaline with sodium carbonate. Methyl alcohol is added, and the resulting mixture distilled for half-an-hour on a water bath at 40° c., under a reduced pressure of about 30 mm. mercury. The products that distil off are passed into two flasks in series containing a measured quantity of decinormal sulphuric acid. When the distillation is complete, the excess of acid in these flasks is determined by titration. The amount of acid neutralised by ammonia is thus determined. The result of this method is always lower than that of the method described in No. 575. The difference represents amino acids present in the urine.

579. ROTHERA'S TEST FOR ACETONE IN URINE.

To the urine in a test tube is added a few drops of sodium nitroprusside solution, ammonia till alkaline, and solid ammonium sulphate to saturation. A colour similar to that of permanganate develops in a few minutes and then slowly fades. The test is sensitive to 1 in 20,000 acetone and is distinctive for ketones.

Tube A represents the colour obtained, but materials are available for applying the test.

580. RYFFEL'S METHOD OF ESTIMATING LACTIC ACID IN URINE. (Proc. Physiol. Soc. Journ. Physiol xxxix. p. 5.)

The urine is subjected to steam distillation at a temperature about 155° C. after the addition of rather more than an equal volume of pure sulphuric acid. By this means lactic acid is decomposed to acetaldehyde which distils over. The first distillate is purified by rendering alkaline and redistilling. The aldehyde in the second distillate is determined colorimetrically by adding Schiff's reagent (rosaniline hydrochloride solution bleaches with sulphur dioxide) and comparing the colour so produced with that yielded by Schiff's reagent and formaldehyde solution. Glycuronic acid forms a source of error, but may be removed by means of basic lead acetate and ammonia.

A represents the reaction obtained from 80 c.c. normal urine (specific gravity 1020).

B represents that from 3 c.c. urine after running for two minutes.

581. CRYSTALS OF CYSTINE, showing two crystalline forms. The cystine was obtained from the urine of a case of cystinuria by the method of Gaskell. (Journ. Physiol xxxvi. p. 142.)

Ammonia and calcium chloride solution are added to the urine, which is then filtered. The filtrate is allowed to stand for two days after the addition of acetic acid till just acid and an equal volume of acetone. The cystine, which is precipitated quantitatively, is filtered off, reprecipitated from ammonia solution by acetic acid and acetone, dried and weighed.

APPARATUS USED FOR DETERMINATION OF DISSOCIATION CURVE OF BLOOD AT TENERIFFE.

582. TONOMETER, in which 1 c.c. of blood can be exposed to any atmosphere of known composition.
583. BLOOD GAS APPARATUS, in which 1/10 c.c. of the blood can be analysed for oxygen.
584. HALDANE'S GAS ANALYSIS APPARATUS FOR ANALYSING GAS IN TONOMETER.

Lent by Dr. Barcroft.

VII.—ALIMENTARY SYSTEM.

Hon. Curator - Dr. HERTZ.

PHARYNGEAL AND ŒSOPHAGEAL POUCHES.

596. PRESSURE POUCH OF PHARYNX.

Specimen showing dilatation of the lower part of the pharynx at a point corresponding to the lower border of the inferior constrictor muscle, forming a pouch equal in size to that of a bantam's egg. The pouch, which implicates only the posterior and lateral walls of the cavity, projects downwards behind the upper part of the Œsophagus. It is apparently composed of a portion of the mucous membrane and submucous tissue protruding through the muscular wall of the pharynx. No muscular fibres can be seen in its walls under the microscope.

Removed from the body of a man æt. 63, who for several years before his death had suffered from inability to swallow. After a meal he was in the habit of returning small portions of food, and this would continue for some hours. His death was due to inflammation of the lungs. For two or three years prior to his death he had been subject to attacks of inflammation of the larynx.

Lent by St. George's Hospital.

597. DIVERTICULUM OF THE PHARYNX AND ŒSOPHAGUS.

Part of an Œsophagus, together with the lower part of the trachea and its bifurcation. In the middle line of the anterior wall of the Œsophagus, 3 c.m. below the bifurcation of the trachea, is a small pouch-like diverticulum. The opening of the diverticulum is oval in shape, and measures about 1 c.m. in its longest diameter, and the interior is lined with normal mucous membrane. In the bifurcation of the trachea is part of a small group of deeply-pigmented glands containing calcareous matter, and to the lowest gland is adherent the apex of the conical protusion of the muscular wall of the Œsophagus which forms the pouch.

From a man who died in U. C. H. of phthisis.

Lent by University College Hospital.

598. POUCH REMOVED BY OPERATION

From lower end of pharynx or upper end of œsophagus.
Extended down into chest, and held nine ounces of fluid.

599. ŒSOPHAGEAL POUCH.

A portion of the œsophagus with the roots of the lungs, shewing a pouch projecting from the lateral wall of the gullet below the right bronchus. The adjacent lung is adherent to the outer wall of the sacculus, the lining membrane of which is continuous with the mucous coat of the œsophagus, and is roughened by partial gastric solution.

William K., æt. 78, was admitted under Mr. Jacobson for retention of urine caused by enlargement of prostate. The bladder was punctured above the pubes, and the patient died four days later from pyelitis and broncho-pneumonia.

Lent by Guy's Hospital.

600. DIVERTICULUM OF THE ŒSOPHAGUS.

The lower part of the œsophagus, and the cardiac end of the stomach of a child. At the lower part of the right side, close to the cardia is a small sacculation, which appeared to be connected with the lumen of the tube by a small orifice. The sacculation was applied to the lower end of the œsophagus to which it was loosely adherent. The walls are fairly thick, and consist, apparently, of all the coats, except the muscular, and there is a firm adventitious covering.

The specimen was removed from the body of an infant which died of bronchitis. There was no history of gastric trouble or vomiting.

Lent by Charing Cross Hospital.

601. ŒSOPHAGEAL POUCH.

A portion of an œsophagus with the bifurcation of the trachea attached, shewing below the right bronchus a lateral pouch about the size of a pigeon's egg. The margin of its orifice is smooth, and the mucous membrane of the œsophagus is continuous with the lining of the sacculus.

William A., æt. 74, was admitted under Mr. Lucas for severe injuries received in being run over, and died one week after admission from septicæmia. At the autopsy the mediastinal glands were found to be large and pigmented.

Lent by Guy's Hospital.

602. ŒSOPHAGEAL POUCH.

An œsophagus with the lower end of the trachea and the main divisions of the bronchi. On the anterior wall of the

œsophagus on the right side is a circular opening about half an inch in diameter leading to a thin-walled sacculus the size of a pigeon's egg. Above this aperture there is a shallow depression of the mucous membrane produced by the adhesion of the œsophagus to a mass of caseous glands situated at the bifurcation of the trachea.

George W., æt. 79, was admitted under Mr. Cooper Forster with a fracture of the leg, and died from pulmonary embolism and uræmia.

“ IDIOPATHIC ” DILATATION OF ŒSOPHAGUS.

603. HYPERTROPHY AND DILATATION OF THE ŒSOPHAGUS.

An œsophagus and stomach shewing the former greatly dilated and its muscular coat hypertrophied throughout its whole length. It is 11 inches long, and $6\frac{1}{2}$ inches in external circumference at its widest part. The cardiac orifice is laid open, and measures only $1\frac{1}{4}$ inches transversely. There is no appearance of fibroid thickening or cicatrisation of this orifice, the small size of which is thought to be the cause of the enlargement of the œsophagus. The stomach is large and “the pyloric ring is more distinct than usual, but quite free from disease.”

From J. K., a farmer, æt. 74, who from boyhood had found difficulty in swallowing solid food, small quantities of which usually regurgitated after meals. At the autopsy the body was well nourished.

604. DILATATION AND ULCERTION OF THE ŒSOPHAGUS.

A greatly dilated œsophagus, the circumference of which measures $2\frac{1}{2}$ inches at its upper end and 4 inches just above the cardiac orifice. The mucous membrane of the upper 3 inches of the œsophagus is healthy, while below this it is extensively destroyed by numerous ulcers of various sizes, the larger ones exposing the muscular coat. At the upper limit of the ulceration there is a flat wart one-third of an inch in diameter. The muscular coat is somewhat hypertrophied, and the lymphatic glands of the bifurcation of the trachea are much enlarged.

From a young lady, aged 19, who from the time she was nine years old was noticed to have some peculiarity in her manner of swallowing, the cause of which could not be determined. She however, enjoyed fair health till within about a year of her death, when signs of œsophageal obstruction developed and she became emaciated. At the autopsy the stomach was found enormously dilated, but apparently healthy. Nothing was found to explain the condition of the œsophagus.

605. DILATATION OF THE ŒSOPHAGUS.

An Œsophagus, so greatly dilated that in its central part it has a circumference of 12 c.m.; at the upper and lower ends of the specimen the dilatation gradually diminishes, the upper end of the Œsophagus and the cardiac orifice being both normal in size. Throughout nearly the whole length of the Œsophagus the normal appearance of the mucous membrane is lost; the natural longitudinal rugæ are replaced by irregular rugæ, whilst above the cardiac orifice the surface is mamillated and velvety. Over a large circular area near the middle of its length the inner surface of the Œsophagus is rough, irregular, and discoloured; and presents areas of ulceration in which the whole thickness of the mucous membrane is destroyed. In this area the wall of the Œsophagus presents a shallow bulging, bounded along its right side and above and below by a rounded border; on the lower part of this border is an oval clean-cut erosion, near which a layer of exudation has separated from the surface. To the naked eye the muscular coat presents no change.

Microscopic structure: The epithelium is hypertrophied; there is fatty degeneration of the muscular coat.

From a woman, aged 35, who was admitted in U. C. H. under the care of Dr. Sidney Martin, September 17th, 1892. The duration of the illness was 2 years and 1 month; it commenced with vomiting and pain in the epigastrium; attacks of dyspnoea followed, and towards the end there was cough with mucopurulent expectoration. At the post-mortem examination the dilated Œsophagus was filled with undigested food; it pressed on the pericardium. There was recent pleurisy at the base of the right lung.

Lent by University College Hospital.

606. IDIOPATHIC DILATATION OF THE ŒSOPHAGUS (CYLINDRICAL).

From a boy æt. 8, who died from vomiting. The Œsophagus is $9\frac{1}{2}$ inches long, and $3\frac{1}{2}$ inches in circumference at the widest part. The muscular coat is hypertrophied. There was no stricture or manifest obstruction to account for the dilatation.

Lent by St. George's Hospital.

607. IDIOPATHIC FUSIFORM DILATATION OF ŒSOPHAGUS.

From a man, æt. 28, who died about 12 months after the first onset of symptoms which consisted of vomiting, emaciation and epigastric pain. Laparotomy was performed on the

suspicion that there was disease of the stomach, but nothing abnormal was found. The appearances are very similar to those in the preceding case. There was no stricture or manifest obstruction to account for the dilatation.

PYLORIC STENOSIS IN INFANTS.

608. CONGENITAL HYPERTROPHY WITH STENOSIS OF THE PYLORUS.

From the body of a male infant, seven weeks and five days old.

609. STOMACH showing results of pyloroplasty for congenital hypertrophic stenosis.

The child survived three months and died from zymotic enteritis.

610 HYPERTROPHIC STENOSIS OF PYLORUS.

A stomach, the coats of which are slightly hypertrophied throughout. A section through the pylorus shews a fusiform thickening of this part, about an inch in length, due to a more considerable hypertrophy of its muscular wall. In the recent state a small probe could with difficulty be passed through the pyloric orifice.

Albert E., æt. five weeks, was admitted under Dr. Goodhart, for vomiting of eight days' duration with constipation. He died in convulsions thirteen days after admission. At the autopsy the other viscera were normal.

Lent by Guy's Hospital.

611. STOMACH of infant with hypertrophic stenosis of pylorus.

Lent by University College Hospital.

612. HYPERTROPHIED PYLORUS.

Found in the body of a man, æt. 52, who died from cerebral embolism and morbus cordis. No symptoms referable to pyloric condition.

Lent by St. George's Hospital.

HIRSCHSPRUNG'S DISEASE.

613. HYPERTROPHY AND DILATATION OF THE COLON.

A portion of an infant's colon measuring three inches in

circumference the wall of which is considerably hypertrophied. The mucous membrane presents several superficial ulcers, some of which are cicatrised.

From an infant, aged seven months, who from the age of two months until death suffered from obstinate constipation with vomiting and distension of the abdomen. On one or two occasions diarrhœa was produced by strong purgatives.

Lent by Guy's Hospital.

614. HYPERTROPHY AND DILATATION OF THE COLON.

The anus with the last eighteen inches of the large intestine showing extreme hypertrophy and dilatation of the rectum and sigmoid flexure. Just within the anus the mucous membrane presents several deep ulcers with somewhat thickened edges. Higher up there are larger ulcerated areas, and a small perforation, surrounded by recent lymph, is visible on the serous surface of the sigmoid flexure.

Emma R., æt. seventeen, was admitted under Dr. Goodhart for gradually increasing abdominal distension of nine months' duration, with occasional sudden attacks of pain. For some time her bowels had been very irregular, sometimes constipated, at others loose. For three weeks there had been diarrhœa with incontinence of fæces. Six days after admission she died, twelve hours after the onset of symptoms of acute peritonitis. At the autopsy the peritoneal cavity was found to contain a quantity of foul gas, and there was some greenish pus upon the coils of intestine. The enlargement of the intestine extended from the anus to the hepatic flexure of the colon, where it suddenly ceased. There was no stricture.

615. HIRSCHSPRUNG'S DISEASE.

Edith G., æt 22, admitted under Dr. Hertz. Constipation and large abdomen as long as she could remember. Five years previously a more severe attack which kept her in bed for a month, relief being finally obtained by enemata. For the few weeks before admission she had become more constipated and her abdomen more distended. Dyspnœa, abdominal pain, but no vomiting. On admission enormous distension, liver dulness from third to fifth space and heart dulness began in first space. An enema gave a copious result, but distension was unaffected. At the operation everything was hidden by the enormous colon. The dilated pelvic colon was found to have folded over the undilated rectum, so that a kink was produced, as shown in the photograph. By pulling the pelvic colon upwards, a tube could be introduced from the rectum and much gas and

fluid fæces were evacuated. As no great improvement resulted, colectomy was performed twelve days later, but the patient died from shock the following day.

The muscular coat of the colon is greatly hypertrophied and the vessels are much enlarged.

- 615A. A portion of the large bowel removed by operation. The lower, larger end represents the rectum and part of the sigmoid, the upper, narrow end the ascending limb of the sigmoid. In the fresh state both ends of the specimen were widely open. The wall is hypertrophied and the mucosa pigmented. The lumen was completely filled with green-coloured fæces.

From a girl of 12 years, born with an imperforate anus for which she was operated on when three days old. She has always been very constipated.

Lent by Charing Cross Hospital.

DIVERTICULA OF THE COLON.

616. PART OF THE DESCENDING COLON laid open to show the orifices of numerous sacculi which project from the outer surface of the bowel. The sacculi contained mucus and fæces.

Wm. H., æt. 50, was admitted under Dr. Pavy in uræmic coma. He died a few hours later, and at the autopsy the kidneys were found in a condition of suppurative inflammation.

Lent by Guy's Hospital.

617. ABSCESS ORIGINATING FROM DIVERTICULA OF SIGMOID COLON.

Male, 60 years of age. Constipation and abdominal pain for ten years. Abscess in the left side of the abdomen six weeks before death. Necropsy: emphysema, enlarged heart. Abscess cavity between the left kidney and the colon which communicated with the bowel through an aperture at the bottom of the specimen. This is the sigmoid colon; it is much sacculated, and the sacculations involve the normal haustra. In the floor of these, as well as in other situations in the mucous membrane, are smaller orifices leading into tubular passages which are lined with mucous membrane. These for the most part doubtless entered the fatty tissues of the appendices epiploicæ, but this is now

cleaned away, showing many of the diverticula cut across. At the bottom of the preparation one of the sacculi shows a small perforation, through the edges of which the mucous membrane is everted.

618. STRANGULATION BY BAND FORMED FROM A DIVERTICULUM.

Male, 51 years of age. Admitted under Mr. Davies Colley in 1891 for anal fistula. An enema was administered and was followed by pain and vomiting, to which he rapidly succumbed. At the necropsy two appendices epiploicæ of the sigmoid flexure were found to be adherent to the mesentery of the ileum just above the cæcum. This adhesion formed a band below which was strangled a loop of ileum 8 feet in length. On examining the specimen its diverticular origin is apparent. A diverticular sac leads into one of the adherent appendices. Below the aperture of this are two other diverticula, one of which has a depth of half an inch into another epiploic appendage. There are also some thickening and narrowing of the gut.

619. VESICO-SIGMOID FISTULA ORIGINATING FROM A DIVERTICULUM.

Male, 65 years of age. Admitted under Mr. Thomas Bryant for passage of wind (12 years) and fæces (six weeks) from the urethra. Colotomy; death in three days. The patient had been in the tropics but had not had dysentery. At the necropsy signs of former ulceration were observed six inches from the anus but none higher up. Description in catalogue: "Much thickened sigmoid which is contracted to some extent; unduly rugose but practically normal mucosa. There is a very chronic perisigmoiditis and a large mass of inflammatory tissue between it and the bladder; a small fistulous communication exists between them." This is an instructive and typical specimen: the thickened, stenosed, and rugose bowel, with two inches of inflammatory thickening between the bladder and the bowel. Into this can be seen extending in two or three places, diverticular passages, cut more or less obliquely across and lined with smooth mucous membrane. Beneath the rugæ, and not obvious until searched for with a probe, are the small orifices of many diverticula half an inch or more in depth. The fistula is a tortuous passage communicating with a small nut-sized abscess cavity.

Lent by Guy's Hospital.

620. LOCAL ABSCESS ORIGINATING IN CONNECTION WITH
DIVERTICA.

Male, 45 years of age. Had had dysentery and syphilis. Symptoms of chronic intestinal obstruction, causing death. Some time before death an abscess formed in the left iliac region and on being opened was found to communicate with the intestine. The sigmoid flexure, for a distance of two inches, is narrowed by inflammatory thickening of its wall. The mucous membrane is smooth and presents near the mesenteric attachment the orifices of several deep sacculi into which the mucous lining dips; the orifices of smaller mucosal depressions are to be seen. There is some thickening of the bowel and into this one of the diverticula can be traced. Several other diverticula, the ends of which have been cut off in preparing the specimen, are to be identified.

Lent by Guy's Hospital.

621. PIECE OF SIGMOID FLEXURE, with faecal masses
firmly embedded in pouches.

Lent by St. George's Hospital.

622. MULTIPLE DIVERTICULA OF THE COLON.

A portion of the ascending colon showing multiple diverticula projecting into the appendices epiploicae. Perforation of one of the sacculi situated 5 inches above the caecum has occurred.

From a stout man of 68 years of age, admitted into hospital with signs of peritonitis.

Lent by the Middlesex Hospital.

623. DIVERTICULA OF LARGE INTESTINE.

A portion of the large intestine showing numerous diverticula (indicated by date-stones).

The specimen was taken from the body of man who died from cerebral hæmorrhage. The whole of the large intestine from the caecum to the lower part of the pelvic colon showed numerous diverticula but the condition had, apparently, produced no symptoms during life.

Lent by Charing Cross Hospital.

623A-L. SPECIMENS OF DIVERTICULA OF THE COLON.

Lent by Dr. Maxwell Telling.

623M. HYPERPLASTIC TUBERCLE OF CÆCUM.

Cæcum removed during life from a middle-aged woman in whom a short circuit of gut had been performed prior to the removal. The lumen of the cæcum is represented by a small slit. The enormous thickness of the walls is shown microscopically to be due to tubercle.

Lent by St. George's Hospital.

623N. HYPERPLASTIC COLITIS (? TUBERCULOSIS).

Lent by Mr. Lockhart Mummery.

SARCOMA OF THE ALIMENTARY CANAL.

624. SARCOMA OF THE PAROTID GLAND.

A tumour laid open by a longitudinal section. It is oval in shape, measuring three inches and a half by two inches, and attached to its lower border by fatty tissue is a small secondary growth. The convex surface is smooth and covered with a thin fibrous capsule. On section the tumour is composed of very friable white material, marbled with darker areas due to extravasation of blood. Histologically it consists of round and oval sarcomatous cells, among which are embedded a number of ducts and glandular acini.

From a man, æt. 54. The tumour was removed from the side of the neck, behind the angle of the jaw.

Presented by Mr. Durham, 1888.

Lent by Guy's Hospital.

625. SARCOMA OF THE TONGUE.

A portion of the left half of a tongue, with the adjacent soft parts forming the floor of the mouth. Deeply embedded in the muscular tissue of the tongue, there is a new growth about the size of a plover's egg. Below it there is a second tumour of similar size, which on the reverse of the specimen is seen projecting beneath the mucous membrane of the floor of the mouth. Histologically the tumours have the structure of round-celled sarcoma.

Joseph P., æt. 65, was admitted under Mr. Howse in 1888 for a tumour of the tongue, which had been slowly growing for about twelve months. There was a second growth in the floor of the mouth. There was no difficulty either in swallowing or in speech. The tumours were removed, but secondary deposits occurred in the cervical glands, and the patient died in July, 1891.

Lent by Guy's Hospital.

626. SARCOMA OF THE FAUCES.

The hinder part of the tongue, with the pharynx and the thyroid gland. A sloughy growth occupies the left side of the pharynx, and extends to the base of the tongue. The larynx is pushed over to the right, and its aperture is narrowed. The thyroid gland is enlarged by infiltration, with new growth. A blue rod passes from the external carotid artery into its lingual branch, which has been opened by ulceration. A ligature is seen around the common carotid artery. Histologically the growth is a sarcoma with small round cells.

Reuben, A., æt. 22, was admitted under Mr. Cooper Forster for a large ulcer involving the left side of the fauces and the root of the tongue. Six weeks after admission the left common carotid was tied for profuse hæmorrhage. The patient died one week later. At the autopsy no growth was found elsewhere.

627. SARCOMA OF THE PHARYNX.

A tongue with the pharynx and larynx attached. At the upper part of the pharynx on the right side, there is a growth which occupies the tonsils. The growth is firm and nodular, and the mucous membrane over it is not ulcerated except behind the right tonsil, where there is some sloughing which extends into the tissues of the neck. Histologically the growth is sarcomatous, consisting of round and spindle cells.

Martha B., æt. 31, was admitted under Dr. Addison for difficulty in swallowing and enlargement of the cervical glands. These symptoms had been noticed for fourteen months. At the autopsy the cervical glands were infiltrating with secondary deposit. The lungs were tuberculous.

628. SARCOMA OF THE ŒSOPHAGUS.

A portion of an œsophagus laid open to show a tongue-shaped tumour measuring four and a half inches from above downwards, two inches from side to side, and one inch in thickness, which in the recent state almost occluded the lumen of the tube. The broad attachment of the tumour occupies the whole circumference of the œsophagus with the exception of a small area about an inch wide on its posterior wall. The edges of the growth are overhanging, and its surface is shaggy from sloughing. The vertical section made through the margin of the tumour shows the muscular coat of the œsophagus to be for the most part free from growth, though on the reverse of the specimen a small

nodule projects upon the outer surface of the tube. Histologically the growth is a sarcoma with round and spindle cells.

William G., æt. 70, was admitted under Dr. Habershon for dysphagia of one month's duration, and died two months later. At the autopsy there was broncho-pneumonia of both lungs and cirrhosis of the liver.

629. SARCOMA OF THE ŒSOPHAGUS.

A pharynx and œsophagus with the larynx and trachea. An inch below the level of the cricoid cartilage there is the raised upper border of an ulcer three inches in length, which occupies the entire circumference of the wall of the œsophagus. On the posterior wall the ulceration is superficial, the muscular coat being unaffected; while in front it extends deeply, invading the neighbouring lymphatic glands and perforating the trachea a short distance above its bifurcation. Histologically the base of the ulcer is infiltrated by growth, having the characters of sarcoma with round and oval cells.

Charlotte S., æt. 38, was admitted under Dr. Barlow for dysphagia of six months' durations. She was exceedingly emaciated, and any attempt to swallow was followed by regurgitation through the nostrils, and produced a rattling noise in the chest. She died one week after admission. At the autopsy some purulent serum was found in the left pleural cavity, and there were secondary deposits in the lungs and kidney.

Lent by Guy's Hospital.

630. SARCOMA OF ŒSOPHAGUS.

A sarcomatous growth of size of an orange, imbedded in which was the right subclavian artery, vagus and recurrent laryngeal nerves. It projects into trachea and into œsophagus. Growth said to have arisen in the œsophagus; but possibly in glands outside it.

A man, æt. 43 years.

Lent by St. George's Hospital.

631. SARCOMA OF ŒSOPHAGUS.

Sarcomatous tumour of sausage-like shape, attached by pedicle to wall of œsophagus.

Microscopically growing from submucous tissue and composed of chiefly spindle-shaped cells, some of very large size.

From a man, æt. 50 years, symptoms of dysphagia for 3 months.

Gastrostomy, followed by peritonitis and broncho-pneumonia.

632. SARCOMA OF THE STOMACH.

The stomach of a child, part of the anterior wall having been removed to show a tumour springing from the lesser curvature about midway between the œsophagus and pylorus. It is much lobulated, and projects boldly into the cavity of the stomach, the attached part being narrowest. The walls of the stomach for some distance round the pedicle are thickened by infiltration. The mucous membrane is intact over the surface of the growth. At its periphery the tumour is soft, but it is firm in the centre. The growth is a round-celled sarcoma.

Lent by University College Hospital.

633. MELANOTIC SARCOMA OF STOMACH.

The pylorus and adjacent parts, showing large secondary growths of melanotic sarcoma in the submucous tissue of the stomach. The masses are raised and mushroom-like, their edges are overhanging, and everted. The larger ulcerated, and all are deeply pigmented.

The primary growth was in the supra-renal capsules.

Lent by Charing Cross Hospital.

634. MELANOTIC SARCOMA OF THE STOMACH.

A stomach showing in its mucous membrane a large number of minute brown dots resembling petechiæ. Histologically they consist of aggregations of round pigmented cells situated entirely within the mucous coat.

John B., æt. 35, was admitted under Dr. Habershon for enlargement of the liver, which had been noticed for six weeks. He died on the day of his admission. At the autopsy melanotic growths were found in all parts of the body. The liver weighed 188 ozs.

Lent by Guy's Hospital.

635. SARCOMA OF THE STOMACH AND DUODENUM.

A portion of a stomach and duodenum showing an infiltrating growth occupying the pyloric half of the stomach and extending about an inch into the duodenum. The surface of the affected area is in parts covered by stretched mucous membrane, and in parts ulcerated. Towards the cardia the edge of the growth is well defined and a section through the thickened pylorus shews the infiltration to be greatest in the submucous tissue. Histologically the growth is a round-celled sarcoma.

Frederick W., æt. 15, was admitted under Dr. Gull for an

abdominal tumour with jaundice. At the autopsy there were secondary deposits in the mesenteric glands and in one of the kidneys.

Lent by Guy's Hospital.

636. SARCOMA OF THE DUODENUM.

A duodenum with the stomach suspended from the pylorus. The duodenum is considerably dilated, and its walls are thickened by a deposit of growth which extends into the connective tissue and glands about the head of the pancreas. The mucous surface is extensively ulcerated, and presents numerous prominent nodules of growth. On the reverse of the specimen several isolated button-like secondary deposits are seen beneath the mucous membrane of the stomach. Histologically the growth is a round-celled sarcoma which invades the muscular coat of the intestine.

John C., æt. 21, was admitted under Dr. Addison and died three days later. At the autopsy secondary deposits were found in the jejunum and ileum, and the whole of the large intestine was acutely inflamed.

Lent by Guy's Hospital.

637. PEDUNCULATED SPINDLE - CELLED SARCOMA OF INTESTINE.

Lent by St. George's Hospital.

638. PRIMARY SARCOMA OF SMALL INTESTINE.

From the body of a woman aged 58. The gut shows the characteristic dilatation. There were numerous secondary growths in kidneys and pelvic organs. The growth is a small round-celled sarcoma.

Lent by St. George's Hospital.

639. MELANOTIC SARCOMA OF THE JEJUNUM.

A portion of a jejunum the wall of which for a distance of three inches is thickened by a deposit of melanotic growth. The mucous membrane at this part is slightly ulcerated, and the calibre of the gut is somewhat widened. There is a similar black deposit in the lymphatic glands and in the mesentery. Histologically the growth is a sarcoma consisting of round and oval cells, many of which contain brown pigment.

Ann O., æt. 40, was admitted under Dr. Moxon for ascites. She had previously suffered from pain in the back with frequent attacks of vomiting, and died one month after the onset of her illness. At the autopsy melanotic growth was found in the skin, pleura, peritoneum, lungs, kidneys, and spleen.

Lent by Guy's Hospital.

640. LYMPHO-SARCOMA OF ILEUM.

A portion of ileum removed by operation, showing an annular growth extending along the intestine for 7 to 8 c.m. and markedly narrowing the lumen. In places the entire thickness of the wall is involved. The cut surface of the growth presents a uniform dead-white colour. No secondary deposits were found post-mortem. Microscopically the growth is a lympho-sarcoma.

Ellen B., æt. 46. Admitted under Dr. Murray, 5th April, 1906, and died 21st May, 1906.

Lent by Charing Cross Hospital.

641 SARCOMATOUS POLYPI OF THE COLON.

A portion of the colon laid open to show numerous single and compound polypi, the smallest the size of a pea, and the largest measuring two inches long by an inch broad, and projecting three quarters of an inch into the lumen of the bowel. The mucous membrane over them is smooth and free from ulceration. At the situation of the growths and above them the calibre of the intestine is widened and its wall thickened. On the reverse of the specimen several adherent lymphatic glands are seen to be enlarged. Histological examination of the polypi and of the lymphatic glands shows the growth to have the characters of a sarcoma composed of oval and spindle cells. (Presented by Sir Astley Cooper).

Lent by Guy's Hospital.

GASTRIC ULCER EXPERIMENTALLY PRODUCED BY THE INJECTION OF GASTRO-TOXIC SERUM.

Lent by Dr. Charles Bolton.

642. These specimens show the stages of healing of gastric ulcer in the guinea pig from the 4th to the 21st day.
- 642A. This specimen shows a local abscess between the stomach and liver.
- 642B. These specimens show the stages of healing of gastric ulcer in the cat from the 4th to the 28th day.

CIRRHOSIS OF THE LIVER IN PATIENTS WHO WERE TEETOTALERS.

Lent by Dr. Braxton Hicks.

643. A TYPICAL "GIN-DRINKER'S LIVER."

Weighing 26 ozs., removed from a man, æt. 39, who was a total abstainer. Two months before death he was admitted with ascites, and had a history of blood spitting and epistaxis of 6 months' duration.

644. TYPICAL MULTILOBULAR CIRRHOSIS OF THE LIVER.

From a woman, æt. 28, who had been in the Incurable Ward of the Hospital for sixteen years with extreme arthritis deformans. The liver weighs 21 ozs.

MISCELLANEOUS SPECIMENS.

*Lent by London School of Clinical Medicine,
Greenwich.*

644A. FOREIGN BODIES found in cæcum and ascending colon of Arab seaman.

Brass Buttons	...	...	21	|	Brass Toothed Wheels	...	3
Brass Screws	...	...	2	|	Odd pieces of Brass	...	27
Pieces of Lead	...	...	2	= Weight of whole 6 $\frac{3}{4}$ ozs.			

645. A SPECIMEN OF ACUTE YELLOW ATROPHY.

From a patient æt. 3 $\frac{1}{2}$ years, who had a history of jaundice 3 days before death, coma for 24 hours.

Leucin and tyrosin found in urine ante mortem.

645A. INTESTINE AFFECTED WITH AMOEBIC DYSENTERIC ULCERATION.

646. OMENTUM SHOWING 3 HYDATID CYSTS.

646A. SPECIMEN, showing a diaphragmatic hernia of the splenic flexure of the colon.

646B. PICTURES of sigmoidoscopic appearances.

Lent by Mr. Lockhart Mummery.

VIII.—GENITO-URINARY SYSTEM.

Hon. Curator - Dr. SWIFT JOLY.

647. CARCINOMA OF KIDNEY.

Tumour springs chiefly from upper pole of kidney and projects into the pelvis. Microscope: Carcinoma, in places papilliferous. Patient æt. 50. Five months before operation sudden profuse hæmorrhage, which was repeated several times.

Lent by the Royal College of Surgeons.

648. SPINDLE-CELLED SARCOMA OF KIDNEY.

A large growth springing from the upper pole of the kidney. In places it is opaque and pale from necrosis. Microscopic: Spindle-celled sarcoma. Patient æt. 50. History: Malaise, ten months; symptomless hæmaturia, three months. Cystoscope: No efflux on side of growth.

649. HYPERNEPHROMA OF KIDNEY.

Right kidney: Upper two-thirds normal. From lower pole is growing a mass as large as the whole kidney, irregular in outline, many necrotic areas. Patient losing weight and strength six months; pain on frequency of micturition four weeks; never hæmaturia. Nephrectomy, December, '08. Patient died of recurrence (local) July, '09.

Lent by St. Peter's Hospital.

650. HYPERNEPHROMA OF KIDNEY.

Small encapsuled homogeneous tumour in lower pole of kidney; tumour of light brown colour. Microscope: hypernephroma cells resembling those of the cortex of the suprarenal gland. Patient suffered from attacks of hæmaturia and pain for four years. Pain only during attack. Cystoscope: Blood coming from right side. Nephrectomy. Three months later (?) recurrence.

651. SMALL HYPERNEPHROMA OF KIDNEY.

A small round tumour lying in cortex of kidney. In one spot it has ulcerated into the pelvis. Tumour mottled in colour. Symptoms: Pain and hæmaturia (5 attacks) for nine months. Cystoscope: Long worm-like clots and fluid blood extruded from left ureteric orifice. Clear efflux right side. Nephrectomy. No recurrence.

652. HYPERNEPHROMA OF KIDNEY.

A large imperfectly lobulated tumour springing from lower pole of kidney. Microscopically : Composed of adrenal tissue. Nephrectomy 3 months before death. P.M. tumours of similar structure found in lungs and liver.

Lent by the Royal College of Surgeons.

653. TUMOUR OF KIDNEY.

Kidney opened to show a mass of mixed growth and blood-clot lying in the pelvis. Nature of tumour unknown. Patient æt. 54. Pain and hæmaturia 9 months. These come on in attacks, and last for 4-5 days.

Cystoscope : Worm-like clot projecting from right ureteric orifice.

Nephrectomy : Death 18 months afterwards.

Lent by St. Peter's Hospital.

654. PAPILLOMA OF PELVIS OF KIDNEY.

Pelvis and calyces are tensely filled with a white villous growth which nowhere invades the renal tissue. Symptoms : Unilateral hæmaturia.

Lent by the Royal College of Surgeons.

655. POLYCYSTIC KIDNEY.

Large kidney in which the secreting tissue has been almost entirely converted into small closely packed cysts. Both kidneys in the same condition. Patient, æt. 50. Died of intercurrent disease.

656. LARGE CYST OF KIDNEY.

Only a small amount of kidney substance left at either pole of the kidney. The remainder is converted into a large thin-walled sac which contained urinous fluid. The ureter is patent throughout its whole length, but joins the pelvis at rather an acute angle.

Lent by St. Peter's Hospital.

657. RUPTURED KIDNEY.

Four months previous to operation, patient fell on his side. Very severe pain, and hæmaturia which persisted and necessitated removal of kidney. A transverse rupture about middle of kidney, extends into pelvis. Callus-like formation of young connective tissue binding the two halves of the kidney together.

658. CALCULOUS DISEASE OF KIDNEY.

Large branched calculi filling up the whole pelvis and calyces. Kidney substance reduced to very thin layer. Patient *æt.* 35. Intermittent hæmaturia since childhood. Attacks of pain right side. Nephrectomy. Cure.

659. HYDRONEPHROSIS, due to blocking of the upper end of the ureter by a small calculus.

The kidney is transformed into a large thin-walled sac, lobulated on the outside due to distention of the calyces.

660. SUPPURATIVE PYELO-NEPHRITIS.

Septic abscesses in renal substance, one containing a phosphatic calculus. Patient had prostatic calculi (see specimen No. 690) acute cystitis and ascending infection of both kidneys.

661. ADVANCED URINARY TUBERCULOSIS.

Right Kidney.—Completely replaced by caseous material arranged in loculi. No secreting tissue left.

Right Ureter.—Fibroid. Plugged with caseous material.

Left Kidney.—Tuberculous and septic, pyelo-nephritis.

Left Ureter.—Dilated and tortuous. Tuberculous foci in mucous membrane.

Bladder.—Extensive tuberculous ulceration. Numerous tubercles round left ureteric orifice.

Prostate.—Tuberculous focus broken down. Sinus tracking to perineum.

Rectum.—Tuberculous stricture, and also a distinct tuberculous ulcer adhered to the bladder.

Patient *æt.* 35.—Tuberculous cystitis, 10 years. Hard nodule in left epididymis. Died of tuberculous meningitis. Old phthisis both apices.

662. RENAL TUBERCULOSIS.

Tuberculous ulceration at the tip of every pyramid. Isolated nodules scattered through kidney substance. Submucous tubercles in pelvis. Kidney not enlarged. History: Patient H., *æt.* 19. Admitted for stricture of urethra. When in hospital it was found that tubercle bacilli were present in the urine. Internal urethrotomy, Cystoscopy: tubercles surrounding right ureter. Catheterisation of ureters. Clear urine left side, no tubercle bacilli. Turbid urine right tubercle bacilli. Nephrectomy.

663. EPITHELIOMA OF RIGHT SIDE OF BLADDER INVOLVING RIGHT URETER.

Right kidney small, renal tissue thin and hollowed out from back pressure. Right ureter dilated. Left kidney slight compensatory enlargement.

664. INFILTRATION OF BLADDER WALL BY CARCINOMA.

Dilatation of both ureters and renal pelves.

665. CARCINOMA OF BLADDER (pedunculated).

On left side of bladder base is the pedicle of a large friable carcinoma which was removed 3 months before death. Infiltration of bladder wall compressing left ureteric orifice. Left ureter dilated and tortuous. Left kidney atrophic, hollowed out by back pressure. Right kidney compensatory enlargement. No secondary growths or enlarged glands found at post-mortem.

Patient, æt. 65, had intermittent hæmaturia for 2 years, sometimes very profuse. Sacral pain 6 months. Per-rectum infiltration left side of bladder base.

666. PEDUNCULATED CARCINOMA OF BLADDER.

A large mass of recurrent carcinoma fills almost the whole bladder. Left lateral wall infiltrated by growth which has extended through the bladder wall in one spot. Large pedunculated cauliflower mass of growth removed from left side of bladder 6 months before death. Microscopic examination : Carcinoma. The specimen shows the recurrent growth.

Patient, æt. 52. Symptoms : Persistent hæmaturia, great frequency of micturition, pain after micturition, loss of weight.

667. EPITHELIOMA OF BLADDER.

An extensive growth involving the left lateral wall and extending on to the trigone and to internal meatus.

Patient, æt 70. Pain and frequency 6 months. Occasional attacks of hæmaturia. Post-mortem : No secondary growth or enlarged glands.

668. LARGE PAPILLOMA OF BLADDER.

Large pedunculated papilloma (size of an orange). Pedicle about one inch long and as thick as a cedar pencil. Growth together with a button comprising the whole thickness of the bladder wall removed by operation. Most of the "button" has been cut away for microscopic examination. No sign of malignancy found. Patient had hæmaturia for 7 years, laterly pain and frequency (due to cystitis). No sign of recurrence.

669. PAPILLOMA OF BLADDER.

Tiny growth composed of a short stalk and a few delicate villous tufts. The growth springs from a small button of mucous membrane. Removed by operation.

670. LARGE CONGENITAL SACCULUS OF BLADDER.

A very large sacculus springing from the left side of the bladder. The opening was about one inch above and in front of the left ureteric orifice, and just admitted the tip of the first finger. The sacculus filled up the whole pelvis. On the posterior surface a groove caused by the ureter can be seen, and on the lateral aspect another fainter one caused by the vas deferens. Microscopically : the sacculus is composed of all three layers of the bladder wall, but the muscular coat is largely replaced by fibrous tissue. Removed by operation.

Patient, æt. 52. Difficulty of micturition and a very weak stream all his life. For six years cystitis, great frequency, and pain. Residual urine $\frac{3}{4}$ xix.

671. PROSTATIC OBSTRUCTION : DISTENDED SACCULATED BLADDER.

Collar-like enlargement (adenomatous) of prostate. Marked bending of prostatic urethra due to tension of ejaculatory ducts. Patient, æt. 58. Prostatic obstruction nine months. Catheter twice daily. Death from diabetic coma.

672. BLADDER OPENED ON ANTERIOR ASPECT to show an intravesical adenomatous prostatic enlargement.

Patient, æt. 68. Catheter life four years. Death from pneumonia.

673. BLADDER AND PROSTATIC CAVITY from a patient who died thirty-five days after Prostatectomy by Freyer's method.

Specimen opened on anterior aspect.

Bladder small walls very thick. Mucous member rugose.

Prostatic cavity opening directly into bladder above and membranous urethra below.

674. ENLARGED ADENOMATOUS PROSTATE removed from previous specimen.

Greater part of enlargement on left side causing considerable intravesical enlargement.

Patient æt. 69. Catheter life three months.

675. DISSECTION showing relation of parts after suprapubic prostactectomy.

Patient died thirteen days after operation of cardiac failure.

Vertical section of hardened pelvic viscera made just to right of middle line.

Bladder wall thickened, prostatic cavity in direct communication with bladder.

676. ENLARGED PROSTATE, removed from previous specimen.

Adenomatous prostate affecting both lateral lobes. Large intravesical projection. No "middle" lobe.

Five facettèd phosphatic stones were found in the post-prostatic pouch.

677. SPECIMEN SHOWING RELATIONS OF PARTS AFTER SUPRAPUBIC PROSTATICTOMY.

Patient died ten days after the operation. Above will be seen the cavity of the bladder, this is separated from the prostatic cavity by a slight constriction formed by the sphincter vesicæ. At the extreme lower end of this a small portion of the prostatic urethra is still to be seen.

The specimen has been opened down the front.

ADENOMA OF PROSTATE.

Lent by Mr. P. J. Freyer.

678. Enormous gland weighing $17\frac{1}{2}$ ozs. Both lateral lobes greatly hypertrophied, large intra-vesical projection chiefly formed from the right lobe. Enucleated from patient æt. 70, who had been on catheter life for 18 years.
679. Gland weighs $14\frac{1}{4}$ ozs. Both lobes greatly hypertrophied and connected posteriorly by a high thick lip. The apex of the left lobe is ulcerated (?) by a calculus which was in the bladder at the time of the operation.
680. Enlargement chiefly of the right lateral lobe. Left lobe irregular in shape due to adenomata bulging up through the capsule.
681. The greater part of the gland consists of an enormous "third" lobe. This is formed by outgrowths from both lateral lobes as evidenced by the median groove on it. The deep horizontal constriction is caused by the sphincter vesicæ.
682. A large "third" lobe springing entirely from the left lateral lobe of the gland.
683. This prostate is of the "closed type." A fibro-muscular band is to be seen connecting the anterior aspects of both lateral lobes. This was wanting in the preceding specimens. There is a well marked middle lobe.
684. This prostate is of the closed type with practically no evidence of formation of a "third" lobe.
685. A small gland weighing $\frac{3}{4}$ oz. Well marked middle lobe, forming a "ball valve."
686. Very small prostate weighing $\frac{1}{2}$ oz. There is no intra-vesical projection, and the lateral lobes are scarcely larger than normal. Prostate enucleated from patient æt. $81\frac{1}{2}$, who had been entirely dependent on catheter for 5 months.

687. A very asymmetric gland. The right lobe is greatly hypertrophied, while the left is not much larger than normal. Urethra distorted.
688. A large symmetrical prostate of the "open" type. Small intra-vesical projection apparently springing from the right lobe.

CARCINOMA OF PROSTATE.

689. A symmetrical prostate without any "third" lobe. Microscopically carcinoma. Suprapubic enucleation 6 years ago. Patient still alive.

PROSTATIC CALCULI.

690. Bladder wall very thickened. Mucous membrane dark, congested, sloughing in places.
- Urethra.—Two small round openings in prostatic urethra. With a probe in the opening numerous calculi can be felt.
- Prostate.—On posterior surface two windows have been cut, exposing cavities in both lobes which contain calculi and open anteriorly into the urethra.
- Patient admitted moribund from uræmia. Double pyelonephritis, one kidney shown (specimen No. 660.)

EPITHELIOMA OF PENIS.

691. Rapid cauliflower growth. Penis and skin of pubis removed. Blue rod in urethra.
- Patient æt 37. Noticed a small nodule on glans penis 10 months before death. Refused operation.
- P.M. Small deposits in pleura.

MIXED CELLED SARCOMA OF TESTIS.

692. Patient æt. 36. History of painless swelling of testis one year. Extensive involvement of lumbar glands. Testicle removed at patient's request on account of weight.

SMALL ROUND-CELLED SARCOMA OF TESTIS.

693. Patient æt. 55. History: Painless swelling of testis 6 months. Large hydrocele containing $\frac{3}{4}$ xvi of fluid. Testicle of unequal consistence.
- On section tumour appears fairly homogeneous. Microscopically: Small round-celled sarcoma.

CHONDRO-SARCOMA OF TESTIS.

694. Patient æt. 28. History of 9 months' painless swelling of testicle after a blow. Body of testis enlarged, with soft rounded bosses, which gave a sense of fluctuation. These were where the growth had perforated the tunica albuginea.

695. DERMOID OF TESTIS.

Testicle bisected. Sections shows from above downwards.

1. A dermoid cyst.
2. A lobulated new growth.
3. Compressed testicle.

Lent by Mr. F. J. F. Barrington.

GUMMA OF TESTIS.

696. Patient, æt. 40, syphilis 14 years before. Rapid swelling of testicle after urethral irrigation 6 months. Gradually got worse inspite of administration of iodide of potassium. Skin adherent. Large gumma in body.

Lent by St. Peter's Hospital.

697. Left testis and cord bisected. In the upper and anterior part of the body of the testis is a broken-down gumma.

Patient, æt. 30. History : syphilis 4 years before. Swelling of testicle 9 months, painful 10 weeks Cavity tapped ; green pus-like fluid withdrawn, which wass sterile on culture.

698. TORSION OF THE TESTIS.

Left testis and portion of cord. Testis and tunica intensely infiltrated with blood. Vessels of cord very much congested. Body of testis recognised by its pale colour.

Patient, æt. 26. Sudden pain in testicle without injury or movement, 10 days. Left side of scrotum swollen and cedematous. On aspiration blood was found in the tunica.

Lent by the Royal College of Surgeons.

699. TUBERCULOUS TESTICLE.

Specimen injected by the late Mr. Hy. Curling. In the epididymis is a large yellow caseating mass, breaking down. Small nodules in the body of the testis.

Patient, æt. 24. Duration 18 months. Ulcer formed in the scrotum through which caseous material was discharged.

X-RAY SLIDES.

700. A LANTERN SLIDE.

Showing a dense rounded mass apparently springing from the upper pole of the right kidney. This shadow is not dark enough for calculous, but its edge is well defined.

Operation.—Kidney explored. Large round malignant growth found adherent to the upper pole of the kidney. (?) Supra-renal tumour. Growth is inoperable.

Lent by St. Peter's Hospital.

701. LANTERN SLIDE OF X-RAY NEGATIVE.
Showing fairly well marked shadow in cortex of left kidney.
Operation.—Tuberculous kidney. Nephrectomy. Caseous mass in position of X-ray shadow.
702. LANTERN SLIDE OF X-RAY NEGATIVE OF KIDNEY REGION.
Outline of right kidney fairly distinct, much larger than other side. Density increased uniformly.
Operation.—Large hydronephrosis containing 26 oz. urinous fluid. Nephrectomy.
703. LANTERN SLIDE OF X-RAY NEGATIVE OF RENAL REGION.
Outline of right kidney fairly well marked, very irregular. Kidney much larger than that of opposite side—nodular.
Operation—Sarcoma : Nephrectomy.
704. LANTERN SLIDE OF X-RAY NEGATIVE OF RENAL REGION.
Showing very dense shadow in left renal area, and a smaller one in line of ureter. Calculi.
705. CALCULI.
Removed by nephrolithotomy from case represented in previous specimen. Dense phosphatic covered stones weight 1,710 grs. These specimens show that one shadow may be caused by several stones.
706. LANTERN SLIDE OF X-RAY NEGATIVE OF RENAL REGION.
Showing well marked oval shadow in right renal area.
707. OXALIC CALCULUS.
Weight 100 grs., removed by nephrolithotomy from last case.
708. LANTERN SLIDE OF X-RAY NEGATIVE.
Showing shadow of large branches, calculus in left renal area.
Lent by St. Peter's Hospital.
709. URIC ACID CALCULUS WEIGHING 408 GRs.
Removed from last case.
710. LANTERN SLIDE OF X-RAY NEGATIVE.
Showing large dense opaque area, in left renal area. Caused by large oxalate stone.
711. LANTERN SLIDE OF X-RAY NEGATIVE OF PELVIS.
Showing two large shadows in line of left ureter. Calculi removed by uretero-lithotomy.

712. LANTERN SLIDE OF X-RAY NEGATIVE OF PELVIS.

Showing shadows thrown by a calculus in ureter, and also of ureteric bougie. It will be seen that the bougie passes up above the calculus showing that the ureter was not blocked.

713. LANTERN SLIDE OF X-RAY NEGATIVE OF PELVIS.

Showing shadow (seen just behind symphysis pubis) due to stone in the prostate.

714. TWO HEMISPHERICAL CALCULI.

Removed by operation, from prostate of last case. These specimens show that one shadow may be caused by more than one calculus.

715. LANTERN SLIDE OF X-RAY SHADOW OF PELVIS.

Small oval shadow on left side, outside line of ureter. Several small shadows forming a ring just behind symphysis pubis. These shadows are caused by phleboliths. They could be felt, per rectum, just outside the prostate.

MICROSCOPIC SECTIONS.

716. SECTION OF HYPERNEPHROMA OF KIDNEY.
(Section cut from specimen No. 650).

Section shows the columnar and alveolar type, but not the papillary. Cells are large and clear, and are situated directly on the capillary walls.

Lent by Mr. F. J. F. Barrington.

717. SECTION OF PAPILLOMA OF RENAL PELVIS.

Section shows the finger-like projections cut in various directions. Epithelial cells nowhere breaking through basement membrane.

Lent by Mr. Pardoe.

718. SECTION OF KIDNEY FROM CASE OF EARLY
PRIMARY TUBERCULOSIS OF KIDNEY.

Tuberculous ulcer in one calyx, scattered tubercles lying here and there in the cortex.

Lent by Mr. Joly.

719. SECTION OF ADENOMA OF PROSTATE.

Cystic spaces lined with columnar epithelium, numerous intracystic projections. In places these spaces have been flattened out from pressure.

720. SECTION OF ADENOMA OF PROSTATE.

Here the fibrous tissue predominates, the acini are few and far between.

721. SECTION OF MYOMA OF PROSTATE.

Shows a leiomyoma and part of an adenoma.

Lent by Mr. F. J. F. Barrington.

722. SECTION OF CARCINOMA OF PROSTATE.

Shows a small part of normal prostate. Remainder is growth. Both columnar and round-celled types can be seen in the section.

723. SECTION OF PAPILLOMA OF BLADDER. (Section taken from Specimen No. 668).

Shows numerous finger-like projections covered with epithelium cut in different directions. In one place some of the muscular tissue of the bladder wall is to be seen. No sign of infiltration with growth.

Lent by Mr. Joly.

724. SECTION OF CARCINOMA OF BLADDER.

Large masses of cells infiltrating bladder wall.

725. SECTION OF GROWTH FROM SPECIMEN NO. 695.

Alveolar growth with varying amount of stroma. Alveoli lined by columnar epithelium. Some have lacunæ containing secretion ; in others the alveoli are completely filled with cells.

Lent by Mr. F. J. F. Barrington.

INSTRUMENTS.

726. WYNDHAM POWELL'S URETHROSCOPE WITH OPERATING ATTACHMENT.

727. A CRYOSCOPE.

728. CATHETERISING CYSTOSCOPES AND A PHANTOM BLADDER.

IX.—GYNÆCOLOGY.

Hon. Curator - Dr. HELEN CHAMBERS.

THE CHORIONIC VILLI AND SYNCYTIIUM.

729. MICRO-PHOTOGRAPHS (mounted in one frame).

Ruptured tube. *Lent by Dr. T. Curwardine.*

Chorionic villi.

Embryonic vesicle.

Idem.

Idem.

Cell sheet.

Villus (wandering cell).

Villus (cell processes).

Villus (origin of wandering cell with processes).

Cells with fine processes.

Invading cells.

Villi-syncytium.

Syncytium processes.

Nuclei and processes (free).

Chlorion-epithelioma (for comparison: from Teacher's Monograph).

730. DRAWING OF MESIAL SAGITTAL SECTION OF BODY OF WOMAN, SIX MONTHS PREGNANT, WITH CANCER OF CERVIX AND VAGINA.

Labour commencing: Funnel-shaped cervical canal. The section was made by Mr. T. W. G. Lawrence, after injecting and hardening in formalin solution.

Lent by Dr. Herbert Spencer.

731. DRAWING OF FŒTUS AT TERM IN UTERO.

Cervical canal obliterated: Membrane intact. Note thinness of lower segment.

732. DRAWING OF UTERUS RETROFLEXED BY ADHERENT MYOMA.

Cæsarean section and total hysterectomy. Arrow, indicates middle of fundus. Note thinness of anterior wall, the posterior being unable to expand. Emergency operation, child already dead. Recovery of mother.

733. DRAWING OF UTERUS REMOVED BY TOTAL
HYSTERECTOMY FOLLOWING CÆSAREAN
SECTION.

Multiple fibroids, one slightly twisted. Spontaneous recovery from tubal pregnancy, 13 months before (mole seen in tube). Albumen and ascites present: breach presentation. Recovery of mother and child.

734. DRAWING OF LARGE CARCINOMA OF CERVIX WITH
BILATERAL PYOSALPINX.

Patient well three years after Wertheim's operation.

735. DRAWING OF BILATERAL OVARIAN FIBROIDS.

Removed during pregnancy (the smaller tumour by enucleation and stitching up the remains of the ovary). Abortion followed the operation. The patient subsequently had a living child.

736. DRAWING OF UTERINE MYOMA.

(13lb.), with abscess in centre caused by infection from gangrenous submucous myoma. Total abdominal hysterectomy; recovery.

737. DRAWING OF CHORION-EPITHELIOMA.

(Developing some months after hydatidiform mole); secondary growth in wall of fundus. Patient well two years after total abdominal hysterectomy.

738. DRAWING OF CYSTIC FIBROMA OF OVARY.

739. DRAWING OF DIFFUSE ADENOMYOMA OF UTERUS.

Removed by total abdominal hysterectomy. Patient developed cancer of the breast two years later.

DEGENERATED MYOMA.

740. Removed by total abdominal hysterectomy from patient only 22 years of age. The tumour weighed 7lb.

741. Removed by total abdominal hysterectomy. The degenerated fluid material has been squeezed beneath the peritoneum by the contraction of its muscular bed, threatening rupture.

742. PICTURE OF A DIFFUSE ADENOMYOMA OF THE
POSTERIOR WALL OF THE UTERUS, from
Dr. Cullen's "Adenomyoma of the Uterus,
1908."

Lent by Messrs. Saunders & Co.

The uterus has been amputated through the cervix. The anterior uterine wall is unaltered. The posterior wall from

cervix to fundus is greatly thickened, owing to the presence of a diffuse myomatous growth lying between the mucosa and the outer covering of normal muscle. This diffuse growth consists of fibres forming whorls, but also passing in all conceivable directions. It encroaches to a slight extent on the uterine cavity. At *a* is seen the junction between the diffuse myoma and the normal muscle. The fibres of the one, however, blend imperceptibly with the other, and it would be impossible to shell this growth out, as can be done with discrete myomata. Near the internal os is a small polyp. The uterine cavity is somewhat lengthened. The mucosa lining the anterior wall is of the normal depth, but that covering the posterior wall is considerably thickened, and at two points indicated by *b* it can be traced for a considerable distance into the myoma. At *c*, just along the lower margin of the growth, the mucosa can be seen penetrating into the uterine wall for fully 1.5 c.m. (For the histological appearance of the posterior wall see next figure).

743. PICTURE OF A DIFFUSE ADENOMYOMA OF THE POSTERIOR UTERINE WALL.

The section represents the upper half of the posterior wall of the uterus seen in preceding figure. The wall is divided into three distinct zones, an inner, *a*, consisting of the uterine mucosa; a middle zone, *b*, thick and coarse, made up of diffuse myomatous tissue; and an outer zone, *c*, composed of normal muscle. The mucosa, although increased in thickness, is normal. The surface epithelium is intact and the glands present the usual appearance. The diffuse myomatous growth has many islands of glands scattered throughout it. These consist of practically normal uterine glands and are surrounded by the characteristic stroma of the mucosa. Some of the glands are much dilated. Occasionally a gland occurs singly and lies in direct contact with muscle. At *e* the gland has retracted from the surrounding stroma. The origin of the gland elements in this diffuse myoma is clear, as at *d* we see the uterine mucosa extending directly into the myoma.

744. PICTURE OF A DIFFUSE ADENOMYOMA OF THE POSTERIOR UTERINE WALL.

The section is taken from the upper part of the uterine cavity, as shown by the position of *a*, which denotes the fundus. The uterine walls with the higher power show a slight myomatous transformation. There is considerable encroachment of the growth on the uterine cavity. At *b* the mucosa is of the usual thickness and is normal in appearance. At

the fundus as seen at *c* it is thickened, but mechanically injured. At *d* the mucosa penetrates the diffuse growth for a short distance and at *d'* can be traced far into the muscle. At the latter point there is also a direct communication between the two down-growths. *e* is a cystic uterine gland. Scattered throughout the inner half of the uterine wall are numerous islands of uterine glands surrounded by deeply stained areas—the normal stroma of the mucosa. Here and there is a small gland lying in direct contact with the muscle. There are also numerous deeply stained areas, as represented by *f*. These consist of stroma of the mucosa devoid of gland elements. That the glands of this growth are derivatives of the uterine glands is evident.

745. PICTURE OF A DIFFUSE ADENOMYOMATOUS THICKENING IN THE FUNDUS AND POSTERIOR UTERINE WALL WITH EXTENSION *en masse* OF THE MUCOSA INTO A LARGE CREVICE BETWEEN MYOMATOUS MASSES.

The myoma is welling into the uterine cavity, and into the space between myomatous masses a large area of mucosa is flowing. With the continued growth of the myomatous tissue this mucosa would in all probability be nipped off and carried outward, thus forming a large island of mucosa surrounded by myomatous tissue.

746. PICTURE OF A DIFFUSE ADENOMYOMA FORMING A COMPLETE ZONE AROUND THE UTERINE CAVITY.

The figure represents an antero-posterior section through the entire uterus which has been amputated through the cervix. The uterine cavity is of the normal length and appearance and the mucosa is probably thinner than usual. The inner two-thirds of the muscular wall have been completely transformed into a diffuse myomatous tissue which extends to, but does not encroach upon, the uterine cavity. At *a* is a small cyst with a smooth inner lining. The outer portion of the uterine wall consists of perfectly normal muscle. Scattered throughout it are many cross-sections of small blood vessels, well shown at *b*. Although the myomatous muscle sharply contrasts with the normal muscle, the two gradually merge into one another and are intimately blended. For the histological appearance see the two following figures.

747. PICTURE OF A DIFFUSE ADENOMYOMA OF THE
UTERINE WALL WITH MARKED EXTENSION
OF THE MUCOSA INTO THE GROWTH.

This is a section through the entire uterine wall in the preceding figure. *a* indicates the uterine mucosa ; *b*, the outer covering of normal muscle. The intervening portion, comprising the major part of the uterine wall, consists of diffuse myomatous tissue. The uterine mucosa at *a* is of the normal thickness and presents the usual appearance. It is immediately noticeable that the surface is perfectly even, there being no tendency toward the formation of outgrowths. At *c* there is a wholesale extension of mucosa into the diffuse myoma. At *c'* and *c''* the mucosa can be traced for a considerable distance, but at *c'''* a most instructive picture is seen. Here we are able to follow the extension of the mucosa fully two-thirds of the way through the uterine wall and almost to the point where the diffuse growth ends and the normal muscle begins. It will be noted that the usual stroma accompanies the glands. At numerous other points, indicated by *d*, the mucosa is seen penetrating the myoma. Scattered throughout the diffuse growth are many islands of uterine mucosa containing anywhere from one to a dozen or more sections of glands embedded in the characteristic stroma. A few of the glands are dilated as shown at *e*. Here and there there are islands of stroma (*f*) devoid of glands. The glandular invasion in this case is remarkable, but it will be noted that no epithelial elements are found in the normal muscle.

748. PICTURE OF EXTENSION OF THE MUCOSA INTO
A DIFFUSE MYOMA OF THE UTERUS.

The section is from the body of the same uterus. A very low-power picture of this is seen in the preceding picture. *a* represents the thickness of the normal mucosa. The surface epithelium is intact and the surface of the mucosa is comparatively smooth. At *b* we have an angle where the lateral wall joins the top of the uterine cavity. The greater number of the uterine glands are normal in size, but a few are dilated. The normal mucosa is everywhere extending into the diffuse myoma, as indicated by *c*. The mucosa in the down-growths differs in no way from that lining the uterine cavity save for the fact that some of the glands, as seen at *d*, are dilated. This is another example of the fact that the mere extension of the uterine glands into the muscle is not necessarily indicative of a malignant growth.

749 PICTURE OF A DIFFUSE ADENOMYOMA OF THE
ANTERIOR UTERINE WALL.

This is an antero-posterior section of the uterus. The organ has been amputated through the cervix. The anterior lip of the cervix is considerably thickened. The anterior uterine wall is increased in thickness. It is covered externally with a zone of normal muscle, but the major portion of the thickening is composed of a diffuse myomatous growth which has encroached to a marked degree on the uterine cavity. In this diffuse myoma several small discrete myomata are visible. A few of the cervical glands are dilated and lying in the cervical canal is a polyp. The uterine cavity is considerably lengthened. The mucosa of the anterior wall is of the usual thickness, but at numerous points it can be seen penetrating the diffuse myoma for a short distance. The posterior wall is relatively normal, but at *a* contains a submucous myoma. Attached to the uterus is the proximal end of the right tube. For the histological picture of the diffuse growth in the anterior wall, see two following figures.

750. PICTURE OF A DIFFUSE ADENOMYOMA OF THE
ANTERIOR UTERINE WALL.

This is a section through the anterior uterine wall in previous figure. Almost the entire wall consists of diffuse myomatous tissue, but at the points indicated by *a* three discrete nodules are visible, and between these and the mucosa is a fourth one. *b* represents the usual thickness of the mucosa, and it will be seen that it is normal. In many places, as indicated by *c*, the mucosa is seen extending into the myoma and there sending off numerous secondary branches. At *d* is an island of mucosa situated deep in the muscle, but showing at several points continuity with the mucosa lining the uterine cavity. Scattered throughout the inner half of the uterine walls are glands occurring in bunches or singly. They are invariably surrounded by dark zones which represent normal stroma of the mucosa. The glands can be traced as far outward as *e*. *f* represents a tear in the specimen. It is clear that the glands in this diffuse adenomyoma have originated from the uterine mucosa.

751 PICTURE OF THE MODE OF EXTENSION OF
UTERINE GLANDS INTO A DIFFUSE ADENOMYOMA.

The section is from the diffuse adenomyoma in the anterior wall of the same uterus. *a* is a portion of the normal uterine mucosa. The superficial layers have accidentally

been removed by mechanical injury. The mucosa can be traced by direct continuity to *a'*. It will be seen that the glands, apart from some dilatation, are perfectly normal, and that they are accompanied by the stroma of the mucosa. *b* is an island of stroma containing one uterine gland. This stroma can be traced upward nearly to the surface, downward as far as *c*. The irregularity in its course is undoubtedly due to the unequal pressure of the ever-growing diffuse myoma. *d* is an island of stroma devoid of glands; *e*, another point where the mucosa is penetrating the myoma.

752. PICTURE OF A DIFFUSE ADENOMYOMA OF THE
UTERUS WITH SEVERAL DISCRETE MYOMATA.

This is an antero-posterior section of the uterus and to one side of the median line, as we are only able to see portions of the uterine cavity *a* and *a'*. Situated in the anterior wall and fundus are six myomata, and in the posterior wall near the cervix there is a small interstitial nodule. Both uterine walls show a rather coarse arrangement of the muscle and the posterior wall is somewhat thickened. The uterine mucosa as seen at *a* is of the normal thickness and appears to be unaltered. For the histological picture see next figure.

753. PICTURE OF A DIFFUSE ADENOMYOMA OF THE
POSTERIOR UTERINE WALL.

The section is from the posterior wall in previous figure. *a* represents the uterine mucosa; owing to imperfect hardening the surface epithelium is wanting. The glands and stroma are, however, perfectly normal. The uterine walls are composed of myomatous muscle. At *a'* the mucosa is seen penetrating the muscle, and scattered throughout the deeper portions are cross-sections and longitudinal sections of glands. These are surrounded by stroma separating them from the muscle. At *b* the stroma around the gland seems to be sending off prolongations in all directions. The dark areas *c* and *c'* are also areas of stroma, but are devoid of glands.

754. PICTURE OF A DIFFUSE ADENOMYOMA OF THE
UTERUS INVOLVING THE ANTERIOR AND
POSTERIOR WALLS AND FUNDUS.

The uterus has been amputated through the cervix. Almost the entire body has been transformed into a diffuse myomatous growth represented by several large coarse bands of fibres with many smaller bands passing off from them and winding in every conceivable direction. The thickening is most marked in the anterior wall where the growth extends almost

to the peritoneal surface. There is, however, a thin muscular covering, as indicated by *c*. The lower margin of the growth in the anterior wall is indicated by *a*. In the posterior wall the growth extends downward to *b*. The entire growth, although well defined, is intimately blended with the normal muscle. The uterine cavity is of the normal length and, although there are a few inequalities in the surface of the mucosa, it is comparatively regular and of normal thickness. The next figure, from a section through the entire body of the uterus, illustrates the structure as seen with the low magnification. The finer details are shown in the two following figures. Clinically a bimanual examination of this uterus would show a moderately enlarged, globular, but smooth, firm fundus. No clue would be gained from introducing a sound into the uterine cavity.

755. PICTURE OF A DIFFUSE ADENOMYOMA OF THE ANTERIOR AND POSTERIOR UTERINE WALLS.

This is an antero-posterior section through the entire thickness of the uterus in previous figure. It is, however, taken nearer the side, hence only a small portion of the uterine cavity (*a*) is seen. At this level the anterior and posterior walls are practically of equal thickness. The myomatus transformation of the muscle is hardly recognizable with this power. At *b* the uterine mucosa is of the normal thickness, but at *c* can be seen penetrating the surrounding muscle. At *c'* it can be followed for quite a distance. The mucose penetrates *en masse*, carrying with it the normal stroma. Scattered throughout both walls, but more particularly the anterior, are bunches of mucosa. These are shown at *d* and at *d'*. We can trace the mucosa in its windings for a considerable distance. A goodly number of isolated glands or glands in small bunches are distributed throughout the walls. At *e* are several dilated glands with little or no intervening stroma separating them from the muscle. *f* is a discrete myomatous nodule. It is clearly evident that the glands in this diffuse myoma are due to down-growths from the mucosa. (For the finer structures of the adenomyoma see the two following figures.

756. PICTURE OF THE METHOD OF PENETRATION OF THE MUCOSA IN A DIFFUSE ADENOMYOMA OF THE UTERINE WALL.

The section is from the body of the same uterus. *a* represents the thickness of the uterine mucosa. The surface epithelium has been mechanically lost except over the small area indicated by *b*. The uterine glands are perfectly normal.

At three points, however, the mucosa can be seen extending into the underlying myomatous tissue. This is especially well marked at *c*, where a large mass of the normal mucosa is flowing into the growth. It can be traced to the lower margin of the section at *c'*. At *d* we have an island of mucosa which can be traced upwards to *d'*; in other words, almost to the mucosa. The island of muscosa (*e*) resembles in every particular that lining the uterine cavity. Here and there a gland shows some dilation.

757 PICTURE OF THE EXTENSION OF UTERINE GLANDS INTO THE DIFFUSE MYOMATOUS TISSUE OF AN ADENOMYOMA.

The section is from the body of the same uterus. *a* represents the limits of the mucosa; the surface epithelium is intact and normal. The mucosa is of the usual thickness and its glands are unaltered. The stroma between the glands is slightly rarefied in the superficial portions owing to a slight œdema. In the vicinity of *b* are a number of glands lying in the muscle. At *c* we have fortunately been able to trace a gland by continuity from the mucosa for a considerable distance into the diffuse myoma. It divides into two branches (*c'*), which extend further into the growth. Accompanying the gland *c* are *d* and *e*. These have been much convoluted, as only occasionally we catch a glimpse of them, at *d'* and *d''* and *e'* and *e''*. In following the glands *c*, *d*, and from above downward, one gathers the impression that all the cross-sections seen in the lower third of the field are cross-sections of the terminal portions of the three glands. Accompanying the glands and separating them from the diffuse myomatous growth is the stroma of the mucosa.

758. PICTURE OF INTERSTITIAL AND SUBPERITONEAL UTERINE MYOMATA. INTERSTITIAL ADENOMYOMA.

This is an antero-posterior section of the uterus. The figures *a*, *a*, *a*, *a*, indicate myomata, one in the anterior wall and three in the posterior. The anterior wall, not implicated by the myomata, is considerably thickened. The organ has been amputated through the cervix. The uterine cavity is of the normal length. The mucosa of the anterior wall is much thickened, but its surface is relatively smooth. Some of the glands are dilated, forming small cysts. The mucosa of the posterior wall is little altered, but it also shows some glandular dilatation. The area represented by *b* has been magnified and is shown in the next figure. It contains a small diffuse adenomyoma.

759. PICTURE OF A SMALL ADENOMYOMA IN THE FUNDUS OF THE UTERUS.

The section represents the area *b* seen in previous figure. *a* is the upper part of the uterine cavity; *b* is the thickened mucosa of the anterior wall. The glands on the whole are normal, except that there is dilation of some few of them. The line of demarcation between mucosa and muscle is irregular and not well defined. The glands show a tendency to invade the muscle. *c* represents the mucosa in the posterior wall. This is thin, and there is some gland dilatation, but the mucosa is sharply outlined from the muscle. At *d* there is a regular colony of glands deep down in the muscle. They bear a marked resemblance to the normal uterine glands. Some of them are surrounded by the characteristic stroma of the mucosa. Others lie in direct contact with the muscle. The surrounding tissue and the uterine walls generally are made up of a diffuse myomatous tissue. At *e* and *e'* are discrete myomata.

760. PICTURE OF A DIFFUSE ADENOMYOMA OF THE UTERUS.

The section is an antero-posterior one through the left side of the uterus. At this point nearly the entire uterine wall is composed of a diffuse myomatous growth. At points *a*, *a*, however, a small amount of normal uterine muscle remains. In other places the growth reaches the peritoneum. Scattered throughout the myoma are round, oval, irregular or slit-like cavities with smooth inner linings. They are most abundant and reach their greatest diameters just beneath the peritoneum. Here they have a lining resembling mucosa which in places reaches 1 mm. or more in thickness. The two cyst spaces, seen at *b*, are in reality merely two cross-sections of one convoluted cavity. At *c* one of the cyst-like spaces can be traced as a slit for a considerable distance into the growth. On histological examination the large cyst-like spaces proved to be miniature uterine cavities.

761. PICTURE OF A DIFFUSE ADENOMYOMA OF THE UTERINE WALL.

The section is from the body of the uterus. A glance at *a* shows that the mucosa is very thin and that some of the glands are dilated. At *b* is a small polypoid outgrowth consisting of normal mucosa. The uterine wall is transformed into the diffuse myomatous growth. At *c* the normal mucosa is seen extending for quite a distance into the diffuse myoma, and at points *d*, *d*, we have islands of the mucosa in the depth. At *e* there is considerable gland dilation. Distributed here and

there are isolated glands accompanied by their stroma, and at *f* is an island of stroma devoid of gland elements. The glandular elements of this diffuse adenomyoma have undoubtedly arisen from uterine glands.

762. PICTURE OF CYST-LIKE SPACES JUST BENEATH THE PERITONEUM IN DIFFUSE ADENOMYOMA OF THE UTERUS.

The section represents the area *b* in the penultimate figure. *a* is the thin outer covering of normal muscle; *a'* the peritoneum. *b* is one of the cyst-like spaces; it is lined with a definite mucosa. This mucosa has a surface epithelium and beneath it a mucous membrane containing many glands. The majority are small and round. Some of them, however, dilated and convoluted. For the finer structures see next figure, which is the area *c* much enlarged. The mucosa cannot be distinguished from the normal uterine mucosa and the entire cyst resembles a small uterine cavity. At *d* is an area of mucosa identical with that normally found lining the uterine cavity. *e*, *e'*, *e''*, *e'''* are evidently cross-sections of one cavity which is much convoluted. The mucosa in them resembles that lining the cavity *b*. The cyst space *b* and those represented by *e*, *e'*, *e''*, *e'''* are also evidently part of the same cavity as seen by the connecting link of the mucosa *f*.

763. PICTURE OF THE MUCOSA LINING ONE OF THE CYST-LIKE SPACES SITUATED JUST BENEATH THE PERITONEUM IN A DIFFUSE ADENOMYOMA OF THE UTERUS.

The section is the area *c* in previous figure much enlarged. *a* represents the mucosa; *b* the myomatous muscle. The surface of the mucosa is comparatively regular and is covered by a cylindrical epithelium. At two points glands are seen opening on the surface. The glands of the mucosa are round or oval on cross-section, and are lined with cylindrical epithelium. Surrounding the glands and separating them from the muscle is a definite stroma. In this the endothelial cells of the blood capillaries are moderately swollen. *c* is a gland showing some branching; *d* and *d* are the bases of glands so cut as to resemble solid nests. This mucous membrane resembles uterine mucosa in every particular, and given such a section, not knowing its source of origin, we should unhesitatingly say that it was normal mucosa from the uterine cavity.

764. PICTURE OF A DIFFUSE ADENOMYOMA OF THE
ANTERIOR UTERINE WALL.

The uterus has been cut open and is seen from the front. The drawing is from the specimen hardened in Müller's fluid. A small portion of the cervix is present. Projecting through the cervical opening is a globular nodule (*a*), whose pedicle springs from the uterine cavity just within the internal os. On histological examination this was found to be a myoma everywhere penetrated by glands. The anterior uterine wall is much thicker than usual. It is divisible into two portions, an inner coarsely striated and an outer but narrower zone which is the normal uterine muscle. This outer zone presents a parallel arrangement of its muscle bundles. On examining the fundus carefully, the coarse striation is seen to be confined to the anterior wall. The uterine mucosa, apart from slight undulation of the surface, is smooth. The small folds described as occurring near the internal os are obscured by the polyp. One of the most striking features is that there is practically no encroachment of the growth on the uterine cavity, the anterior wall showing little if any convexity. This is in marked contrast to what takes place in cases of submucous myomata. For the histological picture see the next three figures.

765. PICTURE OF A DIFFUSE ADENOMYOMA OF THE
ANTERIOR UTERINE WALL.

This is a cross-section from the thickened anterior uterine wall in the previous figure. *a* indicates the uterine mucosa, *b* the adenomyomatous zone and *c* the normal outer covering of uterine muscle. The surface of the mucosa presents a wavy outline. The surface epithelium is intact and the glands are for the most part normal in size. A few of them are dilated, one reaching a considerable size. On passing to the muscle large numbers of longitudinal glands are seen penetrating downward into the growth between the muscle bundles. These are surrounded by a tissue darker than the muscle—the typical stroma of the mucosa. The greater part of the specimen is composed of bundles of muscle fibres. Some of the bundles present a circular arrangement, others are oblong and some wind in and out in all directions. These large bundles are again subdivided into smaller ones. Scattered everywhere through the thickened zone are dark areas. Some of these are triangular; some are semicircular, while others are irregular in shape. On examining these areas closely, the majority are found to contain longitudinal or cross-sections of glands. Some of these glands are dilated

and irregular in contour. A longitudinal section of a gland with a dilatation on one side is seen near the junction of the myomatous zone with the uterine muscle. The large clear spaces scattered throughout the myomatous zone are dilated glands. Here and there a dark patch is seen in which no glands are present. Islands of stroma devoid of glands also occur. The glandular elements diminish in number in the outer portions of the growth and at the point where the uterine muscle commences they are absent. The outer zone consisting of uterine muscle presents the appearance of normal muscle.

766. PICTURE OF THE CROSS-SECTION OF A GLAND TAKEN FROM PREVIOUS FIGURE AT D.

The gland is lined with one layer of cylindrical epithelium and is surrounded by cells having oval vesicular nuclei. Its appearance is identical with that of the normal uterine gland. Surrounding the stroma of the gland are non-striped muscle fibres, the majority of which are cut longitudinally.

767. PICTURE OF A BRANCHING GLAND FROM A GLANDULAR AREA IN AN ADENOMYOMA.

The section is taken from the diffuse growth in the anterior wall of the same uterus. *a* appears to be the main trunk of the gland. Upward we have three branches *b*, *b'*, *b''*, downward it can be traced to *d* and to the right as far as *c*. The gland with its various branches appears to be lined with numerous layers of cells. This is due to the thickness of the section. It is in reality lined with a single layer. There is nothing in the least suggestive of malignancy. At points *e* are sections of other glands. The gland *f* is cut on the bevel at *f'*. The stroma surrounding the glands is exceptionally dense owing to the unusual number of stroma cells.

768. PICTURE OF A DIFFUSE ADENOMYOMA OF THE BODY OF THE UTERUS.

The uterus has been amputated through the cervix. Occupying nearly the entire body of the organ is a diffuse myomatous growth. In the upper part all trace of the normal muscle has disappeared except at *b*. Downward the growth can be traced to *a* and *a'*. The myomatous portion is composed of coarse bands of tissue passing in all directions and often forming definite whorls with small round or irregular cavities in their centres. Some of these cavities are cross-sections of blood-vessels; others are small cysts. The portion of the uterine cavity seen presents the normal appearance and the mucosa shows no change. For the histological picture see the two following figures.

769. PICTURE OF THE EXTENSION OF THE MUCOSA INTO THE MUSCLE IN A CASE OF DIFFUSE ADENOMYOMA OF THE UTERUS.

The section is from the body of the uterus in the preceding figure. *a* represents the thickness of the mucosa which is smooth save for the projection *b*. The uterine glands are normal in appearance and the stroma is dense, resembling that normally found after the menopause. The mucous membrane is extending *en masse* into the myomatous tissue and can be followed as far as *c*. *d* is a small tuft of myomatous muscle almost completely encircled by mucosa. *e* is an isolated gland in the muscle and partially surrounded by the characteristic stroma. *f* is a vein.

770. PICTURE OF THE METHOD OF PENETRATION OF A SINGLE UTERINE GLAND INTO THE DIFFUSE MYOMATOUS GROWTH OF AN ADENOMYOMA.

The section is from the body of the same uterus; in the upper part of the field is the uterine mucosa, the lower limits of which are represented by *a*. The glands present the normal appearance, but the stroma around some of them is pale-staining, while that in the vicinity is denser than usual. There is, however, no evidence of inflammation. At *b* are cross-sections of two small glands. The origin of such glands is indicated by *c*, where we have a longitudinal section of one commencing in the mucosa and penetrating the myomatous muscle. It is lost for a space, but again recognised at *c'*. Near the mucosa it seems devoid of stroma, but in the deeper portions it is partially surrounded by stroma. *d* is a vein.

771. PICTURE OF A DIFFUSE ADENOMYOMA OF THE BODY OF THE UTERUS.

The section embraces the upper part of the uterine cavity. *a* and *b* indicate the relatively normal thickness of the mucosa. The ragged inner surface is due to a recent curettage. The mucosa is everywhere much thickened and is extending into the underlying myomatous muscle. This down-growth is strikingly well seen at *c*, and is also extensive at *d*, *e*, and *f*. At *g* there is marked thickening of the mucosa as well as an invasion of the muscle. At no point do the glands appear abnormal.

772. PICTURE OF DISCRETE UTERINE MYOMATA. DIFFUSE ADENOMYOMA WITH THE GLANDS ORIGINATING FROM THE MUCOSA. ADENOMYOMA OF THE LEFT UTERINE HORN.

Scattered throughout the uterus are one medium-sized and

several small myomata. Near the uterine horn is a distinct prominence which on section is seen even on macroscopic examination to be a diffuse adenomyoma. Histological examination of the uterus shows diffuse adenomyoma with the glands originating from the mucosa. For a longitudinal section of the uterus between points *a* and *b* see next figure.

773. PICTURE OF LONGITUDINAL SECTION OF DISCRETE MYOMATA; DISCRETE ADENOMYOMA NEAR THE LEFT UTERINE HORN.

This figure is a longitudinal of the previous figure from point *a* to *b*. In the anterior wall are sections of two discrete myomata. The posterior wall shows slight thickening. The discrete adenomyoma, although clearly defined, nevertheless is intimately associated with the surrounding muscle *a*, and could not be shelled out as could the other two myomata. It contains cystic spaces as indicated by *b*. The larger space has a definite smooth lining and was filled with yellowish putty-like material,—old and inspissated menstrual blood.

774. PICTURE OF SUBPERITONEAL, INTERSTITIAL AND SUBMUCOUS UTERINE MYOMATA; DIFFUSE ADENOMYOMA OF THE ENTIRE FUNDUS.

The uterine cavity has been cut in two. In the right half several polypi are seen. Scattered throughout the uterine walls are subperitoneal and interstitial myomata, and at the cervix a fairly large submucous nodule. The uterine muscle in the body shows a very coarse diffuse myomatous appearance which instantly suggests adenomyoma. The pathological report shows that the uterine glands penetrate this diffuse myomatous tissue.

775. PICTURE OF A DISCRETE MYOMA OF THE CERVIX; DIFFUSE ADENOMYOMA OF THE BODY OF THE UTERUS.

a represents a small portion of the uterine cavity. Situated at the cervix is a discrete myoma. The uterine walls are greatly thickened as a result of a diffuse myomatous change. Scattered throughout this coarse tissue were large and small yellowish, porous areas at once recognised as islands of uterine mucosa. On histological examination the uterine mucosa was seen literally pouring into the diffuse myomatous muscle. Covering the outer surface is a mantle of normal muscle of varying thickness.

776. PICTURE OF A DIFFUSE ADENOMYOMA OF THE
BODY OF THE UTERUS.

A longitudinal section through the entire uterus. Surrounding the uterine cavity, which looks normal, is a broad zone of diffuse myomatous tissue, much thicker in the anterior than in the posterior wall. Covering this is a mantle of normal muscle, *a*, but at the fundus the coarse myomatous tissue almost reaches the peritoneum. Sections show that the uterine mucosa extends into the depth and that many islands of mucous membrane are scattered throughout the myomatous tissue.

777. PICTURE OF A DIFFUSE ADENOMYOMA OF THE
FUNDUS WITH CYSTIC SPACES IN THE LEFT
UTERINE HORN.

The entire fundus is converted into a diffuse myomatous tissue and with the low power the uterine mucosa can be seen penetrating the myoma in all directions. The cystic space *a*, in the left uterine horn is due to gland dilatation, it being lined with cylindrical ciliated epithelium. The space *b* is filled with blood. On the right side is a tubo-ovarian cyst. The inner pole of the right ovary is normal.


778. PICTURE OF A CYSTIC SUBPERITONEAL ADENO-
MYOMA OF THE UTERUS.

The drawing represents one-half of the tumor, which was attached to the enlarged fundus by the very short broad-based pedicle situated in the vicinity of *d*. The tumor is roughly divided into a semi-solid and a cystic portion. The cyst is irregular in outline and, as seen in the next figure at *a* it connects with little bays extending off into the solid portion. In some places the cyst wall is very thin, as at *a*. The ragged appearance in the interior of the cyst and the smooth homogeneous substance just within the cyst wall are due to coagulated cyst contents. The inner surface of the cyst is in reality smooth and velvety. The solid portion of the tumor is composed of a diffuse myoma. Scattered throughout it are large and small cyst-like spaces. *b* is such a cavity. It is, however, irregular in form and branches out considerably. It has a smooth inner lining. In the space *c* the coagulated contents still remain. There are also numerous smaller spaces scattered throughout the myomatous tissue. These spaces, on careful study, do not convey the idea of cysts, but it seems as though the muscle were being tunnelled in various directions by spaces of variable size. For the very low magnification see the next figure.

779. PICTURE OF A CYSTIC SUBPERITONEAL ADENOMYOMA OF THE UTERUS.

The section is through the same tumor as previous figure but at another level. *A* is the same large cyst cavity. It has a small bay (*a*) extending off to the left. It is lined with a single layer of epithelium, which from the text is seen to be cylindrical. Just beneath the epithelial lining at *b* is a small gland; *c* represents the coagulated cyst contents. *B* and *C* are irregular cyst-like spaces lined with one layer of epithelium. In the neighborhood of *d* are numerous small glands, also lined with cylindrical epithelium. Some of the glands, notably at *e*, are surrounded by a definite circular zone of myomatous muscle. The deeply staining areas, as seen at *e'*, are the myomatous muscle bundles. The intervening pale framework is a somewhat rarefied connective tissue. We would not be much surprised if at one time all the large cyst cavities communicated with one another.

780. PICTURE OF A SUBPERITONEAL CYSTIC ADENOMYOMA OCCURRING IN THE CASE OF A LARGE MYOMATOUS UTERUS.

 The uterus is much enlarged, owing to the presence of myomatous tumours. Projecting through the cervix is a small portion of a submucous myoma and situated anteriorly and to the left are the large myomata *a* and *b*, only dimly outlined. The right tube, although lengthened, is little altered. It is attached to the ovary by a few bands. Scattered over the posterior surface of the uterus are several sessile nodules and one of moderate size with several cysts springing from its surface. *c* is a single cyst and at *d* a group of seven are seen. All are thin-walled and semi-translucent. They are not sub-peritoneal cysts, their walls being composed of myomatous tissue, and furthermore they are lined with a single layer of cylindrical epithelium. For the histological picture see the next figure, which is taken from the area *d*.

781. PICTURE OF A CYSTIC SUBPERITONEAL ADENOMYOMA OF THE UTERUS.

The section is from point *d*, in previous figure. *a* is the solid myomatous portion of the tumour; *b* is the thin myomatous layer forming the outer walls of the cysts *c* and *d*. The outer peritoneal covering is represented by *b'*. The cyst spaces, *c* and *d*, have convoluted inner surfaces and at many points (*e*) there are gland-like depressions. The cysts and also the depressions are lined with a single layer of cylindrical

ciliated epithelium. Situated in the myomatous tissue at *f* and *f* are two gland-like spaces which bear a most striking resemblance to hypertrophic uterine glands. *g* is the edge of a neighbouring cyst.

782 PICTURE OF SUBPERITONEAL AND INTERSTITIAL UTERINE MYOMATA. ADENOMYOMA OF THE BODY OF THE UTERUS. ADENOMYOMA SPRINGING FROM THE LEFT UTERO-OVARIAN LIGAMENT.

The uterus is the seat of subperitoneal and interstitial myomata. Near the cervix on the anterior surface is a small cyst. The left tube is normal. The left ovary contains a small corpus-luteum cyst, *b*. Projecting from the left utero-ovarian ligament is a subperitoneal myoma, *a*. This has a few cysts projecting from its surface as indicated. On section this nodule was found to contain cysts, 1 cm. or more in diameter, lined with mucosa and filled with chocolate-coloured blood, miniature uterine cavities, also whitish yellow areas, and normal uterine mucosa. (See next figure.)

It may be of interest to know that the uterine mucosa extended into the myomatous uterine walls.

783. PICTURE OF CROSS-SECTION THROUGH A PEDUNCULATED SUBPERITONEAL ADENOMYOMA.

The picture represents a cross-section through the subperitoneal adenomyoma *a* in the preceding figure. Scattered throughout the tissue are isolated cystic and dilated glands (*a*). Near the centre are two large areas of typical uterine mucosa; one of these contains a miniature uterine cavity as indicated at *b*. The darker tissue as seen at *c* indicates the myomatous muscle. This stands out in sharp contrast to the paler staining stroma as indicated at *d*.

784. PICTURE OF AN INTRALIGAMENTARY AND ALSO PARTLY SUBMUCOUS CYSTIC ADENOMYOMA OF THE UTERUS.

The uterus, which is much enlarged, has been opened anteriorly. The vaginal portion of the cervix is considerably thickened. The external os is dilated and the cervical mucosa is more shaggy than usual. The anterior uterine wall is considerably thickened. Occupying the right broad ligament is a globular tumor *A*. This has extended through the right uterine wall, projects into and completely fills the uterine cavity. The submucous portion projects from the posterior and right

uterine wall. It is smooth and glistening but lobulated, owing to the presence of cysts varying from 1 mm. to 1.5 or more cm. in diameter, which project slightly from the surface. Over some of these the blood-vessels are slightly dilated. At one point the submucous myoma has been cut for a distance of 2 cm. and we see the smooth inner surfaces of three cysts. The appendages on the right side are normal, those on the left are also normal, except for a band of adhesion between the outer end of the tube and the ovary. The next figure represents a transverse section through the uterus on a level with the line *b* and *b'*. The histological picture is shown in the following one.

785. PICTURE OF A CYSTIC INTRALIGAMENTARY AND PARTLY SUBMUCOUS ADENOMYOMA OF THE UTERUS.

The drawing illustrates a section through the previous figure between *b* and *b'*. *a* is a cross-section of the left tube. *b* is a small portion of the uterine cavity. *c* is the submucous portion of the cystic adenomyoma and *d* its intraligamentary pole. *e* is one of the irregular cyst-like spaces with a smooth velvety inner lining resembling mucosa. Just above it is a similar but smaller one. The other spaces, as indicated by *f*, also irregular in outline, are filled with glistening coagulated contents which have not been removed. The coagulation, of course, was due to the hardening fluid. *g* is the characteristic myomatous tissue. The outline of the myomatous growth is well defined, but notwithstanding this fact the tumor merges gradually into the normal muscle.

786. PICTURE OF THE SUBMUCOUS PORTION OF A CYSTIC ADENOMYOMA OF THE UTERUS.

The section is from the submucous myoma seen in the two preceding figures. *a* represents the uterine mucosa, which has an intact surface epithelium and perfectly normal uterine glands. The stroma of the mucosa is rarified but normal. *A* is one of the cyst-like spaces. At some points it is lined with a layer of cylindrical epithelium lying directly on the muscle. At other points this is separated from it by a small amount of stroma similar to that of the uterine mucosa. While in some places, as at *b*, there are definite uterine glands beneath the epithelial lining, at *c* we have a uterine mucosa equally as thick as that covering the surface of the submucous myoma and consisting of a typical gland hypertrophy. *B*, *C*, *D* and *E* are other cyst-like spaces lined with cylindrical epithelium. *A* and *B* are evidently one and the same cavity, communicating as they do with one another by the bar *d* consisting of the characteristic stroma of the mucosa and containing two small glands.

787. PICTURE OF A SUBMUCOUS ADENOMYOMA OF THE UTERUS.

Nearly all trace of the mucosa formerly covering the growth has disappeared. Nevertheless some of the stroma remains and is recognized at *a*. In some places are a few isolated uterine glands (*b*). The growth is composed chiefly of myomatous muscle and at points *c c* are the characteristic islands of uterine mucosa, consisting of glands enveloped in the usual amount of stroma. Scattered here and there throughout the growth are isolated glands, some surrounded by, others devoid of, stroma. *d* is a dilated gland.

789. PICTURE OF A SUBMUCOUS ADENOMYOMA OF THE UTERUS, THE MYOMATOUS MUSCLE BEING RIDDLED WITH MINIATURE UTERINE CAVITIES.

This is a longitudinal section of the mutilated submucous myoma which was associated with a double vagina and a double cervix. The greater part of the tissue consists of myomatous tissue, diffuse in character. On the left is a partial covering of normal uterine muscle (*a*). Scattered everywhere throughout the myomatous tissue are collapsed and dilated miniature uterine cavities. *b, b*, are collapsed cavities, lined with a definite mucosa. *c* is a slightly dilated cavity likewise lined with mucosa, while *d* represents a miniature uterine cavity distended with blood. These cavities on histological examination are found, as their names would imply, to be lined with typical uterine mucosa.

790. PICTURE OF AN INTERSTITIAL UTERINE MYOMATA WITH A SMALL DIFFUSE ADENOMYOMA IN THE CERVIX.

The uterus has been amputated through the cervix and opened anteriorly. Situated in the anterior wall is a myoma. This has not been cut through the centre, and consequently one portion is larger than the other. Near the uterine cavity is a myoma about 1 cm. in diameter. This has been cut in two. The uterine walls, were it not for the myomata, would be of normal thickness. The uterine cavity is of the normal length and its mucosa unaltered. On the right side of the cervix at a point approximately corresponding to *a* was a small diffuse adenomyomatous thickening, part of which is represented in the next figure.

791. PICTURE OF AN ADENOMYOMA IN THE OUTER PORTION OF THE CERVIX NEAR THE BROAD LIGAMENT ATTACHMENT.

The section is through the right side of the cervix in previous figure at a point approximately indicated by *a*. *a* is the

normal cervical mucosa. The surface epithelium is intact and the characteristic racemose glands are seen. Beneath them is the normal stroma. At *b* is an island of mucosa situated in myomatous muscle. The glands in this island resemble uterine glands. Some of them are dilated. At *c* and *c* they spread out in "goose march" fashion—that is, in single file. All of these glands are surrounded by the characteristic stroma. At *d* are seen isolated glands lying in direct contact with the muscle.

792. PICTURE OF A CYSTIC MYOMA MACROSCOPICALLY
SIMULATING A CYSTIC ADENOMYOMA.

The picture represents a cross-section through the tumour as seen in the upper left corner, the section being made from *a* to *a'*. A small portion of the uterine cavity is seen. On one side of it are cross-sections of two simple myomata. At *b* we have a cystic myoma with a slightly irregular cavity that was filled with chocolate-colored blood. We felt confident that a histological examination would reveal a cystic adenomyoma. The walls of the cavity were, however, composed of myomatous tissue that had undergone partial hyaline degeneration and the cavity was totally devoid of any epithelial lining. There had evidently been simple cystic formation as a result of the breaking down of hyaline tissue. Hemorrhage had taken place later. This is the only one of our cases in which a tumour presented such a gross appearance and did not yield adenomyoma on histological examination.

793. PICTURE OF A SMALL UTERINE POLYP.

This section is from the fundus of the uterus. The mucosa lining the uterine cavity is rather thin, and has a smooth surface covered with one layer of epithelium. Scattered throughout the mucosa are a small number of normal uterine glands. Projecting from it is a tongue-shaped polyp (*a*), which points downward. Its surface is covered with one layer of epithelium, continuous with that covering the surface of the mucosa. Its substance contains glands differing from those in the mucosa only in that a few of them are dilated. The stroma of the polyp merges imperceptibly into that of the normal mucosa and is of the same character. It is evident that this is in reality the result of a partial extrusion of the normal mucosa.

794. PICTURE OF LARGE VENOUS SINUSES IN THE
UTERINE MUCOSA CAUSING SEVERE HEM-
ORRHAGES.

a is a portion of the surface epithelium, which is greatly

flattened. In the lower part, as well as in the upper third of the field, are several uterine glands of the usual size and shape, and lined with one layer of cylindrical epithelium. They are perfectly normal, and are surrounded by the normal stroma of the mucosa. Over one half of the section is made up of three large venous sinuses (*b*), showing exceedingly delicate walls. That there is no malignant process is clear. It is little to be wondered at that free hemorrhages should have taken place, when such large blood sinuses existed.

795. PICTURE OF THICKENING OF THE UTERINE MUCOSA. MARKED DILATATION OF SOME OF THE GLANDS WITHOUT ANY ATROPHY OF THEIR EPITHELIUM; VERY DENSE STROMA.

The section is a portion of a scraping. The surface epithelium is intact as seen at *a* and *a*. At *b* are two normal uterine glands. Fully half of the glands are more or less dilated. At *c* is an irregular and dilated gland filled with coagulated serum. *d* and *e* are also dilated but not spherical glands. The gland *f* is markedly dilated and spherical. In none of the dilated glands is there any atrophy of the epithelium. The stroma between the glands is very dense. In some of these cases large veins are found scattered throughout the stroma. Given such a mucosa as this, one can say with almost absolute certainty that the patient has had very profuse menstrual bleeding.

796. PICTURE OF A PORTION OF A DIFFUSE ADENOMYOMA OF THE POSTERIOR WALL OF THE UTERUS.

At operation the posterior uterine wall was found much thickened. A wedge was removed and the cut surfaces were brought together as in an ordinary myomectomy. *a* is the peritoneal surface; just beneath it is a narrow zone of normal muscle. The growth presents the typical appearance of a diffuse myoma. Along the outer margin it gradually merges into the normal muscle. *b* corresponds to the point nearest the uterine cavity. The uterine cavity was not opened. Scattered throughout the myoma are small round oval or oblong spaces. Some are dilated glands, others cross-sections of small blood vessels. For the histological findings see next figure. At the time the operation was performed we were unfamiliar with these adenomyomatous growths.

797. PICTURE OF A DIFFUSE ADENOMYOMA.

The section is taken from previous figure. The growth under the higher power was recognised as a diffuse myoma. At *a*

and *a'* we find groups of glands resembling uterine glands both in form and in their even distribution. They are embedded in a definite stroma which separates them from the muscle. Some of the glands in the islands of mucosa show slight branching. At *c* the glands are arranged in "goose march" fashion. They are in all probability sections of one and the same gland which has been much convoluted. At *d* one of the glands is moderately dilated. *e* shows a more marked dilatation, and here so much tension has taken place that little of the surrounding stroma remains. *f* corresponds very well to a miniature uterine cavity. On the one side it has become flattened out so that there is merely a layer of epithelial cells and a faint amount of stroma. On the opposite side is a well developed mucosa. Isolated glands are scattered throughout the growth. Without exception they are surrounded by the characteristic stroma and nearly all closely resemble uterine glands. The cystic dilatation is to be expected where the glands are subjected to the myomatous pressure.

798. PICTURE OF A VERY EXTENSIVE HYPERTROPHY OF THE CERVIX. DISCRETE MYOMA AND DIFFUSE ADENOMYOMA OF THE BODY OF THE UTERUS.

We have purposely had the specimen drawn the natural size so that an accurate idea of the great and almost uniform increase in size of this organ is obtained. The cervix shows a very extensive hypertrophy, but is everywhere intact. A few of the cervical glands are dilated. At the fundus the subperitoneal myoma is seen. The uterine walls show considerable diffuse myomatous thickening, and scattered throughout them are seen islands of typical uterine mucosa. The continuity between them and the parent mucosa has in places been traced.

799. PICTURE OF AN ADENOMYOMA IN ONE HORN OF BICORNATE UTERUS.

The left horn, which was removed, is sketched, but the right horn is merely outlined. In this case there was no trace of any connection between either uterine horn and the vagina.

800. PICTURE OF A DIFFUSE ADENOMYOMA OF THE BODY OF THE UTERUS.

The section is from the upper part of the uterus. *a* indicates the uterine cavity and *b* and *b'* the normal thickness of the mucosa. The surface epithelium is intact and the glands are of the normal appearance, but the mucosa is everywhere

flowing into the underlying myomatous muscle, as is particularly well seen at *c*, *d*, and *e*. Sections at another level would show that the apparently isolated islands *f* and *g* are also continuous with the mucosa lining the uterine cavity.

801. PICTURE OF A SQUAMOUS-CELL CARCINOMA OF THE CERVIX; DISCRETE SUBPERITONEAL AND INTERSTITIAL MYOMATA; DIFFUSE ADENOMYOMA OF THE POSTERIOR UTERINE WALL.

The lower picture represents the cervix with a small cuff of vaginal mucosa surrounding it. The cervix presents a roughened and slightly nodular appearance due to the carcinoma. From the upper picture we see that the growth has invaded the cervix to a considerable extent. Situated in the fundus are two discrete myomata. The posterior wall shows diffuse myomatous thickening and at several points, indicated by *a*, discrete myomatous tissue. Histological examination shows islands of mucosa scattered abundantly throughout the diffuse myoma.

802. PICTURE OF COMMENCING DIFFUSE ADENOMYOMA OF THE BODY OF THE UTERUS ASSOCIATED WITH ADVANCED SQUAMOUS-CELL CARCINOMA OF THE CERVIX.

A, The lower part of the cervix and surrounding portions of the vaginal vault are replaced by a new growth having a shaggy surface due to myriads of finger-like outgrowths. Laterally this growth extends practically to the broad ligament attachment; upward its confines are indicated by the letters *a*, *a*. The upper part of the cervix and body seem little altered. At *b* is a small polyp. The mucosa in the upper part of the cervix and in the body is very thin but smooth. *B*, a longitudinal section of *A*. The extent of the growth in the posterior wall is clearly outlined at *a*. The cystic cervical polyp is seen at *c*. The posterior wall is made up of two distinct portions, an outer consisting of normal muscle and an inner presenting a diffuse myomatous appearance. This coarse tissue extends directly to the mucosa. At *d* is a small discrete myomatous nodule. From the text it will be noted that the uterine walls show a commencing myomatous transformation and that the glands in many places penetrate the muscle for a distance of 9 mm.

803. PICTURE OF AN ADENOCARCINOMA OF THE BODY OF THE UTERUS ASSOCIATED WITH A SMALL SUBPERITONEAL ADENOMYOMA.

The uterus is of normal size. The left half appears in the

figure. Attached to the posterior surface near the fundus is a small subperitoneal myoma, which on histological examination is found to contain mucosa resembling that of the uterus. In the middle of the anterior wall is a small interstitial myoma; the cervix is intact. The mucosa in the lower part of the cervical canal is normal, but that of the body is replaced by a new growth. The inner surface presents an eaten-out appearance due to the finger-like growths. The growth itself is light in color and appears to be friable. It does not seem to penetrate the uterine walls very far, but as the subsequent history showed the case was one of the most malignant we have encountered. It is rather interesting to find a myoma, an adenomyoma and an adenocarcinoma of the body of the uterus in the same patient.

804. PICTURE OF ADENOCARCINOMA DEVELOPING FROM A DILATED GLAND IN AN ADENOMYOMA OF THE UTERUS.

Occupying the centre of the field is a large cystic space lined with one layer of cylindrical epithelium (*a*) and separated from the surrounding myomatous muscle (*c*) by a faint zone of characteristic stroma (*b*). In the upper part of the field numerous glands are seen opening into the large cavity. These glands are also lined with cylindrical epithelium. Projecting into the cavity are the four large folds, *d*, *d'*, *d''* and *d'''*. These new folds have a stroma very rich in small round cells and are surrounded by many layers of epithelial cells. At points *e*, *e'*, *e''* the gland epithelium is seen to become swollen and greatly thickened and this thickened epithelium is directly continuous with that covering the folds. As is clearly evident, the growth is an adenocarcinoma. In this case the carcinoma was seen developing from other similar areas as well as from the mucosa lining the uterine cavity.

805. PICTURE OF A MYOMA, ADENOMYOMA AND PRIMARY ADENOCARCINOMA OF THE BODY OF THE UTERUS; PYOSALPINX AND PRIMARY ADENOCARCINOMA OF THE OVARY.

Specimen sent by Dr. Joseph Price, of Philadelphia. Occupying the body of the uterus is an adenocarcinoma. Isolated carcinomatous nodules are scattered throughout the muscular walls and at one point have nearly reached the peritoneal surface. On one side is a discrete myoma. On the other near the uterine horn a diffuse adenomyoma, which on histological examination presented the typical appearance.

The tube is thickened in its outer portion and was filled with pus. The ovary has been converted into a porous growth, partly cystic and divided off into smaller areas by trabeculae. This carcinomatous growth was of a totally different pattern from that occupying the uterus.

806. PICTURE OF AN ADENOMYOMA OF THE UTERINE HORN.

a is a cross-section of the Fallopian tube; *b* the outer or peritoneal surface; *c* the tissue near the broad ligament. Scattered everywhere throughout the tissue, which under a higher power was seen to be myomatous, are round, oval or irregular, elongated glands, occurring singly or in bunches. These were lined with cuboidal or cylindrical epithelium which in most places rested directly on the muscle. This appears to be an adenomyoma originating from the tubal portion of the uterine horn.

807. PICTURE OF ADENOMYOMATA OF BOTH UTERINE HORNS; DISCRETE MYOMATA; - DIFFUSE ADENOMYOMA OF THE UTERUS.

Occupying the uterus are several myomatous nodules. The left tube is the seat of a hydrosalpinx; it is firmly fixed to the ovary and to the surface of the uterus. At the left uterine horn is a definite thickening. This area appeared cystic and on making an incision from *a* to *a'* the picture in *B* was found. The cyst spaces were irregular in form and varied from 1 to 5 mm. in diameter. A similar and smaller cystic tumour was present at the right uterine horn, as indicated by *c*. This on examination presented the same picture as did that of the left. On histological examination the thickenings in both horns were found to be due to the presence of adenomyoma. The glands were of the uterine type and in many places were surrounded by the characteristic stroma of the mucosa. Near *c* was a typical miniature uterine cavity. The uterine walls were the seat of a diffuse adenomyoma.

808. PICTURE OF LEFT TUBAL PREGNANCY; DISCRETE UTERINE MYOMATA; ADENOMYOMA OF THE RIGHT UTERINE HORN WITH DECIDUAL FORMATION IN THE STROMA SURROUNDING THE GLANDS.

The uterus is occupied by several small subperitoneal and interstitial myomata. The left tube contains an unruptured pregnancy (*a*). The surface of the tube is covered with

markedly dilated blood-vessels. In the right uterine horn are two small nodular thickenings which encroach upon the tube. Histological examination showed that they were adenomyomata. The stroma around many of the glands had been converted into typical decidua.

809. PICTURE OF AN ADENOMYOMA OF THE ROUND
LIGAMENT.

The figure represents a longitudinal section of the tissue removed. The greater part consists of fat and the surface is covered with skin. Occupying the lower part is an oval area, dark in color and composed of fibres running in all directions—the myoma. Passing off from it are numerous strands which merge into the adipose tissue. The small dark areas in the myoma represent dilated gland cavities. The large and small dark masses in the adipose tissue are hemorrhages. For the histological picture of the adenomyoma see next figure.

810. PICTURE OF AN ADENOMYOMA OF THE ROUND
ROUND LIGAMENT.

The section is taken from the oval nodule in preceding figure. The framework consists of non-striped muscle fibres cut chiefly longitudinally. Scattered throughout the muscle are glands which occur singly or in groups. They are round oval or irregular and show some branching. All are lined with one layer of cylindrical epithelium and even the smaller ones are surrounded by a definite stroma which with the high power is seen to be identical with that of the uterine mucosa. In the right lower corner is adipose tissue. A few stray fat cells are found in the myoma. In the left upper corner is a so-called pseudo-glomerulus

811. DYSMENORRHOEAL MEMBRANE.

A uterus and its appendages injected and showing the presence of a dysmenorrhœal membrane.

Lent by the Middlesex Hospital.

812. DYSMENORRHOEAL MEMBRANE.

Two pieces of soft flocculent tissue expelled from the uterus of a woman at two successive menstrual periods. One side of each piece is covered with shaggy membrane, the opposite side presents numerous minute depressions.

From a married woman, æt. 43. For eighteen months she had suffered from severe pain during the menstrual period which recurred with perfect regularity. At each period fragments similar to those here preserved were expelled. The patient had not been pregnant for several years. (Presented by Sir F. H. Champneys, Bart.)

Lent by the Royal College of Surgeons.

PREGNANT UTERI (COMPLICATED).

813. HYSTERECTOMY FOR UTERINE FIBROID DISEASE IN EARLY PREGNANCY.

A pregnant uterus of about the third month which was successfully excised on account of the complication arising from the growth of fibro-myomatous tumours in its wall. The largest fibroid projects from the left side and measures 5 inches in diameter.

From a woman, æt. 33. Married four months. Amenorrhœa three months. Abdominal hysterectomy. Complete recovery. (Presented by Alban Doran, Esq., 1903.) LANCET, Vol. II., 1902, p. 1453.

Lent by the Royal College of Surgeons.

814. PREGNANCY IN A UTERUS WITH FIBROIDS. Panhysterectomy during labour in the seventh month.

The pregnant uterus of a woman, which was removed after labour had commenced, on account of the obstruction occasioned by the growth of a large fibro-myoma about 4½ inches in diameter growing from the cervix. The tumour in question almost completely occupied the cavity of the true pelvis. The left arm of the fœtus presented through the cervix; the head was locked above the growth.

Patient æt. 33. Eight months' amenorrhœa. The pelvic tumour completely obstructed the passage and the fœtus was found to be dead. Hysterectomy. Complete recovery. Trans. Obstet. Soc. Vol. XLVI. p. 138. (Presented by J. Bland Sutton, Esq., 1905.)

Lent by the Royal College of Surgeons.

815. UTERINE FIBROID WITH PREGNANCY.

A large pregnant uterus removed by operation after the removal of a living child by Cæsarian section.

J. M., æt. 33. Patient first seen in the second month of pregnancy, it was considered unlikely that a living child could be born, as the fibroid on the right side was in the pelvic cavity. During the latter months the fibroid was lifted quite out of the pelvis, and within a fortnight of full term, the pelvis being empty and the child in the first vertex position, attempts were made to induce labour, which completely failed. Abdominal section was then done, child extracted (healthy, living), and the whole uterus with right ovary removed.

Lent by Dr. David Forsyth.

816. A PREGNANT UTERUS.

This specimen was successfully removed on account of the complication due to the growth of fibro-myomatous tumours. From a patient in whom parturition had five years previously been complicated by the presence of tumours, the parturition being premature. The patient having again become pregnant applied for advice. When examined a tumour was found to occupy the true pelvis, and a larger one the false pelvis on the left side. The uterus had been gravid for about two months. Hysterectomy was successfully performed, one ovary being left. (Presented by J. Bland-Sutton, Esq., 1901.

Lent by the Royal College of Surgeons.

FIBROID UTERUS AND PREGNANCY.

817. A pregnant uterus in which delivery [was obstructed by the presence of a large subserous fibroid in the pelvis. The uterus contains many fibromyomata, one large pedunculated fibroid is attached to the posterior wall. The placenta is in situ. The os is partially dilated.

Operation.—Cæsarean section at full term and hysterectomy. Living child. Good recovery.

Lent by The New Hospital for Women.

818. A uterus showing pregnancy of about three months' duration, removed on account of the complication arising from the growth of fibro-myomatous tumours. There is a large fibromyoma growing from the cervix which occupied the true pelvis.

819. SUBMUCOUS MYOMA OF UTERUS.

With portion of adherent placenta on its surface

Lent by University College Hospital.

820. MYOMA COMPLICATING PREGNANCY.

Constant pain; no red degeneration of myomata; thickened and degenerated muscle. Panhysterectomy.

821. MYOMA COMPLICATING PREGNANCY.

Old tubal gestation 15 months before Cæsarean section and panhysterectomy.

822. UTERUS.

Removed by total hysterectomy after Cæsarian section for retroflexion due to subperitoneal myoma.

823. DEGENERATED MYOMA.

17 lb. in weight, enucleated from broad ligament a few hours before delivery.

824. SUPPURATION OF DEGENERATED MYOMA OF UTERUS.
Uterus and tumour removed after delivery.

825. MYOMATA OF LOWER SEGMENT AND BODY.
Cæsarean section. Breach presentation.

UTERUS CONTAINING A FIBROMYOMA, UNDERGOING NECROBIOTIC DEGENERATION.

826. A PREGNANT UTERUS COMPLICATED WITH FIBROIDS.
Subtotal hysterectomy was performed at the fourth month.
The large cervical fibroid was in the condition known as "red degeneration." The tumour, when fresh, measured 12cm. in its minor and 15cm. in its major axis.

Lent by the Middlesex Hospital.

CARCINOMA OF CERVIX AND PREGNANCY.

827. An enlarged uterus showing placenta in situ, and the cervix extensively involved in carcinomatous growth.
Operation.—Cæsarean section at full term and hysterectomy.
Living child.

Lent by the New Hospital for Women.

828. A uterus showing pregnancy of about five months' duration, and a cervix involved in carcinomatous growth.

829. MULTIPLE MYOMATA OF UTERUS.
Small venous aneurism on surface of largest tumour. Total abdominal hysterectomy.

Lent by University College Hospital.

830. SUBMUCOUS MYOMA OF UTERUS.
Caused inversion of uterus.

831. The uterus shows a large necrobiotic fibro-myoma on the posterior wall, about 4 in. in diameter. There is a circular opening, $\frac{1}{2}$ in. in diameter, where the interior of the fibroid has communicated with the uterine cavity.

F., married, æt. 32. Menorrhagia for three years.

Lent by the New Hospital for Women.

832. The uterus is laid open and shows a large submucous fibro-myoma which has been partly extruded.
F., married, æt. 35. Menorrhagia one year.

833. FIBRO-MYOMA UNDERGOING NECROBIOTIC DEGENERATION.

834. The uterus shows a large intramural fibro-myoma in the anterior wall, 4 in. in diameter. There is a smaller fibro-myoma in the right lateral wall, encroaching on the uterine cavity, and showing extensive necrobiotic degeneration.

835. CYSTIC ADENOMYOMA OF UTERUS.

Supra vaginal hysterectomy. Weight with colloid contents 70 lb. Patient well 15 years later.

Lent by University College Hospital.

ADENOMYOMA OF UTERUS.

836. An enlarged uterus showing what appears to be an enormous overgrowth of the endometrium, which at the fundus is $1\frac{1}{4}$ in. in thickness. Microscopic examination shows the structure of a simple adenomyoma.

F., single, æt. 26. Menorrhagia eleven years.

Lent by the New Hospital for Women.

837. A uterus cut longitudinally, showing diffuse adenomyomatous infiltration of the uterine wall. In the right ovary is a small cyst 2 in. in diameter.

F., married, 38. Menorrhagia two years.

838. ADENO-MYOMA OF UTERUS.

Part of an enlarged uterus which weighed twelve-and-three-quarter ounces. There is a diffuse adeno-myomatous tumour occupying the fundus, leaving only a thin covering of uterine muscle on the outer surface.

Microscopically : A simple adeno-myoma.

F., æt. 56. Unipara. For three-and-a-quarter years irregular uterine hæmorrhage.

Operation—Panhysterectomy. Good recovery. (Presented by Mrs. Scharlieb.)

Lent by the Royal Free Hospital.

839. FIBRO-ADENOMA OF THE UTERUS.

The tumour is an elongated irregular mass, divided about its middle by a deep constriction. It consists of fibrous tissue enclosing a large number of cysts containing mucus. It protrudes from the cervix and was attached by a comparatively small pedicle to the inner wall of the uterine cavity.

Microscopic examination shows numerous cavities lined by columnar epithelium enclosed in a framework of fibrous tissue. Tumour removed by operation.

F., æt. 48. Symptoms for 12 months.

Lent by St. Bartholomew's Hospital.

ADENOMYOMA OF UTERUS.

840. Total abdominal hysterectomy.

Lent by University College Hospital.

841. TUBERCULOUS DISEASE OF THE UTERUS, ASSOCIATED WITH AN ADENO-FIBROMA.

Portion of a uterus in the muscular wall of which a tubercular infiltration had led to a notable enlargement localised to an area about $2\frac{1}{2}$ inches in diameter.

The uterus was removed from an unmarried lady, æt. 46, who had suffered from menorrhagic for $2\frac{1}{2}$ years, which latterly had become very profuse and long-continued. At the operation the uterus was found to have contracted firm adhesions to the rectum and bladder. The ovaries and fallopian tubes were small; these were left. Recovery uneventful. (Presented by J. Bland-Sutton, Esq.) Trans. Obstets. Soc. XLVII., 1905, p. 72.

Lent by the Royal College of Surgeons.

842. A CASE OF ADENO-MYOMA UTERI.

The patient was a married nullipara, aged 34 years. Her menstruation had been profuse and painful for some years. For the past five years there had been pain in the right iliac region, which had rendered her an invalid.

On admission, a very hard irregular swelling was felt above the pubes, lying chiefly on the right of the median line. Bimanually this proved to be the uterus, and the diagnosis of multiple fibroids was made. Abdominal supra-vaginal hysterectomy was performed in Trendelenberg's position. The largest fibroid, the size of an orange, invaded the right broad ligament, and had to be enucleated therefrom. The patient made an uninterrupted recovery.

Description of specimen. To the naked eye this appeared to be a typical example of multiple fibroids of the uterus; the separate tumours were cut across with a knife and all had an unusually firm, white appearance, with the exception of one of the smaller superitoneal growths; in the centre of this was a softened area, about $\frac{3}{4}$ in. in diameter, surrounded by firm white tissue, the area itself having a much darker appearance; sections of this were taken and, under the microscope, the softened area showed typical adenomatous tissue, viz.: numerous gland spaces, lined by a single layer of columnar epithelium and having a cellular inter-alveolar stroma. This adenomatous tissue was sharply defined and did not spread into the surrounding mass, which had the typical structure of an ordinary fibro-myoma.

The case appears to differ from most of those recorded in that the adenomatous tissue was localised and not diffused throughout the uterine wall, as is usual, so that its origin

by direct spreading from the endometrium is not capable of proof, and the growth resembles closely the tumours described by von Recklinghausen, the origin of which was attributed by him to Wolffian "rest cells"; it also further agrees with these in that it was situated near the uterine cornu and on the dorsal aspect of the uterus.

"Journal of Obstetrics and Gynæcology," July, 1908.

Lent by Dr. C. E. Purslow (Sections and Microphotographs by Dr. A. A. Saunders.)

843. PHOTO-MICROGRAPH OF SECTION.

Magnified 8 diameters.

844. PHOTO-MICROGRAPH OF SECTION.

Magnified 42 diameters.

845. MICROSCOPICAL SECTION OF AN ADENO-MYOMA UTERI.

Lent by Dr. Purslow.

There was a localised patch of adenomatous tissue in the centre of a sub-peritoneal fibroid. The adenoma was distinctly visible to the naked eye as a circular, dark area in the midst of the densely white tissue of the fibri-myoma, and there was apparently no connection between the glandular tissue of the adenoma and that of the endometrium.

ADENOMYOMATA.

ADENOMA OF THE UTERUS.

Lent by Dr. J. Inglis Parsons.

846. Microscopical Section.—The growth was removed by the curette in 1902. Large pieces came away, appearing to the naked eye exactly like malignant disease. The patient, age 42, had had five children and no miscarriage. Menstruation had been irregular for three years, culminating in continuous metrorrhagia for three months before operation. After the curetting she improved for a few months, and then the hæmorrhage recurred. (See next section).

847. Microscopical section taken from the uterus two years later after hysterectomy had been performed. The glandular character of the growth is still very distinct, but in the places there is an irregular proliferation of the cells suggestive of commencing carcinoma.

848. A FALLOPIAN TUBE AND OVARY, FROM A CASE OF ADENOMYOMA.

The adenomyoma occupies the proximal portion of the Fallopian Tube and is a small round mass. The mass has

been laid open so as to show the whorled arrangement of tissue. The distal portion is slightly thickened and the ostium is sealed. The ovary is seen to be attached. Resection of the appendage was effected just internal to the adenomyomatous growth. The Fallopian Tube cannot be detected.

Lent by Dr. Bryden Glendinning.

849. Microscopic section of adenomyoma of the tube (tubercular). The specimen shows (1) a fibro-muscular tissue, typical of that of a uterine fibro-myoma; (2) areas of glandular tissue, scattered about the field, lying subjacent to free epithelium, with small masses of lymphoid tissue; (3) typical giant cell systems in places and several areas of necrosis.

SPREAD OF CANCER OF THE FALLOPIAN TUBE.

850. Microscopic section, showing a cancerous mass, free in the lumen of the Fallopian Tube. The endo-salpinx is free from growth at this point. (Other sections of the fimbriated extremity show small masses free in the abdominal cavity between the fimbriæ.) Another section of the same, under a higher magnification.
851. Microscopical section, showing the growth in its intimate relations to the epithelium of the tube. At one point there is discontinuity of epithelium, but this has probably been produced accidentally in cutting the specimen.
852. Microscopic section showing the same mass. In this specimen the growth was extending toward a second larger growth which occupied a lymphatic vessel.
853. Microscopic section of cancer in the lymphatic spaces in the sub-epithelial tissue.
854. Microscopic section of meso-salpinx, showing invasion of the lymphatic vessels in this situation.
855. Microscopic section of a cancer invading the wall of the Fallopian Tube and permeating the muscular wall.

ADENOMYOMA OF UTERUS.

856. The section is from a diffuse tumour condition in the uterine wall. It is not separated off from, but is directly continuous with, the endometrium.

The section shows the usual islets of lymphadenoid stroma enclosing gland tubules, the whole being surrounded by muscular tissue. The connection with the endometrium can be traced in the section.

Lent by Drs. S. J. Cameron and Archibald Leitch.

857. The section is from a small intramural tumour situated at the tubal angle posteriorly and not directly continuous with the endometrium. Circumscribed tumour.

The section shows the usual islets of lymphadenoid stroma in which are embedded gland tubules, the islets being surrounded by muscular tissue.

858. The section is from a subserous pedunculated tumour about the size of a walnut which was removed by myomectomy. Another tumour of the same size was joined to this, but showed only the usual structure of a fibro-myoma. Whether there existed more tumours in the wall of the uterus or not is unknown. Demonstrates islets of tissue identical with the endometrium.

859. The section is from a submucous pedunculated tumour.

860. ADENOMYOMA OF VAGINA.

861. INVOLVEMENT OF THE URETER IN CANCER OF THE CERVIX UTERI.

The parametrium is invaded and masses of cancer cells are seen in proximity to the ureter wall which, however, in the series of sections taken from this case, is not actually invaded. Distance of cancer cell mass from ureter less than 1 mm.

Lent by Dr. Archibald Leitch.

862. The parametrium is invaded, and the cancer cells are traveling along the loose areolar tissue surrounding the ureter. In this section the cancer cells can be seen infiltrating the muscular wall of the ureter from the so-called "sheath." Operation specimen. There was no naked-eye evidence of involvement.
863. The parametrium is invaded. A collection of cancer cells can be seen in a dilated lymphatic vessel close to the submucous layer of the ureter. The process has not spread by continuity but by lymphatic permeation. The ureter gave no naked-eye evidence of involvement, and might have been dissected free. Operation specimen.
864. The parametrium is invaded, and the ureter wall is extensively infiltrated with cancer, so that its structure is much disorganised. Post-mortem specimen. The ureter was not dilated, and moved freely in the parametrium, and only microscopic examination revealed the fact that it was involved in cancer. Supposing an operation had been attempted, the ureter might easily have been dissected free, and the condition would have excited no suspicion.

INVOLVEMENT OF THE URETER IN CANCER OF THE RECTUM.

865. Female patient. Cancer of the rectum with tendency to colloid degeneration. The cancer cells penetrated the rectal wal

anteriorly, spread along beneath the pelvic peritoneum and invaded the ureter both by continuity and by the lymphatics. The point of entrance of the cells into the ureter was close to its vesical end, and they could be traced backwards in the ureter wall for a distance of four centimeters to a point where they broke into the lumen. This section shows cancer cells in lymphatic vessels in the ureter wall.

866. Female patient. Cancer of rectum with tendency to colloid degeneration. The cancer penetrated the rectal wall anteriorly, and spread beneath the pelvic peritoneum. It invaded the ureter from the parametrium, both by continuity and by the lymphatics. The point of entrance of the cancer cells was close to the vesical end of the ureter, and they were traced backwards in the ureter wall for a distance of four centimeters to a point where they broke through the mucous membrane into the lumen. This section shows the encroachment on the ureter wall.

867. Female patient. Cancer of the rectum with tendency to colloid degeneration. The cancer cells penetrated the rectal wall anteriorly, spread along beneath the pelvic peritoneum, and invaded the ureter both by continuity and by the lymphatics. The point of entrance of the cells into the ureter was close to the vesical end of the ureter, and they could be traced backwards in the ureter wall for a distance of four centimeters to a point where they broke into the lumen. This section shows the cancer cells encroaching on the lumen of the ureter.

868. CARCINOMA OF THE CERVIX UTERI.

Half section of the pelvis. Showing the matting together of the pelvic organs in advanced cases. This matting is an expression of the attempt to delimit the septic advance from the tubes and more especially from the posterior fornix. It conceals what is shown in the other dissected half.

869. CARCINOMA OF THE CERVIX UTERI. The lymph glands affected in the disease.

Dissection demonstrates the position of the principal glands. Those commonly affected lie in the angle between the external iliac and the anterior division of the internal iliac arteries. These glands are connected by lymphatic channels with one or more glands which lie behind the external iliac and are hidden by it. They are continuous with a group lying external to the common iliac. Note how the inguinal glands may be involved. The sacral glands are very rarely affected, and the same applies to glands lying in the branches of the internal iliac artery.

CARCINOMA OF CERVIX UTERI. Extensive operation.

870. Large epithelioma on left side involving the vagina. The left ureter was firmly fixed in the mass but the portion examined microscopically did not show actual cancerous invasion though cancer cells approached to within one millimetre of its wall. Left interiliac lymph gland lies below the left tube and ovary. The tissue lying below this and to the left is intersacral tissue which is indurated not by cancer (as seen microscopically) but by septic processes. Operation by Dr. R. C. Buist. Ureterocystostomy performed on left side.

Lent by Drs. R. C. Buist and Archibald Leitch.

871. Both ureters have had their parametrial portions resected with subsequent reimplantation of the ends in the bladder. The ureters are marked with black circles. On the right side two interiliac lymph glands are attached. Both lower deposits of adenocarcinoma though the primary lesion was epithelioma. On the left-side, interiliac glands and two glands lying outside the common iliac artery have been removed. The juxta-cervical gland is seen on the right side above the ureter. Process spreads on to vagina. Operation by Dr. R. C. Buist.
872. Disease spreads down vagina for a considerable distance. The parametrial tissue on the right side was removed. It is not included in the preparation. Both ureters had their parametrial portions resected with subsequent reimplantation of cut ends in the bladder. One of the ureters showed cancerous invasion by lymphatics. Interiliac lymph glands affected. Operation by Dr. R. C. Buist.

873. CARCINOMA OF CERVIX UTERI AND MYXO-SARCOMA OF OVARY. Extensive operation.

The left ureter lay below the mass on the left side and was dissected from it for a distance of 14 centimetres. The freed ureter was then pushed behind the peritoneum to the opposite side and anastomosed with the opposite ureter just below the pelvic brim. Healing took place but sepsis proved fatal three weeks afterwards. The fleshy mass to the extreme left is infiltrated interiliac tissue enclosing lymph glands. Operation by Dr. R. C. Buist.

874. WERTHEIMER'S OPERATION FOR CANCER OF CERVIX WITH HYDROSALPINX.

Patient well three years later.

Lent by University College Hospital.

CHORIO-EPITHELIOMA OF UTERUS.

875. A uterus showing a large mass of soft, friable, greyish-red growth, invading the fundus and anterior wall.

Microscopically : A chorio-epithelioma.

F., æt. 31. Two years before the uterus was removed, the patient passed a hydatidiform mole. Subsequently she was said to have had a miscarriage, and was curretted twice for hæmorrhage. The uterus increased rapidly in size.

Operation—Panhysterectomy and removal of left appendages. The patient remained well for five months, when she died suddenly with symptoms of cerebral hæmorrhage.

Lent by the Royal Free Hospital.

876. A uterus showing a rounded mass of growth, two inches in diameter, projecting from the fundus. The uterine cavity is slightly elongated, but the endometrium appears to be normal. There are two isolated spherical masses of growth about half an inch in diameter in the vaginal wall.

Microscopically : A chorio-epithelioma.

F., æt. 29. Twelve months before the patient came under observation, she passed a vesicular mole. For seven months the periods were normal, during the next four months she had irregular uterine hæmorrhages.

Operation—Removal of uterus, appendages, and upper half of the vagina.

The growth recurred locally in two-and-a-half months and the patient died with symptoms of cerebral hæmorrhage.

877. ENDOTHELIOMA OF UTERUS.

A uterus much enlarged owing to the presence of a mass of solid growth in the cavity. Microscopically : An endothelioma. F., æt. 51. Multipara: Slight uterine hæmorrhages for six months, starting two-and-a-half years after the menopause. Enlargement of the abdomen and vaginal discharge for ten weeks. At the operation, growth was found involving the wall of the rectum. The patient died seven weeks later.

878. PRIMARY CARCINOMA OF FALLOPIAN TUBE.

The specimen obtained by operation from a woman æt. 43, shows a malignant growth which has sprung from the walls of the right tube. The latter is laid open and is seen to be filled by a papillomatous growth. Microscopically, a columnar called carcinoma.

Lent by St. Bartholomew's Hospital.

879. CARCINOMA OF THE FALLOPIAN TUBE.

Lent by University College Hospital.

880. CARCINOMA OF THE FALLOPIAN TUBE.

881. PRIMARY CARCINOMA OF FALLOPIAN TUBES.

A left tube much enlarged and filled with solid yellowish-white growth. At its upper pole it communicates with a large unilocular cyst.

The right tube is dilated and filled with a papillomatous growth arising from the lower surface

Microscopically : A malignant papilloma.

F., æt. 42. For two-and-a-quarter years paroxysmal pains in left side, and blood-stained vaginal discharge.

Operation—Double salpingo-oophorectomy. Good recovery. No recurrence three years later.

Lent by the Royal Free Hospital.

PRIMARY CARCINOMA OF THE FALLOPIAN TUBES.

882. The specimen is the uterus removed with both adnexa. The outer half of the right Fallopian tube is enlarged and filled with solid growth which at one place has perforated the serous covering. The inner half of the tube is in a condition of hæmatosalpinx. The left Fallopian tube is distended throughout its length, and is filled with blood. It has at one place a small papilliferous growth projecting from its inner wall. Both ovaries are fibroid. The uterus contains many small fibro-miomata. No evidence of malignant disease was found in it on microscopic examination.

F., married, æt. 53. Yellow discharge 2 years, offensive 6 months. Panhysterectomy and removal of appendages. Recurrence in abdominal wall 6 months later.

Lent by the New Hospital for Women.

883. Section of last specimen.

884. BILATERAL CARCINOMA OF THE FALLOPIAN TUBES, associated with Carcinoma of the Uterus.

The uterine adnexa showing thickening of both Fallopian tubes. These are involved in growth which has commenced on the inner aspect, and has not perforated the serous covering.

885. CARCINOMA OF FALLOPIAN TUBES. Section of last specimen.

A section showing the spread of carcinoma along the mucous membrane of Fallopian tube.

TUBERCULAR AFFECTIONS.

886. PRIMARY BILATERAL TUBERCULOUS PYOSALPINX AND OVARIAN ABSCESS.

J. D., æt 20. Single. Robust appearance. Severe dysmenorrhœa and scanty menstruation for three months.

Operation.—Double-salpingo-oophorectomy leaving part of the right ovary. Miliary tuberculosis of peritoneum in lower abdomen. Good recovery. Married a year later.

Lent by Miss Ivens.

887. PRIMARY BILATERAL DIFFUSE TUBERCULOUS-SALPINGO - OOPHORITIS. Both tubes closed and thickened, blood cysts in the right ovary.

A. H., æt. 23. Married. Nullipara. Healthy looking. Pelvic pain—dysuria and profuse menstruation for some months.

Operation.—Double salpingo-oophorectomy, leaving portion of the right ovary.

Appendix involved in pelvic inflammation. Miliary tubercles over lower abdomen. Good recovery.

888. SECONDARY MILIARY TUBERCULOUS SALPINGO-OOPHORITIS.

M. P., æt. 36. Unipara. Anæmic and thin. Menorrhagia and dysuria for 6 months. Tuberculous dactylitis also present.

Operation.—Double salpingo-oophorectomy. Entire peritoneum studded with grey tubercles and miliary tubercles scattered uniformly through tubes and ovaries.

Primary union. Later tuberculin treatment by Dr. Owen.

889. PRIMARY CHRONIC MILIARY TUBERCULOSIS OF THE FALLOPIAN TUBES AND THE RIGHT OVARY. The right ovary is much enlarged by tuberculous deposit and showing some caseating foci.

A. R., æt. 19. Thin and anæmic. Hypogastric pain, leucorrhœa and partial amenorrhœa for 6 months.

Operation.—Right salpingo-oophorectomy. Left salpingectomy. Peritoneal adhesions present, uniting small intestines, rectum, appendages and bladder.

Fœcal fistula for one day. Well three months later.

890. PRIMARY BILATERAL SUB-ACUTE TUBERCULOUS SALPINGO-OOPHORITIS.

Mrs. H., æt. 31. Married 6 yrs. One miscarriage. Robust appearance. Pelvic pain and irregular hæmorrhage for a month.

Operation.—Left, salpingo-oophorectomy and right salpingectomy. Left ovary and tube infiltrated with soft tuberculous deposit and closely adherent to the sigmoid flexure, necessitating suture of the intestinal wall. Infundibulo pelvic and round ligaments infiltrated. Abdominal wound drained and for some weeks purulent discharge containing tubercle bacilli. Patient in good health six months later, but some sinus present.

891. PRIMARY BILATERAL TUBERCULOUS PYOSALPINX AND LEFT OVARIAN ABCESS.

A. A., æt. 18. Married 5 months. Stout, healthy-looking girl. Irregular and excessive periods for three months, with thin discharge. Lately acute abdominal pain.

Operation.—Double salpingo-oophorectomy. The mucosa of both tubes presents a papilliferous appearance, and is infiltrated with tuberculous systems. Good recovery.

892. PRIMARY MILIARY PERI-OOPHORTIS AND SALPINGITIS, ASSOCIATED WITH RUPTURED ECTOPIC GESTATION, LARGE HAEMATOCELE AND NECROBIOTIC UTERINE FIBROID.

E. M., æt. 32. Married 3 years. Nullipara. Thin and anæmic. Offensive leucorrhœa, and abdominal pain for some years. Irregular hæmorrhage for one month before operation, preceded by two months amenorrhœa. Supravaginal hysterectomy, with removal of both appendages and large hæmatocele. Some fluid and blood present. Marked thickening of the round ligaments, and left tube and ovary disorganised. No peritoneal tuberculosis seen. A month later, extensive general tuberculous peritonitis present. Recovery after tuberculin treatment by Dr. Owen.

893. PRIMARY CHRONIC BILATERAL SALPINGO-OOPHORITIS WITH CASEATING FOCI IN OVARIES, AND CALCIFIED CASTS IN TUBES.

A. D., æt. 34. Multipara. Sallow and thin. Intermittent pain for 4 years—scanty menstruation.

Operation.—Double salpingo-oophorectomy, leaving part of one ovary. Signs of chronic peritonitis in lower abdomen, and chronic appendicitis with fecal concretion also present. Good recovery.

894. MICROSCOPIC SECTION OF PRIMARY MILIARY TUBERCLE
OF THE TUBE UNDERGOING CALIFICATION.

M. S., æt. 23. Married. Nullipara. Pelvic pain and profuse menstruation for some years.

Operation.—Double salpingo-oophorectomy, leaving part of the right ovary. Left ovary cystic. Gritty caseating foci in the mucous membrane of both tubes. Signs of peritoneal tuberculosis a few months later. Complete recovery after tuberculin treatment by Dr. Nathan Raw. A year later in good health. Menstruation normal.

895. MICRO-PHOTOGRAPH — MILIARY TUBERCULOSIS OF
ENDOMETRIUM SECONDARY TO TUBERCULOUS
PERITONITIS.

E. G., æt. 29. Married 1 year. Nullipara. Thin. Profuse leucorrhœa and scanty menstruation for 10 years.

Operation.—Curettage. No thickening felt in tubes or ovaries. Ten years previously operation performed for tuberculous peritonitis, with ascites.

896. MICRO-PHOTOGRAPH. — ULCERATIVE TUBERCULOSIS
OF THE PORTIO-VAGINALIS.

M.G. æt. 32. 2 para. Healthy appearance. Examination of cervix a fortnight after miscarriage showed ragged ulcer of the posterior lips. Bleeding rather freely. Scrapings from the ulcer show tuberculous changes.

Operation.—Amputation of the cervix. Good recovery.

897. SPINDLE-CELL SARCOMA.

One-half of a large tumour of the ovary measuring 8 in. long by 6 in. wide. It is solid throughout and presents on the surface a well-marked nodular appearance.

Microscopically: A spindle-celled sarcoma.

E. B., æt. 43. History of menorrhagia and metrorrhagia. Operation, recurred in 9 or 10 months..

Lent by Dr. David Forsyth.

898. SARCOMA OF THE OVARY.

Half of a large solid tumour of the ovary. The tumour is encapsuled and a few fibrous trabeculæ intersect its mass. The cut surface is in places white and fairly firm, in others infiltrated with hæmorrhage. Microscopically, an alveolar sarcoma.

F. æt. 22, unmarried; 12 months' enlargement of the abdomen. Tumour removed by abdominal section.

Lent by St. Bartholomew's Hospital.

899. MYXO-SARCOMA OF OVARY.

Section through one of two bilateral ovarian tumours. Tumour is solid, but includes one large cavity which contained clear mucoid fluid.

Microscopically a fibro-sarcoma which has undergone extensive myxomatous degeneration.

F., æt. 51. Multipara. Two years abdominal swelling—irregular and excessive menstruation. Post-mortem. The pyloric third of the stomach was found to be thickened and indurated. Microscopic examination of the stomach showed chronic inflammation but no conclusive evidence of malignant disease.

900. MYXO-SARCOMA OF OVARY.

The specimen shows a portion of a large solid tumour of the ovary from a patient, in whom both ovaries were similarly affected. The tumour is smooth, ovoid, non-adherent. F. single, æt. 17. Swelling of abdomen 6 weeks before operation. 9 pints free fluid removed. Death 3 months later. Recurrence of ascites. No post-mortem examination.

Lent by the New Hospital for Women.

901. SARCOMATOUS OVARIAN CYST.

Part of a large unilocular ovarian cyst, the wall of which is covered with fine shreddy papillomatous growth.

Microscopically a round-celled sarcoma. Removed by operation. F., æt. 21. Five months' pain in right iliac fossa and abdominal swelling. At the operation the tumour proved to be connected with the left ovary. The contents were apparently pure blood.

Lent by St. Bartholomew's Hospital.

902. MALIGNANT TERATOMA OF THE OVARY.

The tumour is largely cystic in character. The cysts vary much in size. The solid portions of the tumour are in masses shut in by trabeculæ of fibrous tissue.

Microscopic examination. The section shows bone, cartilage, cysts, some lined with columnar epithelium, some with squamous glandular structures, including liver tissue, myxomatous and fibrous tissue.

Girl, æt. 16. Swelling noticed one year. Tumour removed. Recurrence within one month.

MALIGNANT DISEASE.

903. PRIMARY OVARIAN CARCINOMA.

The tumour is for the most part solid, pale yellow colour, with a few hæmorrhagic points and small cysts.

Microscopically. Columnar-celled carcinoma.

F., æt. 28. Abdominal swelling noticed for 6 months. Tumour removed by operation.

904. BILATERAL OVARIAN CARCINOMA.

The tumours are in each case solid and much lobulated upon the surface.

Microscopically the growth proved to be spheroidal-celled carcinoma.

Removal by operation. F., æt. 44 unipara. Menstruation normal. The tumours were removed within a few weeks of the detection of the abdominal enlargement. Good recovery. Three months later no recurrence.

905. CARCINOMATOUS OVARIAN CYST.

From the inner aspect of the cyst wall project large masses of solid growth, giving the specimen a nodular and warty appearance. The serous surface is intact, except at one spot near the fimbriated end of the fallopian tube. The growth has here involved the peritoneum and produced a sessile velvety projection.

Microscopically the growth is composed chiefly of alveolar spaces lined by cubical epithelium.

906. PSEUDO-MUCINOUS ADENOMA OF THE OVARY.

Part of an ovarian tumour which had burrowed between the layers of the broad ligament. The tumour is composed chiefly of congeries of small cysts. The tissue is white, friable and presents a honeycombed appearance, the loculi being occupied by gelatinous material.

Microscopic examination: The loculi are lined by tall columnar epithelium. Removed by operation from a woman æt. 66. Tumour noticed 3 months. Only symptom, pain in hypogastrium.

907. BILATERAL CARCINOMA OF THE OVARIES.

A uterus and its appendages shewing both ovaries enlarged by malignant growth. Each ovary is nodular, and on section shows extensive areas of growth.

From a girl of 19.

Lent by Dr. David Forsyth.

908. BILATERAL CARCINOMA OF OVARY.

Part of two solid ovarian tumours, the larger weighing 217 grms.

They are both smooth and non-adherent, and the cut surface of each shows a localised spherical mass of growth.

Microscopically : A spheroidal-celled carcinoma, probably secondary.

F., æt. 32, married. An abdominal swelling had been noticed for six months, wasting for eight months. At the operation ascites and secondary growths were found in the omentum mesentery and intestines. Death four months later. (Presented by Mrs. Scharlieb.)

Lent by the Royal Free Hospital.

ADENO-CARCINOMA OF OVARY.

909. A cystic tumour of the left ovary with masses of solid growth on its inner wall. Microscopically : an adeno-carcinoma.

From a woman, æt. 33, on whom Cæsarian section had been performed in the 7th month of pregnancy for the complication arising from an ovarian tumour obstructing the pelvis. A cystic tumour of the right ovary similar to this was then removed. The left appendages appeared normal. 13 months later the growth recurred in the left ovary and was removed by operation. Recurrence and death 6 months after the second operation.

910. A large cystic tumour of the ovary showing solid masses of growth projecting from the inner wall, and half filling the cavity of the cyst. Microscopically : an adeno-carcinoma. F., æt. 36. Abdominal pain, swelling and scanty menstruation for six months. Good recovery from operation.

911. A right ovarian tumour removed from a patient in whom both ovaries were affected. The cut surface of the tumour shows an almost solid papillomatous growth with small hæmorrhages. Microscopically : an adeno-carcinoma. F., æt. 67. Nullipara. An attack of uterine hæmorrhage occurred two months before. The growth recurred in the abdomen four months after the operation.

912. Part of a large solid tumour of the ovary containing softened breaking-down areas. Microscopically ; an adeno-carcinoma. F., æt. 57. Presented by Mr. Berry.

913. PRIMARY CARCINOMA OF BOTH OVARIES.

The specimen is a large solid tumour of the right ovary. It is smooth and non-adherent. On microscopic examination, it consists of alveolar spaces lined with high columnar epithelium.

F., single, æt. 19.

Lent by the New Hospital for Women.

914. The left ovary from the same patient showing a similar but less marked condition.

915. SECTION FROM TWO PREVIOUS SPECIMENS.

PRIMARY CARCINOMA OF BOTH OVARIES.

Section shows alveolar spaces lined with high columnar epithelium.

916. MULTI-LOCULAR ADENO-CYSTOMA (MALIGNANT DEGENERATION.)

A large multi-locular tumour removed by operation. The cysts present the usual thin-walled appearance, but in places solid masses of malignant-looking tissue are seen. For ten months patient had suffered pain and vomiting. Four months before the operation these became acute, but, subsiding, the pain recurred from time to time. Both ovaries were similarly affected.

Lent by Dr. David Forsyth.

917. PORTION OF A CYST FROM AN OVARY.

The walls are of unequal thickness. Numerous soft medullary tumours are growing from its inner surface. The upper mass is composed of many small pedunculated tumours, the lower one presents a loose, shreddy surface.

Lent by the Middlesex Hospital.

918. PAPILLOMATOUS CYST OF OVARY.

The two growths were removed from a woman æt. 28.

At the post-mortem examination the peritonium was in a condition of general inflammation. No metastatic deposits were discovered in the peritoneum or elsewhere.

Miscroscopically the growths are built up of a myxomatous tissue lined by columnar epithelium. No evidence of carcinoma was found.

Lent by St. Bartholomew's Hospital.

919. PAPILLOMATOUS CYST OF OVARY.

A growth involving the right ovary. It appears either that the growth had once filled the cyst which had burst and then become everted, or that a papillomatous growth sprouted through the cyst wall and then rapidly grew to its present size. It is asserted that the opening into the cyst was natural and was not made during or after the operation.

F., æt. 29. Ascites for 2½ years before final removal of growth. No secondary deposits in the peritoneum. Recovery.

920. PAPILLIFEROUS CYSTOMA.

The outer portion of a Fallopian tube, to which is attached a large irregular tumour, partly solid, partly cystic, occupying the position of the ovary. The tumour consists of two parts, an outer solid portion with nodules projecting from its upper surface, the greater part of it presenting a fungating appearance; and an inner portion formed by a large cyst. Another cyst of small size is seen on the posterior aspect of the solid growth.

Microscopically: The growth has the character of a papilliferous cyst.

Lent by Dr. David Forsyth.

921. PAPILLIFEROUS OVARIAN CYST. COLLOID DEGENERATION.

An ovarian tumour $4\frac{1}{2}$ inches by 4.4 inches and part of the fallopian tube and meso-salpinx. When cut, the contents are seen to consist of solid growth containing some small hæmorrhages. The capsule is partly detached.

Microscopically: The growth consists of papillomatous processes covered with low columnar epithelium. Colloid degeneration proceeding.

E. D., æt. 38, four months' abdominal pain and distension. Primary columnar carcinoma of splenic flexure and bilateral ovarian tumours.

922. INTRA-CYSTIC OVARIAN PAPILLOMA.

A portion of an ovarian cyst showing on the inner aspect numerous papillomata, some undergoing cystic degeneration.

E. T., æt. 25. Six months' pain in the right hypochondrium. Catamenia regular. Left ovary normal.

923. MALIGNANT PAPILLOMATOUS CYST OF RIGHT OVARY.

Part of the wall of a large ovarian cyst, to which is attached by a narrow pedicle a papillary mass measuring 3 by 2 inches. The cyst reached to the level of the liver, and was densely adherent to surrounding structures; the peritoneum was studded with growth. From a woman, æt. 45, from whom 7 months before a large cystic ovary on the left side had been removed.

Lent by the Royal Free Hospital.

924. CANCEROUS ENLARGEMENT OF THE OVARY.
Secondary to malignant disease of intestine.

Lent by the Middlesex Hospital.

925. SECONDARY COLLOID CARCINOMA OF OVARY.

A portion of the ovary of a woman who died of colloid carcinoma of the stomach. The organ is replaced by a mass of translucent material which retains the original shape of the ovary but is of considerably larger size.

Lent by St. Bartholomew's Hospital.

926. SECONDARY CHLOROMA OF THE OVARY.

An ovary showing secondary infiltration with green sarcoma. Microscopically the growth has the structure of a small round-celled sarcoma.

Lent by the New Hospital for Women.

927. PERITHELIOMA OF OVARY WITH DERMOID CYST.

The solid growth consists of dense fibrous stroma permeated by a close network of epithelioid cells which appear to lie in lymphatic spaces. In some places a blood vessel is seen in the centre of the growth which is intimately connected with its outer walls.

Lent by University College Hospital.

928. SQUAMOUS-CELLED CARCINOMA ARISING IN A DERMOID CYST OF OVARY.

A dermoid cyst of the left ovary, showing a mass of growth arising in the wall of the cyst, involving the adjacent wall of the uterus and the ovary of the opposite side. The cyst contained sebaceous material and a tuft of hair.

Microscopically : A squamous-celled carcinoma.

F., æt. 60. Pain in the right iliac fossa and leg for two-and-a-half months. Emaciation. Good recovery from the operation.

Lent by the Royal Free Hospital.

929. OVARIAN FIBROMA WITH TORSION OF THE BROAD LIGAMENT.

Uterine appendages of the left side, showing a large fibroma of the ovary. The whole of the structures shown are in a condition of extreme hæmorrhagic infiltration from torsion of the broad ligaments. The fallopian tube is elongated, thickened and infiltrated by extravasated blood.

Removed by operation—nullipara æt 41 years. Three days before admission seized with vomiting and severe abdominal pain.

Lent by St. Bartholomew's Hospital.

930. RIGHT OVARY EXCISED FOR LARGE FIBROMA.

Small fibroma enucleated from left ovary. Patient subsequently became pregnant.

930A. CALCIFYING FIBROMA OF OVARY.

The tumour is irregularly ovoid in shape, very hard, and its surface somewhat uneven. The cut surface shows that the tumour is a calcifying fibroma, there being irregular calcareous plates and spicules. It weighed $6\frac{1}{4}$ gs.

Microscopically a pure fibroma with calcareous deposit.

F., æt. 29. Nullipara.

Lent by St. Bartholomew's Hospital.

931. BILATERAL MYXO-FIBROMA OF OVARY.

Two large ovarian tumours, which have shrunk to almost half their original size in preparation. They are smooth lobulated masses and on section consist of soft semi-translucenced fibrous tissue, containing several cysts. They weighed 22 and 20 oz. respectively. Microscopically: Fibromyxomatous tissue. F., æt. 42. Multipara: Enlargement of the abdomen for six months; menstruation regular. Good recovery.

Lent by Royal Free Hospital.

932. CALCIFYING OVARIAN FIBROIDS.

A hard lobulated tumour of the right ovary, containing a large amount of calcareous material, removed from a patient in whom both ovaries were in a similar condition. Weight 255 grms. Microscopically: A simple fibroma with calcification. F., æt. 55. Mullipara: Backache and frequency of micturition for five years. Menopause at 39. Good recovery.

932A. CALCIFYING OVARIAN FIBROIDS.

A tumour of the left ovary from the same case.

933. FIBROMA OF OVARIAN LIGAMENT.

A white lobulated tumour, about 3 inches in diameter, connected with the left ovary by a pedicle. Microscopically: The tumour shows the structure of a simple fibroma, the pedicle consists of connective tissue and strands of unstriated muscular fibres. F., æt. 31. Multipara: Abdominal pain, some vomiting and frequency of micturition for eighteen months. Good recovery.

933A. FIBROMA OF OVARY.

Part of a solid ovarian tumour, measuring $3\frac{1}{2}$ by $2\frac{3}{4}$ inches. The cut surface shows that it is composed of dense white fibrous tissue. Microscopically: Fibrous tissue with some unstriated muscular fibres. F., æt. 65. Paroxysmal abdominal pain and sickness for two years.

934. CYSTIC CORPORA LUTEA ASSOCIATED WITH A
HYDATIDIFORM MOLE.

An enlarged right cystic ovary, removed from a patient in whom both ovaries were in a similar condition. It has been suggested that they are cystic corpora lutea. From a woman, æt. 24, who seventeen days before passed a vesicular mole.

Operation—Hysterectomy and double oophorectomy. Presented by Mrs. Scharlieb.

934A. CYSTIC CORPORA LUTEA ASSOCIATED WITH A
HYDATIDIFORM MOLE.

Left cystic ovary from same case.

935. ACTINOMYCOSIS OF OVARY.

Post-mortem specimen, removed from a woman who had had an illness of many months' duration. Extensive chronic peritonitis, many streptothrix granules found.

X.—RESPIRATORY SYSTEM.

Hon. Curator - Dr. LAKIN.

GLANDERS.

936. PART OF LUNG SHOWING FOCI OF GLANDERS.

The small white areas are visible upon the cut surface. A few similar nodules are seen beneath the pleura.

From a man aged 33, a horsekeeper who died after an illness of eleven days' duration.

The first symptom was pain in right shoulder joint, numerous subcutaneous lumps appeared about the body. *Bacillus mallei* present.

Lent by St. Bartholomew's Hospital.

937. A HUMAN LUNG SHOWING THE CHARACTERISTIC LESIONS OF GLANDERS.

It is intensely engorged, and shows numerous yellowish white areas—the "glanders nodules." There is a little recent exudate on the pleura. The glanders bacillus was found in the nodules.

From a man aged 37. Ten days before admission his left eyelid swelled, and an inflammatory condition resembling erysipelas spread over the face.

938. LUNG AFFECTED BY GLANDERS.

A section of left lung showing numerous yellowish white nodules scattered over the surface and in the substance of the lung. Some of the nodules are breaking down.

From a porter at a meat market. The nasal mucous membrane was ulcerated and pustules were scattered over face, trunk and limbs. *B. mallei* was found.

939. GLANDERS. The Larynx of the same patient as No. 938 showing nodules on its wall.

The patient had been treated for 3 weeks with rheumatism without effect. The knees, hip, elbow and ankle were affected and the temperature constantly above 100° F. Pustules appeared over face, trunk, limbs (see specimen No. 938).

Lent by the Royal Free Hospital.

940. GLANDERS OF LUNG.

A small piece of the lung of a horse, showing the lesions of farcy, small nodules with caseous centres (lying in large blood-stained pneumonic areas, no longer apparent).

Lent by Charing Cross Hospital.

941. A PORTION OF LUNG SHOWING THE LESIONS OF FARCY.

Lent by Dr. David Ferlyth.

942. SLICE OF LUNG FROM A CASE OF GLANDERS.

It shows numerous scattered granulomatous nodules.

Lent by University College Hospital.

943. GLANDERS OF LUNG.

Glandrous abscesses in lung.

From a man, aged 42, a stablehand, working with infected horses.

944. GLANDROUS NODULES IN LUNG.

From a patient, aged 18. Skin lesions were numerous but pulmonary lesions were few and of the kind represented. Microscopically caseous material was present and the nodules could hardly be distinguished from gummata except by the greater congestion around them.

945. CULTURE OF BACILLUS MALLEI ON POTATO.

946. GUINEA PIG INOCULATED WITH GLANDERS.

Showing inflammation of the testicle.

Lent by St. George's Hospital.

ACTINOMYCOSIS.

947. ACTINOMYCOSIS OF LUNG.

Section through the Right Lung of a man aged 31 years. The section is studded with numerous small tubercle-like masses, which now mostly appear in the form of cavities because their contents have fallen out. The right kidney and suprarenal, the liver and spleen were also affected. Actinomycotic abscesses were present in the right elbow joint, the left calf, and in the left deltoid muscle.

Lent by St. Bartholomew's Hospital.

948. ACTINOMYCOSIS OF LUNG.

The Lung substance is the seat of numerous small scattered whitish masses the size of millet seeds. Some of these have softened in the centre.

Microscopically they are seen to be due to the presence of Actinomyces.

Lent by the Royal Free Hospital.

949. A RIGHT LUNG.

The seat of discrete white irregular patches, some of them 3 inches in diameter. Numerous small foci of suppuration are also seen. The surface appearance resembles that of actinomycosis, and an acid fast streptothrix (probably *S. Eppingeri*) was found in the pus and obtained in pure cultures. This lung weighed 57 ozs., but the left lung was unaffected. From a man age 66 who died after an illness of two weeks, with indefinite pulmonary symptoms and a pyrexia of 102.

Lent by Westminster Hospital.

950. A SECTION OF LUNG.

Showing a deposit of actinomycosis at its lower extremity.

Showing a deposit of actinomycosis at its lower extremity.

Showing a deposit of actinomycosis in the lower lobe, secondary to actinomycosis of the liver.

Lent by University College Hospital.

951. ACTINOMYCOSIS OF LUNG.

A section of lung shewing scattered bronchopneumonic areas due to infection with the ray fungus. Streptothrix was present on microscopic examination.

Lent by Brompton Hospital.

HYDATID CYSTS.

952. SECTION OF LUNG CONTAINING NUMEROUS SMALL HYDATID CYSTS.

The Cysts are of various sizes, and uniformly distributed through the liver.

From a domestic servant aged 22. The primary cyst was in the wall of the right ventricle of the heart (vide next specimen). Rupture of the primary cyst had occurred with the discharge of a large number of daughter cysts into the pulmonary circulation.

953. A HEART SHOWING A LARGE HYDATID CYST.

Occupying the outer wall of the right ventricle ; it projects into and almost fills the lower part of the ventricular cavity. At apex of the cyst there is a small circular aperture through which the daughter cysts were evacuated. (See preceding specimen.)

Lent by St. Bartholomew's Hospital.

954. A SECTION OF HUMAN LUNG INFESTED WITH THE OVA OF BILHARZIA HÆMATOBIA.

BRONCHIOLECTASIS.

955. HONEYCOMB LUNG. BRONCHIOLECTASIS. "ACUTE EMPHYSEMA."

Part of the right lung of a child, presenting a honeycombed appearance ; on the surface of the pleura and on section are seen the bladder-like dilatations of the bronchioles and air vesicles. From a child of $5\frac{1}{2}$ years who died of acute bronchopneumonia.

Lent by the Royal Free Hospital.

956. BRONCHIECTASIS AND BRONCHIOLECTASIS.

The anterior thirds of both lobes show general uniform dilatation of medium-sized and small bronchial tubes. The condition is most marked near the periphery giving a honeycombed appearance to the lungs.

See microscopic section.

957. BRONCHIOLECTASIS.

A section of lung shewing "honeycombing" due to dilatation of smaller bronchi. Microscopically the small cavities are seen to have resulted from a dilatation of the bronchioles, there is much peribronchitis.

Lent by Brompton Hospital.

958. HONEYCOMB LUNG.

From a child, aged four, whose illness began five weeks before death with whooping cough. The lungs are riddled with small cavities, some of which are bronchiolectatic in nature. Suppurative broncho-pneumonia is also present.

Lent by St. George's Hospital.

959. THE LUNGS OF A CHILD showing a honeycomb condition.

Extensive tuberculous deposits are scattered through the lung. From a child aged five months.

Lent by the Middlesex Hospital.

960. MASSIVE COLLAPSE OF LOWER LOBE OF LUNG.

The upper lobe is in a condition of grey hepatisation. The lower lobe is collapsed. A fibrinous layer covers the pleural surface of the lower lobe, but no fluid effusion was present. Collapse appears to have resulted from imperfect action of the diaphragm.

Lent by the Middlesex Hospital.

SYPHILIS.

961. WHITE PNEUMONIA (CONGENITAL SYPHILIS).

A right lung affected with syphilitic pneumonia. The lung tissue presents a white hepatized appearance. There is no evidence of any recent inflammation of the pleura.

From an infant who only survived birth $\frac{1}{4}$ hour. A bullous eruption was present on the body. The liver and spleen were enlarged.

Lent by St. Bartholomew's Hospital.

962. SYPHILIS OF LUNG.

A section of lung shewing fibrosis. The main bronchus of the upper lobe is almost completely stenosed so that it is only possible to insert a fine probe through the constriction.

Lent by Brompton Hospital.

963. A SECTION OF LUNG.

From a case of syphilitic mediastinitis. A dense mass of fibrous tissue extended upwards from the mediastinum into the neck. Part of this mass is seen at the upper part of the specimen and extending into the lung substance. Several rounded gummata are present, chiefly in the middle part of the lung.

964. SYPHILITIC FIBROSIS OF LUNG.

The upper, middle and to a greater extent the lower lobe are the seat of fibrosis very well marked in connection with the bronchi. There is no evidence of bronchiectatic dilatation. There was an abscess in each lung.

From a man, aged 47, who for 6 years previous to his death had suffered from pulmonary trouble.

965. GUMMA OF LUNG.

The gumma which is undergoing caseation is embedded in fibrous tissue. There is some pleural thickening.

From a man, aged 28, who had syphilis and died from lardaceous disease of the kidneys. Numerous gummata were found in the liver and testes. There was no evidence of tuberculosis.

Lent by St. George's Hospital.

966-977. TWELVE RADIOGRAMS OF CHEST CASES.

Lent by Dr. G. Harrison Orton.

978 DIAGRAMS TAKEN BY THE ORTHODIAGRAPH (TAKEN BY THE ORTHOGRAPH) ILLUSTRATING IMPAIRED MOVEMENT OF THE DIAPHRAGM.

Lent by Dr. Pasteur.

XI.—CARDIO-VASCULAR SYSTEM.

Hon. Curator - Dr. T. LEWIS.

A.—ANATOMY.

The research work of the past few years has brought to light certain new structures in the mammalian heart. The most important of these are :—

1. The *sino-auricular node*, a specialised tissue lying at the junction of superior vena cava and right auricle. In this tissue, of which the muscular fibres are small and scattered amongst a dense meshwork of connective tissue and nerves, the normal heart-beat probably takes its origin. It is exemplified by exhibits 986-988 (macroscopic and 987-988 (microscopic).

Lent by the Royal College of Surgeons.

986. Specimen.

987. Specimen.

988. Specimen.

2. The auriculo-ventricular bundle which courses from right auricle in the neighbourhood of the coronary sinus termination, to the membranous septum of the ventricles where it divides to distribute itself to right and left ventricles respectively. At its commencement a "node" is situated (the so-called "node of Tawara") consisting of specialised tissue, not unlike that of the sino-auricular node. The auriculo-ventricular junctional system, which has been proved to convey the impulses of the normally beating auricle to the ventricle, is exemplified in exhibits 989-991 (macroscopic) and 994-996 (microscopic).

Lent by the Royal College of Surgeons.

989. Specimen.

990. Specimen.

991. Specimen.

992. DOG'S HEART.

Dr. A. E. Cohn, New York.

A transverse section of the aorta, right auricle and right appendix.

Showing the sino-auricular node; the structure in which the normal heart-beat is supposed to start.

993. NORMAL HUMAN HEART.

Showing the sino-auricular node at the junction of the superior vena cava and right auricle.

It is in this structure that the normal heart-beat is supposed to arise.

994. RAT'S HEART.

A vertical section through the entire heart of a rat.

Showing the auriculo-ventricular bundle at the approach of its division on the septum of the ventricle.

995. NORMAL HUMAN HEART.

Horizontal section through the wall of the right auricle and through the inter-ventricular septum.

To show the two branches of the auriculo-ventricular bundle during their course upon the interventricular septum.

996. NORMAL HUMAN HEART.

Horizontal section through the walls of the right auricle, the auriculo ventricular septum and the membranous septum.

Showing the auriculo-ventricular node and its connections with the auricle on the one hand and with the auriculo-ventricular bundle on the other hand,

B.—MICROSCOPIC ANATOMY.

When the bundle has divided into its two main branches for the supply of right and left ventricles respectively, these branches pursue their course towards the papillary muscles and break up into a complex arborisation and network (the so-called "network of Purkinje"). The structure of this network is very special, the cells are very large, fibrillation is sparse, and they are often multinucleated. The general arrangement of the structures comprising the auriculo-ventricular junction system are shown in the diagram No. 991. The structure of Purkinje's substance is exemplified by exhibits 992-994.

997. A diagram of a heart, opened on the right side, to show the arrangement of the several portions of the auriculo-ventricular functional system.

C.—MICROSCOPIC ANATOMY.

Lent by Dr. Butterfield.

998. Specimen.

999. Specimen.

When the auriculo-ventricular bundle is damaged, either by experimental interference, or by disease, the impulses which normally pass through it are hindered in their transmission from auricle to ventricle and a condition known as heart-block results. Clinically, damage to the bundle has been repeatedly found to give rise to heart-block. The ventricle in this condition beats slowly (more slowly than the auricle), and frequently the condition is accompanied by phenomena dependent upon deficient cerebral nutrition. The Adam-Stokes syndrome is a condition in which bradycardia and eliptic phenomena are combined.

Exhibits 1000-1007 shows lesions of the auriculo-ventricular bundle in patients who developed this syndrome. (Examples of the curves obtained from the hearts of these patients will be seen later.)

D.—MICROSCOPIC ANATOMY (PATHOLOGICAL).

Dr. A. E. Cohn, New York.

1000. Horizontal section through the posterior portion of the membranous septum of the ventricle. Connective tissue and scar are stained red.

The auriculo-ventricular node is shown. It is in an inflammatory state. Granulation tissue is present.

(Reported by Griffiths and Colin.)

1001. Section of a heart from a patient with Stokes-Adams' syndrome. Heart-block present. There was a syphilitic history. The auriculo-ventricular node was inflamed, and bundle narrowed, and the left branch divided.

The section shows round-cell infiltration of the right branch of the bundle.

(Reprinted by Drs. Griffiths and Cohn.)

1002. From a case of clinical heart-block (partial). Stokes-Adams' syndrome present.

The section shows partial obliteration of the auriculo-ventricular bundle and node. There is a large excess of fibrous tissue, and the structure contains large, thin-walled bloodvessels.

From a case of clinical heart-block (partial)
Stokes-Adams' syndrome present.

1003. Horizontal section through the membranous septum. The main division of the auricular-ventricular bundle is shown.

From a case of clinical heart block (partial)
Stokes-Adams' syndrome present.

1004. Section showing the auriculo-ventricular node of main stem of the bundle.

From a case of clinical heart-block (partial)
Stokes-Adams' syndrome present.

1005. Horizontal section through the interventricular septum, showing the auricular-ventricular bundle near its division.

From a case of clinical heart-block (partial)
Stokes-Adams' syndrome present.

1006. Horizontal section through the interventricular septum, showing the auricular-ventricular bundle near its division.

From a case of clinical heart-block (partial)
Stokes-Adams' syndrome present.

1007. Showing the left and right branches of the auricular-ventricular bundle.

E.—CLINICAL PATHOLOGY.

GRAPHIC RECORDS.

The curves of this series are lent by Dr. Thomas Lewis.

It is now known that many disturbances of the heart's system may occur in patients. Our knowledge of such irregularities as they occur clinically is chiefly derived from observations from two new methods:—

1. The venous pulse method.
2. The electro-cardiographic method.

The first purpose of graphic record, in the investigation of irregularities, is the determination of the instants at which auricle and ventricle respectively enter systole.

1. The instrument generally employed for venous pulse work is Mackenzie's polygraph, and it consists of a registering apparatus and two writing tambours, which are connected to receivers which lie upon an artery and vein respectively. The arterial record gives, after certain corrections are made, the time of onset of ventricular systole (this may also be obtained by curves taken from the apex beat). The venous record is an approximate duplicate of intra-auricular pressure and gives the time of onset of auricular systole. The venous pulse consists of three

waves *A*, *C*, and *V* and the interpretations of these waves, and the dips *X*, *X* 1 and *Y*, which intervene between them, are given in exhibit 1008.

1008. A diagram illustrating the chief factors responsible for the production of the main elevations and depressions of the physiological venous pulse.

The time relationships of the venous curve to curves of carotid, aortic, ventricular and auricular pressure are shown in exhibit 1009.

1009. A diagram illustrating the time relationships of:—

1. The carotid pressure curve.
2. The aortic pressure curve.
3. The ventricular pressure curve.
4. The intra-auricular pressure curve.
5. The volume curve of the veins, the venous or jugular pulse.

Actual curves are shown in exhibit 1010.

1010. Examples of the physiological venous pulse (or jugular pulse), obtained by means of Mackenzie's polygraph.

One of the many proofs that the wave *A* is in reality the representative of auricular systole is given in exhibit 1011.

1011. Four curves taken from a single patient. In each strip the lower curve is the radial tracing. The four upper curves of the separate strips were obtained from a fixed point in the neck. They are arranged from above downwards to show the transition from the arterial to the venous type of curve. In the first curve the pressure upon the neck was heavy. In the last curve the pressure was light. The first curve shows no trace of "*a*," the auricular representative; in the second curve it just appears, and directly precedes the upstroke of the carotid. In the last two curves it is well marked.

The second method employed, the electro cardiographic, also gives the instants of onset of *As* (auricular systole) and *Vs* (ventricular systole).

Electro-cardiograms are obtained by means of a highly sensitive galvanometer, the invention of Professor Einthoven. The patient is placed with two limbs (usually right arm and left leg) in baths of salt solution, and these baths are connected to the galvano-

meter. The electric current produced in the body as a result of the heart-beat moves a fine fibre, the shadow of which is magnified and photographed. Both auricle and ventricle yield currents which may be recorded. A diagram of a typical normal electro-cardiogram is given in exhibit 1012.

1012. A diagram illustrating the peaks and depressions of the normal electro-cardiogram and their interpretation.

Actual normal electro-cardiograms are shown in exhibits 1013, 1014 and 1015.

1013. Electro-cardiographic curve from a normal subject, taken by Professor Einthoven. The full auricular and ventricular complexes are shown. P=auricle. Q, R, S and T=ventricle.

1014. Three electro-cardiograms taken by Professor Einthoven and accompanied by carotid and radial curves. From a normal subject. To show a normal variation of the curve with separate leads.

1. From right hand and left hand.
2. From right hand and left foot.
3. From left hand and left foot.

1015. Two electro-cardiographic curves from the dog's heart. The upper figure shows simultaneous myo-cardiographic curves from auricle and ventricle (Au=auricle. V=ventricle). In the electric curves P represent auricle and R and T or R. S and T represent ventricle.

Exhibit 1016 illustrates the sensitivity of the apparatus.

1016. Two curves showing the effect of throwing very small electric currents into the circuit of the galvanometer. The figure shows the quick response of the string and the "dead beat" character of its movement. In the first figure the string was relatively slack, in the second figure relatively stretched. The second figure shows the effect of the passage of a current of $\frac{1}{3,000,000}$ ampère through the string. (The circuit resistance was approximately 10,000 ohms).

F.—THE PACE-MAKER OF THE HEART.

It has been said that the normal heart-beat is probably generative in the neighbourhood of the sino-auricular node. This may be shown by an

electro-cardiographic method. The shape of the electro-cardiogram is determined by the direction in which the heart muscle contracts. If it contracts in the normal direction, the electro-cardiogram will be normal. If a contraction is started at an abnormal point, it will travel in an abnormal direction and will give rise to an electro-cardiogram of a distinctive type. Now the auricular contraction and the ventricular contraction each have their representatives in the electric curve. If an abnormal beat is artificially started in the auricle at a point distant from the pacemaker, the resultant *auricular* curve will be abnormal. The ventricular curve will be much the same in whatever part of the auricle the beat is started, for it will always start the ventricle contracting from the same point. The auricular representative (P) is only normal when the beat is excited from the neighbourhood of the sino-auricular node. (See exhibits 1017 to 1022.)

1017. A diagram showing the electric complexes of the auricular systoles in a series of thirteen experiments. The number of the experiment is indicated to the left. The point from which the auricular systole was propagated is indicated above. Each curve has been traced from the original photograph. Where slight variations in type have been present from beat to beat, that type has been chosen which is of most frequent occurrence. N = normal complex S.V.C. = that obtained from superior vena caval areas (*h* the upper point, and *l* the lower point of excitation). I.V.C. = from inferior vena caval area, an asterisk is placed against curves obtained by internal stimulation. P.V. = from area of pulmonary veins. C.S. = from coronary sinus, internal stimulation. A.B. = from base of auricular appendix. R.A. = from right and L.A. = from left auricular appendix. The curves of the first six experiments were taken at a comparatively low speed, and the P.R. intervals are, therefore, omitted.
1018. An outline of the base of a dog's heart, to show the actual points of stimulation in the experiments. Seen from in front, with the aorta and pulmonary artery removed.
1019. An outline of the base of a dog's heart, to show the actual points of stimulation in the experiments. Seen from behind.

1020. In each curved portions of three beats, artificially excited from a known point of the auricular musculature by means of regular induction shocks, and portions of three beats of the normal rhythm are shown. The stimulus is signalled in the top line, the time-marker in 0.20 sec. is shown in the second line, the electro cardiogram in the third. The sites of stimulation were, I., the superior cavo-auricular junction ; II., the mouth of the coronary sinus internally ; and III., the left appendix.
1021. Similar curves to those of Fig. 4, but excited from I., the right auricular appendix ; II., the inferior vena caval area ; and III., the superior vena caval area III. is at a slower speed, for the purpose of showing the variation in the form of the normal P peak which is at times met with. So marked a variation is very infrequent.
1022. Similar curves to those shown in the preceding figures. The points of stimulation were, I., the superior vena caval area ; II., the mouth of the coronary sinus, internal surface ; and III., the pulmonary vein area.

G.—VENTRICULAR EXTRASYSTOLE.

One of the simple forms of irregularity of the heart may be taken as a type. The ventricular extrasystole is a premature beat which, arising in the ventricle before the normal response to auricle is due, produces an interruption of the ventricular rhythm. It does not disturb the auricular rhythm, the ventricle having contracted prematurely awaits the arrival of the next auricular impulse (the pause so produced is termed the "compensatory pause.")

1023. A diagram showing the mechanism of the heart, and the curves produced in carotid and jugular tracings by ventricular extrasystoles. The premature ventricular beat is the second one in each section of the diagram ; the remaining ventricular beats belong to the normal and by them. The oblique lines represent the impulses descending from A to V.

To illustrate the appearances found in radial pulse curves and the aurtulatory signs when ventricular extrasystoles, seldom or frequent, early or late, interrupt the normal rhythm. The vertical lines and their incidence to the beats show the absence of dis-

turbance of the fundamental heart rhythm. Actual polygraph records from patients are shown in exhibits

1025. Three curves showing premature ventricular beats.
The first shows premature contractions after every 4th normal beat. The second after every second normal beat. The third after each normal beat.

When auricular and ventricular beats coincide, the early ventricular contraction taking place at the expected instant of the next rhythmic auricular beat, a prominent wave is caused in the jugular. The auricle pumps its blood backwards instead of forwards.

1026. Venous and radial curves from a case of irregularity of the pulse due to ventricular premature beats some of which are interpolated (from Laslett's case, "Heart," Vol. 1).

The electro-cardiogram of the ventricular extrasystole is special and is in a measure distinctive of the point from which such a beat arises. They may be "localised" within certain limits.

To illustrate the possibility of localising the origin of premature beats arising ectopically (away from the pacemaker) in the human heart:—

1027. Curve from a dog. The ectopic beats (Ep En) were provoked by stimulation of the base of the left ventricle posteriorly.
Curve from a clinical subject showing similar ectopic beats.
The normal beats of the rhythm, which is interrupted, are designated in the usual way (P=auricle R and T=ventricle).

1028. Electro-cardiograms taken from a patient in which the normal rhythm was interrupted by premature beats arising in the right ventricle. The normal beats of the heart are shown by P (auricular) and R S and T (ventricular) peaks. The premature beats are much more extensive, and consist of variations En and Ep.

The upper curve is taken from the right arm and left leg, the lower from the left arm and left leg. The depth of S in the second curve is held to be an indication of hypertrophy of the left ventricle.

Several ventricular extrasystoles may follow each other in rapid succession (constituting a short paroxysm of tachycardia). Yet the fundamental rhythm may not be disturbed.

1029. Radial curves from a patient with an irregular pulse. To show the absence of disturbance of the fundamental or sinus rhythm of the heart in instances of ventricular ectopes (extrasystoles).
The vertical lines are equi-distant.
1030. The upper curve is an electro-cardiogram taken from a patient with marked irregularity of the pulse. It shows the normal rhythm (composed of waves P R and T) interrupted by first a paroxysm of six beats, and later by one beat. These abnormal beats (marked En, Ep in the figure) are ectopic. They arise in the ventricular musculature on the right side. The lower curve shows the end of a series of beats interrupting the normal rhythm of a dog's heart. They were induced by stimulating a point of the musculature lying in the right ventricle. For comparison with the upper figure.
1031. A polygraph curve showing premature contractions of the ventricle occurring in succession.

H.—AURICULAR EXTRASYSTOLES.

The mechanism of the heart's action when auricular extrasystoles are present is shown in No. 1033, and is contrasted with that obtaining with ventricle extrasystoles in 1032. Polygraph records are shown in 1034.

1032. Diagrammatic representation of the mechanism of the heart when the normal rhythm is interrupted by ventricular premature beats. J = jugular pulse. A = auricle. V = ventricle. R = refractory period of ventricle. C = carotid curve. The oblique lines represent the impulse descending from the auricle.

AURICULAR EXTRASYSTOLES.

1033. Auricular extrasystoles. The uppermost diagram shows no disturbance of the fundamental rhythm (a rare event). The second diagram shows the mechanism where an impulse starts in the junctional tissues fires off A and V together. The third diagram shows the usual mechanism with auricular extrasystoles. The premature beat is followed by a short pause, and the fundamental rhythm of the heart is disturbed.
1034. Irregularity of the heart due to premature beats arising in the auricle. Apex, venous and radial curves.

It has been stated that the electric curve yielded by the auricle depends upon the point at which the auricular

contraction starts. Attention should be paid to the form of the curve directly preceding systole (R). (See Nos. 1035—1042.

1035. Electro-cardiographic and radial curves from a patient. A single premature auricular contraction. The early P variation is of normal form. This contraction has therefore arisen near the pace-maker.

Electro-cardiographic and radial curves from a patient. Two auricular extrasystoles are present, P is iso-electric and does not show.

Electro-cardiographic curve from a patient. Taken from a paroxysm of auricular beats, of which each second one meets no ventricular response. The P variations are inverted.

1036. Premature auricular contraction started in various points of the auricular musculature. Experimental. Showing slight variations in the form of P.

1037. From a patient with an irregular pulse as a result of interference with the normal rhythm by premature auricular contractions. E=electro-cardiogram. Ra=radial curve.

1038. An electro-cardiographic curve from a patient with an irregular pulse. P=auricle, R and T=ventricle. A single premature beat is shown. It arises in the auricle, for the ventricular complex R T is preceded by an auricular representative. The auricular representative differs somewhat from the normal P (the abnormal P is marked below the base line.) From its general shape, and from a comparison with experimental curves it is known to arise in the right auricle in the neighbourhood of the superior vena cava.

1039. From a dog. I. Tachycardia has been excited from the area of the pulmonary veins. In this figure the make and break excitations effect the electric curve; II. single interruptions of the normal rhythm. Two abnormal beats are shown. The stimulus was applied to the superior vena caval area. III. a single premature beat, occurring late in diastole, and excited from the superior caval area, is present.

The figure shows variation in the shape of P dependent on site of excitation; also a new phenomenon, namely, variations in the ventricular portions of the curves, according to the early or late instant of the premature contraction in diastole.

Variations in the form of the ventricular complex accompanying auricular extrasystoles are occasionally met with (see Nos. 1039—1042.) Experimental duplicates may be produced.

1040. Four electro-cardiographic curves from a single patient. The auricular representation of the premature beat always falls upon the preceding ventricular representation, and deforms it by notching it in a downward direction. In the first curve the premature P (marked below) meets with no ventricular response. In the second and third strip the response is present, but in each instance it is of abnormal form.
1041. From the same case. The curves were taken at one sitting. Each strip presents a single ectopic contraction, arising in the central zone of the auricular musculature. They are arranged to show the transition from one type of ventricular complex to another and distinct type.
1042. Dog. Four experimental curves. Each shows a premature auricular contraction. A and C were excited from the superior, B and D from the inferior caval area. A and B occur early, C and D later in diastole. To show a special type of ventricular complex and for comparison with the preceding Exhibit (No. 1041).
1043. Curve.

Just as ventricular extrasystoles may be successive, so may auricular, and the latter form one of the commonest cause of paroxysmal tachycardia. (No. 1043.)

I.—PAROXYSMAL TACHYCARDIA.

Paroxysmal tachycardia may be due to one or other of the following causes:—

1. Neurogenous. Rapid alterations of frequency as a result of nerve influences.

2. Cardiac due to the generation of new impulses (of pathological type) in some portion of the cardiac musculature. The forms are subdivided as follows:—

Successive impulses—

(A.) An auricular form.

(B.) A ventricular form.

Multiple impulses—Auricular pulsation.

The cardiac forms and those which arise as a result of the formation of successive impulses of a pathological type are dealt with in this division.

It is important that it is demonstrated that this impulse formation is independent of the withdrawal of vague impulses. (See Nos. 1044—1047.

1044. Carotid curve taken from a cat by means of Hürthle's manometer. The right coronary artery had been tied. To the left of the stop is the normal pulse curve.

Short paroxysms of tachycardia are shown to the right. The time signal is in seconds.

The vago-sympathetics were divided in the neck.

1045. Two tracings from dogs' hearts, showing the origin of ventricular ectopes (extrasystoles) as a result of tying the first coronary artery, vagi divided. In the first figure, successive extrasystoles *c*, *c'*, *c''* are shown. In the second figure, a paroxysm of beats is starting in the ventricle; each of these beats is retrograde to the auricle (*i.e.* starts an auricular contraction). The ventricle becomes pace-maker to the heart.

V = myocardiogram of ventricle. A = of auricle. C = arterial curves.

1046. Similar curves showing ventricular paroxysms. The upper curve shows the breakdown of a paroxysm under vagal stimulation.

1047. Similar curves showing ventricular paroxysms. The auricle in the left upper figure is failing to respond to each ventricular contraction. In the lower left hand figure it responds to fourth 4th ventricular systole. In the upper right hand figure it is in fibrillation. In the lower right hand figure, vagal stimulation stops auricle but not ventricle.

The preceding figures show that the paroxysm arises in the ventricle, and demonstrate the possibility of the origin of a spontaneous and rapid rhythm away from the pace-maker. New and dominating rhythms must be recognised as an important factor in cardiac pathology.

1048. 1. Four curves from a case of paroxysmal tachycardia taken during the paroxysm and showing the large auricular waves with alternation of the same.

2. The same, showing alternation of the radial pulse as an accompaniment of respiration.

3 and 4. The irregularities of the slow period. They consist of sinus irregularities and premature auricular contractions.

1049. Three polygraph curves form a case of paroxysmal tachycardia arising in the auricle.

1050. Two curves (6 and 7a and 7b) from the case of paroxysmal tachycardia of the auricular form showing the offset of one paroxysm, the onset of the next paroxysm.
1051. Curves from a case of paroxysmal tachycardia of the auricular form.
1. Venous and radial curves with respiration in play and with respiration held.
 - 2 and 3. Radial curves showing pulsus alternans.
 - 4 and 5. Terminations of paroxysms.
 6. Irregularity of the slow periods.
1052. A chart taken from a case of paroxysmal tachycardia of the auricular form. The ordinates represent two-hourly periods. The chart shows changes of pulse rate over a period of seven days.
1053. A chart showing the relationship of systolic pressure at the termination and commencement of an attack of paroxysmal tachycardia.
- The fine line represents pulse rate, the heavy line represents blood pressure.
- The times are marked below.

The polygraph curves show the abrupt onset and offset of the paroxysms, and the long pauses which succeed them. These are features of dislocated rhythms. The electro-cardiographic curves demonstrate definitely that the rhythms are dislocated or eclopic (see Nos. 1054 and 1055).

1054. Electrocardiograms and venous curves. From a case of paroxysmal tachycardia. The first two curves show the mechanism of the heart during the slow periods; the normal rhythm is interrupted by auricular ectopic beats arising prematurely. The third curve shows the onset of a paroxysm of tachycardia. Each beat of the paroxysm is preceded by a small inverted representative of the auricular contraction. The auricular contractions have taken a course other than the normal. They have, therefore, arisen at a point removed from the pace-maker. The paroxysms represent ectopic or dislocated rhythms.
1055. Electro-cardiographic curves from a case of paroxysmal tachycardia.
- The first two curves show the onsets of paroxysms.
- The last two curves were taken during paroxysms.
- The paroxysms arise at a point in the auricle removed from the pace-maker—an instance of ectopic rhythm or dislocation of the site of rhythm production.

A dislocation of rhythm is still more strikingly shown by the next three figures (Nos. 1056—1058).

1056. Apex and radial curves. From a case of paroxysmal tachycardia, showing three complete paroxysms. The beats preceding the paroxysms are well shown in the first two attacks. The two premature beats are seen during the third paroxysm—the pauses are completely compensatory.
1057. Venous and radial curves from a case of paroxysmal tachycardia showing two complete paroxysms. The *a—c* interval is reduced to 0.06 sec. during the etopic rhythm.
1058. Electro-cardiographic and radial curves from a patient with paroxysmal tachycardia. A complete paroxysm is shewn. The curve opens with three normal beats, accompanied by the usual P, R and T variation. These are succeeded by two auricular extrasystoles, and then the true paroxysm commences. The beats of the paroxysm are like those of the normal rhythm; except that the variation P is inverted. The paroxysm ends in a long pause and this is followed by two abnormal beats, a paroxysmal beat and two normal beats in which the upright P variation has returned.

From the same case as No. 1056.

The striking feature of this curve is the complete inversion of P, while R and T are almost unaltered, during the paroxysm. The auricle has contracted from below upwards instead of from above downwards. The shortened interval (P—R) during the paroxysms shows that the rhythm has arisen in the functional tissues.

J.—AURICULAR FIBRILLATION.

Auricular fibrillation gives rise to the commonest clinical irregularity. The proof of the condition in man lies in a close comparison of clinical and experimental curves.

1059. Simultaneous curves from a dog's heart. From above downwards the curves are auricular, ventricular and carotid. At the end of the tracing the normal rhythm returns spontaneously. The fibrillation of the auricle, present in the first parts of the curve, was induced by faradic stimulation of this chamber. During the fibrillary period the auricle remains in the diastolic position.

Arterial curves compared :—

1060. Carotid curves from a dog to illustrate the irregularity of the pulse in fibrillation of the auricle.

A short strip of curve from the normal rhythm is present in the third line up to the point marked by the arrow.

1061. Radial pulse curves taken with a Dudgeon sphygmograph. The time marking, which applies to all curves beneath it, is in 0·2 sec. The figure illustrates the general characteristics of the disordered heart action present while the auricle is fibrillating.

CURVES 1 AND 2.—A. H., a man aged 48, admitted to hospital suffering from mitral stenosis of rheumatic origin and general cardiac dilatation. Enlargement of liver, distended veins and dropsy were present. Irregularity complete and persistent; murmurs early and middiastolic; venous curves of ventricular form; electro-cardiographic curves of usual type. The oscillations were maximal when the electrodes were placed over the right auricle.

CURVE 3.—W. S., a man aged 64, the subject of bronchitis, emphysema and arteriosclerosis. No history of rheumatism. Heart somewhat enlarged to right and left. Heart sounds normal; S. B. P., 150 mm. Hg. With the exception of shortness of breath on exertion no signs of broken compensation were present. The irregularity disappeared on one occasion for a few days, the pulse regularity was then interrupted by auricular extrasystoles. The *a-c* interval was normal. With the complete irregularity the venous pulse was ventricular in outline, the electro-cardiograph was typical, the oscillations were maximal in leads from the parts of the chest wall covering the right auricle. There was no pulse slowing with heavy doses of digitalis.

CURVE 4.—W. P., a man aged 37, suffering from mitral stenosis of rheumatic origin. Heart enlarged to right and left, dyspnoea and slight liver enlargement, no dropsy. Pulse persistently irregular; ventricular form of venous pulse; electro-cardiograms typical; oscillations maximal with electrodes in neighbourhood of right auricle.

CURVE 5.—R. N., a man aged 65, suffering from aneurysmal dilatation of the whole thoracic aorta, pulmonary oedema, associated with arterial sclerosis, emphysema and signs of sclerotic kidney. Dropsy and liver enlargement present. Pulse persistently irregular; ventricular form of venous pulse. Died unexpectedly.

Venous curves compared :—

1062. Polygraph curves taken from a dog with the chest wall intact. Venous and femoral curves are present. Each curve shows

the normal rhythm, associated with *a*, *c* and *v* waves, interrupted by a short paroxysm of irregular tachycardia, as a result of faradisation of the auricle. During the paroxysm the venous pulse is ventricular form.

1063. Simultaneous venous and radial curves from four patients with complete irregularity of the heart and the ventricular form of venous pulse. The figures illustrate some of the different types of venous curve met with in this condition. The venous curves are constant in that all rapid upstrokes lie within the confines of systole (E, E). The dotted lines in this and subsequent curves unite points representing one and the same phase of the cardiac cycle. The heavy vertical lines cutting a whole tracing mark the points where curve has been excised.

CURVE A.—R, a man aged 39. The mother had rheumatic fever. Admitted for shortness of breath and precordial distress. Heart enlarged right and left, veins prominent and liver dulness increased. No dropsy. Heart sounds weak but otherwise normal. Electro-cardiograms typical, oscillations maximal over auricle. Four inches of curve have been excised from this figure.

CURVE B.—Mrs. K. P., aged 23, the subject of mitral stenosis of rheumatic origin. Admitted with enlarged liver and dropsy. The curves were taken some weeks after admission when the patient had responded well to digitalis. Early and mid-diastolic murmurs, electro-cardiograms typical. Eight inches of curve excised.

CURVE C.—M, a man aged 26, with no symptoms other than slight short-windedness on strenuous exertion. History of rheumatic fever. No cardiac enlargement, no murmurs. Irregularity has been present two years and has been persistent. The electro-cardiograms show prominent oscillations and ventricular extrasystoles.

CURVE D.—Mrs. A., aged 38, suffering from mitral stenosis. On admission dropsy and œdema of lungs were present. Tracing taken several months later, subsequent to digitalis. Compensation had so far improved as to allow her to pursue her ordinary duties as housewife. Heart enlarged to right and left; early and mid-diastolic murmurs. Veins not prominent. Irregularity persistent. Two inches of curve excised.

1064. Venous and femoral curves from a dog. In the two first curves the auricle was fibrillating throughout. They illustrate the effects of vagal stimulation.

The two lower curves illustrate the return of the auricle from the fibrillar to the co-ordinate state as a direct result of vagal

stimulation. The small fibrillation waves are well shown on the venous curve during the pauses.

1065. Simultaneous venous and arterial tracings from three patients with complete irregularity of the heart. Illustrating the several types of wave which occur in diastole when the venous pulse is ventricular in form.

CURVE A.—The curve shows fibrillation waves, *f f f*, during the long diastolic pauses. These are superimposed upon long stasis waves. The systolic portion of the venous curve is of the plateau form.

CURVE B.—There is a wave in diastole marked * which is ascribed to closure of the tricuspid valves at the end of filling. In the longest pause small oscillations *f f* appear.

CURVE C.—From a man, aged 49, suffering from mitral stenosis of rheumatic origin. The heart considerably enlarged to right and left. Dropsy and pulsatile liver. Early diastolic murmur at apex. The pulse is completely irregular, except that each large beat is followed by a smaller one at an almost constant interval. In the diastolic portion of the curve a gradual rise ends in a plateau, and where the two meet three small oscillations occur (marked \times). They were accompanied by a valvular sound at the apex and in the neck. They are attributed to closure of the tricuspid valves.

Electro-cardiograms compared :—

1066. Electro-cardiograms taken from dogs in which the auricle was fibrillating. There is no constant P variation, it is replaced by the characteristic oscillations.
1067. Four examples of auricular fibrillation. Electro-cardiograms from patients. Leads, right arm and left leg. To show the variation in the prominence of the characteristic auricular oscillations (marked *f f f* in the figure). The peaks R and T. of the ventricular beats correspond to those met with in the curves of subjects in whom the heart rhythm is regular.
1068. An electro-cardiogram from a dog's heart. The auricle is in fibrillation and the oscillations which it produces are well shown (*f f*). The ventricle is beating very slowly, only one beat (RT) is shown.

The oscillations are maximal in the patient when the leading-off electrodes are placed over the right or superficial auricle.

1069. From a patient with mitral stenosis of rheumatic origin. Completely irregular heart action and the ventricular form of venous pulse were present. The figure shows electro-cardiograms obtained by six separate leads. I., right arm

and left leg. II., sternum between junction of second and third cartilages, and point over right auricle. III., sternum and apex. IV., sternum and outer end of first intercostal space. V., outer end of third intercostal space and apex. VI., apex and point on the abdomen, 3 inches internal to the apex and just below rib margin. The first electrode site mentioned above is in each case the site of the arm electrode. The curves show that the oscillations are maximal according to the proximity of electrodes and superficial auricle. They also show the normal character of the ventricular complex.

1070. From a case of auricular fibrillation in which the oscillations were conspicuous. Leads were taken from five parts of the chest wall by means of special electrodes. It could be shown by this method that the oscillations proceeded from the neighbourhood of the auricle, for their prominence in one lead or another depended upon the proximity of the electrodes to the right or superficial auricle.

The oscillations are maximal in the animal when the electrodes are placed on the auricle.

1071. A series of experimental curves from a single animal.

CURVE I.—Leads from a point on the auricle just below the superior vena cava and from the inferior vena cava. The auricle was fibrillating up to the place marked with an arrow. At this point the co-ordinate contractions returned. A = auricular variations. V = ventricular variations.

CURVE II.—A similar curve. The point where auricular fibrillation ceases is uncertain. In both curves the oscillations are maximal.

CURVE III.—Leads from two points on the right ventricle, one above and near the right border, and one below and near the apex. The auricle is fibrillating over the whole curve, yet no oscillations are seen. Up to the point where the arrow is placed the vagus was stimulated and a slight escape of current is shown in the curve.

CURVE IV.—From the same points after the return to the normal rhythm. A comparison with the last curve shows that the direction of contraction in the ventricle is identical while auricular fibrillation and auricular co-ordination are present.

Curves III. and IV. may be compared in respect of the amplitude of the opening variations of the separate beats. In III. it is variable; in IV. it is constant. Therefore, the auricular oscillations are not entirely responsible for the variation in the height of the peaks R during fibrillation, for in III. no oscillations are present. The height of the opening variations is greater in III. than in IV.

CURVE V. leads from the upper and lower ends of the wound. The wound travelled through the centre and whole length of the sternum. The upper electrode was upon the base of the neck; the lower one upon the diaphragm. The curve is very small, and, though much somatic musculature was included between the electrodes, no oscillations are seen. As a consequence, the oscillations are shown to arise in the heart itself. At the arrow the normal rhythm is resumed. Up to this point the sensitivity of the galvanometer was maintained at a constant point.

CURVE VI.—The same leads as the last, but the sensitivity of the galvanometer is now increased approximately threefold. The oscillations are just visible, and distort the curve to some extent. The normal rhythm is resumed where the arrow is placed. A careful comparison of the ventricular curves before and after the resumption of the normal rhythm shows them to be of essentially the same form, and this form is the normal one.

The electrode site first mentioned is invariably the site of the base electrode.

Auricular fibrillation is frequently paroxysmal. When the normal rhythm returns, the oscillations are replaced by the P variations, representative of the returned and co-ordinate auricular activity.

1072. Two electro-cardiograms from the same patient. The second taken two days after the first.

The oscillations give place to the usual P variations. The pulse became regular and was no longer rapid.

1073. From a patient suffering from mitral stenosis, taken before the onset of fibrillation. It shows an irregularity due to auricular extrasystoles.

1074. From the same case, a few days after the onset of fibrillation. I. Lead from right arm and left leg. II. From sternum at junction of second cartilage and from apex. III. From sternum and point over right auricle. IV. From the third left space in anterior axillary line and from apex. V. From apex and abdomen, three inches interval to the apex and just below the ribs. The first electrode site mentioned above is in each case the site of the arm electrode.

Complete heart irregularity occurs in the horse, and the auricle may be seen to fibrillate on opening the chest.

1075. Electro-cardiographic curves from a horse. The subject of auricular fibrillation. The heart beats are quite irregular,

the rate is increased from normal of 35 to an occasional rate of 150. The ventricular complexes are of normal outline, showing that the impulses creating the ventricular contractions are of supraventricular origin. Faint traces of fibrillation of waves appear at one point (*ff*). The horse was killed, and the chest opened. The auricle was seen to be in a state of fibrillation. An accident which occurred during the opening of the chest rendered the observations inconclusive. The two upper curves are inverted.

K.—HEART-BLOCK,

When there is damage to the induction of impulses from auricle to ventricle, heart block is seen. It occurs in several grades.

1. At first the interval between the onsets of A and V systoles (the *a-c* interval or *P-R* interval represents it) is increased.

2. Then ventricular beats are occasionally missed.

3. Later ventricular beats are missed at frequent intervals.

4. Lastly, separate rhythms are established in A and V.

1076. Heart-block in a cat as a result of asphyxia. Several grades are shown.

1. The first curve shows the normal rhythm.
2. Shows prolongation of *P-R* interval.
3. Shows 2 : 1 heart-block.
4. Shows complete dissociation.

1077. Examples of several grades of heart block :

Prolongation of *a-c* interval.

Missed beats, 1 in 5, 1 in 3, 1 in 3, and 1 in 2.

2 : 1 rhythm (the auricle beating twice as rapidly as the ventricle).

3 : 1 rhythm (the auricle beating three times as rapidly as the ventricle).

Complete dissociation or independent rhythms of auricle and ventricle).

1078. An electro-cardiographic curve showing an early grade of heart-block. The auricle contracts in the normal heart .14 to .16 sec. before the ventricle. In this instance P, the auricular representative, lies at a distance of .4 sec. from the ventricular

- representative R. There is a long interval between the end of the auricular systole and the beginning of the ventricular, which is abnormal. (The upper line is in $\frac{1}{5}$ or .2 seconds.)
1079. Heart-block as a result of asphyxia. Cat. Gradual prolongation of the P R interval leading up to dropped beats is shown.
1080. Dropped beats in a patient as a result of the administration of squills is seen in the upper curve. The lower curve shows complete dissociation in a patient, the subject of Stokes-Adams' syndrome. Venous and electric curves.
1081. 7 polygraph curves and one electro-cardiogram from a case of mitral stenosis in which heart-block was present and in which this was exaggerated by the administration of digitalis.
- No. 1 a vagal irregularity—long pauses occurred in the radial curve. The venous curve shows an escape of the ventricle, and following upon this escape a gradual increase in the length of the *a-c* interval.
- No. 3 shows similar slowing of the pulse with escape of the ventricle, so that auricle and ventricle contract together.
- No. 2 shows a premature ventricular beat occurring in the same patient. The prematurity of the ventricular contracting makes it coincide with the regular auricular beat.
- No. 4 shows similar slowing to that of No. 3, the whole heart is involved.
- No. 5 similar slowing with escape of the ventricle.
- No. 6 shows partial heart-block with the auricular systoles falling back on the ventricular contractions. In the centre of the curve a ventricular response is missed. Following upon this the *a-c* interval decreases, to increase once more to a marked extent.
- No. 7 shows prolongation of the *a-c* interval.
- No. 8 an electro-cardiographic curve showing prolongation of the P-R interval, and splitting of the wave "P"

VAGUS (EXPERIMENTAL).

1082. Two myocardiographic curves from auricle and ventricle with carotid tracings. Vagal stimulation (weak and unipolar) produces a condition of 2 : 1 heart-block. The auricle shows slight slowing.

I.—HEART-BLOCK AND AURICULAR FIBRILLATION.

Auricular fibrillation is sometimes encountered in patients with slow pulses. The combination is due to the presence of heart block and fibrillation in the same subject.

1083. Radial and venous curves from a patient with bradycardia and epileptic fits. Syphilitic history. The venous pulse is of the ventricular form. Absence of "a" waves. The condition is the result of auricular fibrillation and complete heart-block.
1084. From the same case. Electro-cardiographic curve from a patient with complete heart-block and auricular fibrillation. *I*, right arm and left leg. *II*, both electrodes over large right auricle. *III*, sternum and right auricle. *IV*, sternum and apex. *V*, apex and abdomen, internal to nipple and just below rib margin. The electrode site first mentioned is in each case the site of the arm electrode.
1085. An electro-cardiographic and radial curve from a dog. To show the effect of vagal stimulation upon auricular fibrillation. The effect of stimulation is passing off, but is still clear from beats 1 to 5. The stimulation causes slowing of the ventricle, while the oscillations which are largely masked when the ventricle is beating rapidly, are discovered.
1086. Simultaneous curves taken from the auricle, ventricle, and carotid of a dog. Systole writes upwards. To show the effect of vagal stimulation upon auricular fibrillation. The auricle is in a state of flickering diastole throughout. The ventricle responds irregularly to it. Vagal stimulation cuts off the impulses received from the auricle and the ventricle ceases to beat.
1087. Venous and electro-cardiographic curves from a patient with heart-block and fibrillation of the auricle.
1088. A continuous electro-cardiographic curve taken from a cat during the period of asphyxia. The curve starts when 2:1 heart-block is established—the auricle is represented by the variations P. The ventricle is represented by the variations R and T. At the point marked by the arrow in the upper curve the auricle was faradised and fibrillation ensued. The type of curve immediately changes. The normal auricular waves are replaced by the fibrillation waves (*fff*). At the same time, though the ventricle shows no appreciable change of rate its rhythm becomes somewhat irregular. The curve is continued, and shows the breakback from fibrillation + heart-block to a rhythm in which 2:1 heart-block is present. At the end of the lower curve the auricle is once more faradised and fibrillation ensues. The curves show the effect of heart-block in hindering the transmission of impulses from a fibrillating auricle.
1089. Two curves taken from a cat during successive periods of asphyxia. V = myocardiogram of ventricle. A = myocardiogram of auricle. The periods of asphyxia begin and end

where the arrows are placed. The first curve is of uncomplicated asphyxia. The second curve is of a similar asphyxial period, during the whole of which (from the points 1 to 5) the auricle was faradised and sent into fibrillation. At a point lying between 2 and 3 in the upper curve heart-block occurs as the result of the asphyxia. Up to this point the excursion of the auricle has greatly decreased, and from this point onwards the movements of the curve represent tug from the ventricle alone.

1090. At 5 the auricular contractions are again seen, and once more increase in excursion. The heart-block starts with an occasional dropped beat. At 4, 2:1 heart-block is seen. At the point marked 5, shortly after the onset of respiration, the heart-block disappears. In the second curve, and at the point marked 1, fibrillation of the auricle begins. It is accompanied by an increase of ventricular rate and by irregularity of the ventricle seen in the outlines of the ventricular curve. From the point marked 2 the rate of the ventricle gradually decreases up to a point lying between 3 and 4. Just before point 4 respiration starts once more, and the rate of the ventricle increases. Again, at the point marked 5, fibrillation ceases, and the normal sequence of heart-contraction is resumed. The two curves show the effect of heart-block upon the transmission of impulses from auricle to ventricle during fibrillation of the auricle. The obstruction to the passage of impulses shows earlier when the auricle is fibrillating; in the one case the curve shows an abrupt slowing of the ventricle, in the other case retardation is gradual.

1091. TRACINGS FROM A CASE OF MITRAL STENOSIS.

In which the auriculo-ventricular bundle was damaged; showing the effect of digitalis in the production of heart-block.

Lent by Dr. Laslett.

1092. TRACINGS FROM A CASE OF MITRAL STENOSIS WITH AURICULAR FIBRILLATION.

Showing the effect of digitalis. The pulse became practically regular, probably as the result of complete heart-block.

1093. TRACINGS FROM A CASE OF RECURRENT AURICULAR FIBRILLATION.

Showing the normal and abnormal rhythms.

CURVES.

1094. Curve showing a series of infrequent beats. The pulse remained at 30 per minute for long periods, and the long intermissions were infrequent.

1095. Curves showing a long pause of $2\frac{1}{5}$ " and a short one of $\frac{9}{5}$ secs., in which both auricles and ventricles participate. The a-e interval shows no alteration after the pause, being about $\frac{1}{5}$ ". The time marker in this and all the other curves records fifths of a second.
1096. A continuation of curve. After the long pause the rate is at first frequent.
1097. Curve obtained at the same visit as and , but a few seconds later. A syncopal attack with slight convulsive movement of the hands occurred towards the end of the second long pause. Curves , and combined, serve to show the frequency with which the long pauses of the heart occur, when the vagus inhibition is most marked.
1098. Curve showing the temporary quickening of the pulse produced by three swallowing movements made in quick succession. A short pause appears soon after the last swallowing act.
1099. Curve showing the "staircase phenomenon" in the radial pulse. The short pulse measures $\frac{12}{5}$ ". Anacrotism is well marked.
1100. Curve showing the effect of pressure on the artery distal to the bottom of the sphygmograph. The first staircase came after a pause (not shown) of $\frac{13}{5}$ ", the second after a pause of $\frac{19}{5}$ ". Anacrotism well marked in the first two beats after a pause.
1101. Curve showing beats of large amplitude after the long pause of $5\frac{1}{5}$ ". The normal systolic line is not reached till the fifth beat. The first pulse-wave after the pause is slightly anchrotic, and the rate is at first slow.
1102. Curve showing the quickening effect of $\frac{1}{50}$ gr. atropine hypodermically. Taken 15 minutes after the injection. Just before the administration of the atropine the pulse was slow and showed frequent intermissions of 2 and 3 seconds. Auricles and ventricles are equally accelerated. P. 90 per minute.
1103. Curve showing that there is no apparent relation between the respiratory movement and the appearance of the intermissions. Taken with the ink polygraph. The staircase phenomenon is more marked than is usual with this instrument.

M.—VAGAL IRREGULARITIES.

1104. Respiratory irregularities.
1. From a dog's apex beat during sleep.
 - 2 and 3. Irregularity in pulse of young adult during forced breathing.
 4. Unusually marked respiratory irregularity in a case of angina (breathing natural).

1105. Gross irregularity dependent upon respiration at most times (upper two curves). Occasionally independent of it (lowest curve). The whole heart is involved in the irregularity.
1106. Vagal irregularities and bradycardia in the same case.
1107. Irregularity having its origin at the site of the pace-maker. Each heart beat is accompanied by representatives of the auricular contraction (*a*) and the ventricular contraction (C V). The irregularity is known to have been of vagal origin, for it was intimately associated with respiration and was decreased by atropine.
1108. Four curves taken by Dr. Laslett from a case of syncope due to stoppage of the whole heart. The first curve is a radial curve, showing the long pauses and demonstrating the "Staircase" effect at the end of each pause. The first pulse-beats following the pauses are anacrotic.
 Venous and radial curves from the same case, showing that each radial pulse-beat is accompanied by *a-c* and *v* waves.
 The third figure shows a phenomenally long pause of a little over 4 seconds. The jugular curve accompanying it is of the same character as that previously noted.
 The fourth curve taken 15 minutes after the injection shows the quickening effect of 1-50th of a grain of atropine injected hypodermically. Just before the administration of the atropine the pulse was slow and showed frequent intermissions of 2 or 3 seconds duration.
1109. Two curves taken by Dr. Laslett from a case of syncope due to stoppage of the whole heart. The first curve shows persistent bradycardia. The second curve shows the absence of continued relationship between respiration and pulse rate.

N.—HEART ALTERNATION.

A condition in which there is a variation in the strength of alternate heart-beats. Nothing is known of its mode of production, but is of great importance on account of its grave prognostic significance.

1110. Pulsus alternans following a premature beat in the radial curve.
 Patient the subject of angina pectoris.
1111. Pulsus alternans from a case of paroxysmal tachycardia, The second curve shows the onset of alternation in a small beat, the third curve shows the onset of an alternation in a large beat.

1112. Electro-cardiograms and radial pulse curves from a patient with paroxysmal tachycardia. The curves are from the paroxysms and exhibit alternation of the heart.

1. Alternation of the electro-cardiographic peaks R and slight alternation in the radial curve. The alternation is concomitant (the large R corresponds to the large radial beat).
2. Alternation of the peaks R and alternation to extinction of alternate beats in the radial curve. The large peak R corresponds to the absent radial beat.
3. Marked alternation of the electro-cardiogram, with absence of alternation in the radial curve.
4. Absence of alternation in the electro-cardiogram, with slight alternation of the radial curve.

O.—AURICULAR FIBRILLATION AND EXTRASYSTOLES.

Extrasystoles started in the ventricle are not uncommonly met with as a complication of auricular fibrillation. When occurring regularly they give rise to the coupled rhythm. The coupling is most frequently seen when digitalis is being administered.

1113. Electro-cardiographic and radial curves from patients with complete irregularity of the heart and venous pulses of the ventricular form.

The beats of the ventricle are in response to auricular impulses and also to inherent impulses (ventricular extrasystoles, marked Ep. and En.).

1114. An electro-cardiographic curve taken from a cat during a period of asphyxia and showing a combination of auricular fibrillation, heart block and spontaneous extrasystoles, a single extrasystole is shown and is marked Ep. and En.

1115. A curve taken from a patient exhibiting the well-recognised coupled beats of digitalis poisoning. The electro-cardiogram demonstrates that this condition consists of auricular fibrillation (as evidenced by the absence of auricular waves P and by the presence of fibrillation oscillations $f\dot{f}f$) with the addition of ventricular premature beats. The beats of normal type are responses to fibrillary impulses (RT). The abnormal beats arise in the left ventricle (Ep En).

P.—PULSE CURVES.

1116. Curves taken with the Hürthle manometer from the carotid of a dog, and with the Dudgeon sphygmograph from the radial artery of man. To show the resemblance of the two curves.
1117. The hæmautograph curves taken from the brachial artery of a dog. The blood is allowed to spurt from the artery on to a travelling surface of linen. The curves read from right to left and show the sudden upstroke of the pulse wave and the dicrotic notch.
1118. Hæmautograph curves from a dog's brachial artery. The curves read from right to left. They show the sudden upstroke of the primary wave, the dicrotic wave, and less distinctly, the pre-dicrotic and post-dicrotic waves.

Q.—STOKES-ADAMS' SYNDROME.

1119. HEART-BLOCK. Polygraph curves from a case of Stokes-Adams' Syndrome. Records of periods of ventricular stoppage. The ventricles remain in diastole so long that the latter portion of each seizure is characterised by loss of consciousness and convulsive movements.

Lent by Dr. John Hay

1120. HEART-BLOCK.—Polygraph curves from a case of Stokes-Adams' Syndrome. Records of periods of ventricular stoppage. In these records the diastole of the ventricles terminates just in time to prevent the onset of convulsive movement of the body.
1121. POLYGRAPH CURVE from a case of Stokes-Adams' Syndrome. (Complete heart-block.) The curve shows the cessation of ventricular contractions over a long period. During this time the auricles continue beating; but the patient first becomes unconscious and later manifests epileptic convulsions.

R.—CORONARY ARTERIES AND THEIR ANASTOMOSES.

1122. THE HEART OF A LARGE DOG, injected to show the coronary arteries.

Lent by Professor Dr. Spalteholz, of Leipzig.

1123. THE HEART OF A NEWBORN INFANT, injected to show the coronary arteries.
1124. STEREOSCOPIC AND OTHER PHOTOGRAPHS OF HEARTS, injected to show the coronary arteries.

S.—DROPSY AND ARTERIAL DISEASE.

1125. CALCAREOUS AORTA OF RABBIT.

With irregular dilatation, produced by intravenous injections of adrenalin.

Lent by Dr. Charles Bolton.

1126. HEART AND LUNGS OF CAT.

To show the constriction of the inferior vena cava above the diaphragm. The constricting band consists of a piece of rubber tubing; the phrenic nerve can be seen running across the constriction. This method was introduced in order to study the pathology of cardiac ascites.

T.—CARDS AND PORTFOLIOS OF POLYGRAPHIC CURVES.

1127. CARDS.

Lent by Dr. Windell.

Illustrating various forms of ventricular venous pulse.

Idem.

Idem.

Idem.

Idem.

Showing fibrillation waves in venous tracing.

Idem.

Pulse tracings from cases of angina pectoris.

Idem.

Idem.

Respiratory variations in rhythm and force of pulse.

Idem.

Idem.

Idem.

Idem.

Idem.

Idem.

Idem.

Idem.

Idem.

Continuous pulsus alternans.

Idem.

Continuous pulsus bigeminus.

Idem.

Slowing under digitalis.

Idem.

Idem.

1128. PORTFOLIOS.

Illustrating pulsus alternans.
 Illustrating sinus arrhythmia.
 Illustrating action of digitalis.
 Miscellaneous.

1129. ANEURYSM OF HEART.

A dilatation of the left ventricle near the outer ventricular septum is seen.

*Lent by London School of Clinical Medicine,
 Greenwich.*

1130. ANEURYSM OF AORTA. Rupture into Oesophagus.

The aperture in the œsophageal wall is as large as a shilling.
 The only symptom complained of during life was dysphagia.
 Physical signs of aneurysm were not present.

1131. ANEURYSM OF ARCH OF AORTA, rupturing into superior vena cava, associated during life with œdema of face, neck and chest, and considerable dyspnœa.

1132. SPECIMEN, showing effects produced by large aneurysm of the descending aorta.

Note angular deformity of spine from absorption of bodies.

XII.—NEUROLOGY.

Hon. Curator - Dr. WILSON.

Myasthenia Gravis.

Lent by Dr. E. Farquhar Buzzard.

- 1133. Microscopic Specimens.—Transverse section of inferior rectus ocular muscle, showing small aggregations of lymphocytes scattered in between the muscle fibres (lymphorrhages).
- 1134. Transverse section of skeletal muscle, showing lymphorrhages associated with degeneration changes, vacuolation, etc., in the neighbouring muscle fibres.
- 1135. Longitudinal section of skeletal muscle, showing lymphorrhages and great variation in calibre of neighbouring muscle fibres.
- 1136. Section of liver showing small lymphorrhage in the hepatic substance.
- 1137. Section of liver, showing large lymphorrhage in a portion of Glisson's capsule.
- 1138. Section of suprarenal gland, showing a lymphorrhage in the midst of the cortical gland tissue.
- 1139. Suprarenal gland. Lymphorrhage with capillary hæmorrhage in medulla.
- 1140. Section of a pancreas. Appearances suggestive of a lymphorrhage in the wall of a branch of the pancreatic duct.
- 1141. Macroscopic specimens.—An enlarged thymus gland, together with the heart and large vessels, from a fatal case.
- 1142. Heart from a case of myasthenia gravis, showing persistence and marked hypertrophy of thymus gland.

Lent by Dr. S. A. K. Wilson.

- 1143. SERIES OF PHOTOGRAPHS of sections from the spinal cord of a case of subacute combined degeneration, stained by the Weigert-Pal method.
- 1144. SERIES OF PHOTOGRAPHS of sections from the same case of subacute combined degeneration, stained by the Busch method.

Lent by Dr. S. A. K. Wilson.

LANTERN SLIDES.

- 1145. Facial expression in myasthenia gravis.
- 1146. Idem.
- 1147. Idem.
- 1148. Idem.
- 1149. Facial expression showing weakness of orbicular muscle.
- 1150. Facial expression showing inability to whistle.
- 1151. Facial expression showing "myasthenic smile."
- 1152. Shows characteristic atrophy of tongue.
- 1153. Heart from case of myasthenia gravis, showing persistence and marked hypertrophy of thymus gland.
- 1154. Acute poliomyelitis. Lumbar cord, lesion almost entirely confined to one side.
- 1155. Idem. Cervical cord. Chronic case. In addition to atrophy of anterior horn, note relative atrophy of one-half of cord.
- 1156. So-called syphilitic poliomyelitis. Note cavity formation in each anterior horn.
- 1157. Local and partial wasting of right thenar eminence in a case of bilateral cervical rib. Symptoms on right side only.

Lent by Dr. S. A. K. Wilson.

PHOTOGRAPHS.

- 1158. Shows local and partial atrophy of right thenar eminence in case of double cervical rib. Symptoms on right side only.
- 1159. Idem.
- 1160. Anterior and posterior views of right hand in case of double cervical rib. Symptoms right side only. Note flattening and wasting of thenar eminence and also how the long flexor tendons are visible in the palm of the hand.
- 1161. Elevation of right subclavian artery (indicated by the dotted line) above the clavicle in a case of bilateral cervical rib. Symptoms on right side only.

Lent by Dr. S. A. K. Wilson.

RADIOGRAPHS.

- 1162. Double cervical rib. Symptoms on left side only. Operated on. Great improvement. Note how the left cervical rib points downwards while the right points outwards.
- 1163. Long double cervical ribs giving rise to no symptoms whatever.
- 1164. Short-pointed cervical ribs, giving rise to severe symptoms.
- 1165. Double cervical rib, articulating with first rib. Symptoms on right side only. Photograph shows condition after operation on right side. Result, practically cured.

- 1166. Double cervical rib, symptoms on right side only. Before operation.
- 1167. Idem. After operation. Relief of symptoms.
- 1168. Large double cervical rib, giving rise to no symptoms whatever. Discovered accidentally.
- 1169. Double cervical rib, symptoms on right side only. Operated on.
- 1170. Double cervical rib.
- 1171. Double cervical rib. Bilateral symptoms.

Investigation of the Central Nervous System.

METHODS AND INSTRUMENTS.

Progress in our knowledge of the structure and function of the central nervous system is likely in the immediate future to depend a good deal on the application of fine insulated needles for the production of electrolytic lesions or electrical excitation.

In support of above statement the following facts :—

1. **ANATOMY.**—While there is a field for histological research especially of cells, with our present microscopes the limits are apparent, and beyond this the only available method we know of is the study of the effects of degeneration of cells and fibres. It is essential that these degenerations should be precise and definitely limited without any considerable injury of neighbouring parts. Such lesions can be produced with fine iridio-platinum needles insulated in glass capillary tubes, and as far as we know in no other way. The injury produced is confined to that inflicted by the passage of the needle.

2. **PHYSIOLOGY.**—The best method available at present for studying elementary functions of centres, nuclei, groups of cells etc., in the brain is by excitation with electrical currents, and these can only be applied to deep structure with any precision by means of the insulated needle.

3. CLINICAL SYMPTOMS due to injury of the brain are only instructive in so far as they result from precisely localised lesions, and to produce these the insulated needle and electrolysis are of great service.

These considerations show that the accurate application of the insulated needle to any desired point in the brain is important, and to effect it three requirements are indispensable : they are :—

(1.) A system of topography by which every cubic millimetre (or similar small area) in the brain can be readily and accurately identified, recorded and referred to.

(2.) An instrument by which the insulated needle can be mechanically directed out of sight, but with accuracy to any cubic millimetre in the brain.

(3.) A series of sections of the cranium or photographs of them prepared in accordance with the topographical method to serve as maps or charts to direct the instrument.

TOPOGRAPHY.—The cranium of any animal is divided into eight segments by three section planes, approximately central in relation to important structures. These are horizontal, frontal and sagittal, and the segments are described as right and left, frontal, occipital, temporal and cerebellar. The three internal surfaces of each segment are three sides of a cube, and any point can be identified by three perpendiculars of correct length dependent from them. Measurements are made from these section planes and extend from both sides of them. The position of the section planes is determined by the following anatomical features. A line is drawn from the centre of the auditory meatus to the lowest point of the lower margin of the orbit on each side; this is the basal horizontal plane. It is below the brain, and for convenience, a more central zero horizontal plane is

constructed parallel to the basal plane, but above it at one-third of the distance from the centre of the meatus to the vertex on a line of perpendicular to the horizontal plane. This proportion is for the cat; in the monkey it is $\frac{1}{4}$ the distance, in the hedgehog $\frac{1}{2}$; the distance is empirical and determined by convenience. A frontal section of the cranium carried down this line is the frontal zero plane, and the sagittal zero plane bisects the cranium sagittally—it is determined by transverse measurement through corresponding points on both sides.

For record and reference, the cranium is actually or theoretically cut into slices or lamellæ 1 millimetre thick in any plane. They are numbered from the zero plane on both sides of it, the number of the lamella therefore indicates the number of millimetres from that zero plane. Each slice is divided into square millimetres by vertical and transverse lines, the former designated by numerals, the latter by letters of the alphabet. So that by stating the segment, the number of the lamella and the numeral and letter, any cubic millimetre in the brain can be immediately identified.

THE INSTRUMENT.—The stereotaxic instrument directs the needle by a rack and pinion movement on graduated guides in three planes. Essentially it consists of a rectangular brass frame larger than the head, and firmly fixed to it by four clamping screws in such a position that its lower border exactly corresponds to the zero horizontal line of the cranium. It is so adjusted by resting before it is clamped on four supports, viz., two cones fitting the auditory meatus, and two brackets resting on the lower border of the orbits, it can be raised or lowered on these supports till the border is $\frac{1}{3}$ of the distance from meatus to vertex (in the cat), and in this position it is clamped. The clamping screws are graduated so that the head is centred at the same time *i.e.*, the sagittal zero plane

of head and of the frame coincide. On this frame so adjusted a sort of cage is constructed of graduated guides on which the needle is carried in three planes. As the zero point of the instrument and the cranium coincide, and as the needle can be moved to or from any zero on the instrument, it must be at the same time moved to or from the zero planes of the cranium. If the distance of any point in the cranium from the three zero planes is known, it is easy to direct the needle to it by the graduated guides.

CHART SECTIONS.—In order to direct the needle to any particular point in the cranium it is necessary to know the distance of this point from each of the three zero planes. This is ascertained by reference to chart sections or measured photographs of them. They are made as follows: the cranium is frozen and cut into lamellæ 1 millimetre thick in each plane by a special saw. Before it is sawn, the head is drilled at two or three points perpendicular to the plane of section; the punctures are marked with lamp black and are seen in each section; the points selected for drilling are such as to indicate the other two section planes, which are projected on such section as crossed lines, by applying a ruled glass plate to the section. The whole section is thus mapped out in square millimetres, which are reckoned in letters and numerals as already described. We have thus all the data of immediate identification, segment, lamella, letter and numeral.

The whole method may be compared to that of navigation, where in accordance with a system of topographical measurement, a ship is directed by instruments guided by charts. So here, the cranium is cut by measured sections into a series of maps, each of which is divided by vertical and transverse lines corresponding to longitude and latitude. On these the course of the needle is planned and by the measurements supplied by the charts the stereotaxic

instrument is set so as to direct the needle to the required point.

PROPORTIONAL UNITS OF MEASUREMENTS.—It is only possible here to allude to the method of correcting the variations in the size of the cranium and brain which occur in all three dimensions in various animals of the same species. It is provided for by using extensible scales in which the divisions or degrees can be made to vary in size as the animals do.

A standard animal is constructed for each species by taking the average of a large number of measurements in each dimension. All the measurements in the standard animal are in millimetres. The first step in any experiment is to measure the cranium of the animal to be used in three dimensions, and these measurements are compared with the standard—if they are normal, the degrees on the extensible scales are made to measure 1 millimetre each. If any dimension is greater or less than in the standard head, the degrees in the scale used for that dimension are made greater or less than 1 millimetre in the same proportion. In a new stereotaxic instrument which is being made, but not completed, there is an extensible scale for each dimension. One is used for the saw and also for the microtome, and instead of employing a glass plate ruled in square millimetres, screens are photographed for each variation with an adjustable grating of silk threads. The adjustable scale mentioned is a fine spring enclosed in a little tube with a gap down one side in which the spirals of the spring appear. The spirals of the spring indicate degrees of measurement, they can be extended or contracted and fixed in any position so that they measure 1 millimetre or more or less as required.

Lent by R. H. Clarke.

1172. Stereotaxic instrument for directing an insulated needle to any point in the brain in animals by graduated movement in three planes. For localised electrolytic lesions or electrical stimulation,

- 1173. An instrument for directing an insulated needle to any desired point in the spinal cord of animals. For producing minute electrolytic lesions or stimulation.
- 1174. A saw for cutting sections, one or two millimetres thick, of the frozen cranium of animals.
- 1175. A microtome for cutting frozen sections of the brains of animals.
- 1176. A drill for marking special points on sections of the cranium. Employed in intracranial topography.
- 1177. An extensible scale for making proportional units of measurement, applicable to various instruments used in intracranial topography.
- 1178. Adjustable grating for photographing screens with proportional units of measurement for intracranial topography.
- 1179. A series of mounted sections of the cranium of the cat. For intracranial topography.
- 1180. A series of photographs for first fascicular of atlas of chart sections. Sagittal lamellæ of cat. For intracranial topography.

Inflammatory Affections of the Spinal Cord.

ACUTE POLIOMYELITIS.

Lent by Dr. F. E. Batten.

- 1181. Drawing of the lumbar region of the spinal cord of a child who died one month after the acute onset of poliomyelitis. The section shows the acute vascular congestion and destruction of the grey matter of the anterior horns.
- 1182. Drawing of the lumbar region of the spinal cord of a child showing very marked perivascular exudations and infiltrations of the surrounding tissue with complete destruction of the cellular elements in the grey matter of the ventral horns.
- 1183. Drawing of the lumbar region of the spinal cord of a child showing perivascular exudations and cellular infiltration of the grey matter of the ventral horns, but many of the large polar cells retain a normal appearance.
- 1184. POLIO-ENCEPHALITIS OF RIGHT 7TH CRANIAL NERVE NUCLEUS.

Plate showing the comparative condition of the right and left 7th cranial nerve nucleus from a case in which there was right facial paralysis of sudden onset, associated with bulbar symptoms, from which the child died.

1185. EXPERIMENTAL POLIOMYELITIS.

Illustrations taken from Landsteiner and Popper's original paper on the experimental production of acute poliomyelitis in monkeys. Compare with specimens 1181, 1182 and 1183.

1186. POLIO-ENCEPHALO-MYELITIS, PARALYSIS OF FACIAL NERVE.

Photograph showing left facial paralysis in a child, aged $1\frac{1}{2}$ years, who was taken ill with loss of power in the neck muscles and left side of the face, on August 22nd, 1909. Her brother, aged $5\frac{1}{2}$, had been taken ill on August 15th with facial paralysis of the left side and a tremor of a cerebellar type in the right arm and leg. Both children recovered.

MICROSCOPIC SECTIONS.

ACUTE POLIOMYELITIS.

SECTIONS OF THE LUMBAR REGION OF SPINAL CORD stained by the Van Gieson Method.

1187. The section shows very marked perivascular exudation around the vessels, more especially of the grey matter with complete destruction of the cellular elements. (Corresponds to Drawing No. 1203.)
1188. The section shows the same perivascular exudation and cellular infiltration of the grey matter, but many of the larger polar cells retain a normal appearance. (Corresponds to Drawing No. 1204.)
1189. The sections are taken from the lumbar region of the cord of a child who died in November, 1909, one month after being taken acutely ill with poliomyelitis affecting both legs, left arm, abdominal and neck muscles.

ACUTE POLIOMYELITIS.

SERIES OF SECTION OF SPINAL CORD stained by the Weigert-Pal Method.

1190. From a case of poliomyelitis in which the child lived for some years after the acute attack. The specimens show the marked diminution of the grey matter in the affected side, and a general shrinking of the cord on that side.
1191. From a case of poliomyelitis in which the child died three months after the acute onset. The cord shows destruction of the grey matter both anterior horns in the lumbar region and a diminution of the fibres in the antero-lateral tracts.

1192. AN EXHIBIT.

Lent by Dr. Donald Armour.

1193. CHART OF THE WORLD, showing areas of epidemics of acute polio-myelitis during the last decade.

Prepared by Dr. S. A. K. Wilson.

1194. SPECIMEN OF SPINAL CORD WITH MULTIPLE FIBRO-NEUROMATA.

Lent by London School of Clinical Medicine, Greenwich.

1194A. A "THERMESTHESIOMETER."

Lent by Dr. Frederick Carl.

1195. DISSECTION OF A CERVICAL RIB, with plexus in situ.

Lent by Mr. P. W. G. Sargent.

1196. COMPLETE LEFT CERVICAL RIB.

Removed from Girl, age 18. Cured. The seventh root went over the rib, the eighth underneath.

1197. SKIAGRAM of the same.

1198. SHORT LEFT CERVICAL RIB.

Removed from female, age 24. Symptoms practically those of writers' cramp. Great improvement. The seventh root was above the rib, the eighth below.

1199. RIGHT CERVICAL RIB.

Removed from a woman, aged 52. Some improvement.

1200. RIGHT CERVICAL RIB.

From a woman, age 53. Cured. The seventh and eighth roots both passed over the rib, grooving it; the first dorsal passed below.

XIII.

GENERAL SURGICAL PATHOLOGY.

Hon. Curator - Dr. BRAXTON HICKS.

I.—SPLENIC ENLARGEMENTS.

This series shows most of the causes of enlargement of the Spleen. The diagnosis for the main part results from a consideration of the general aspect of the case together with a careful blood examination.

1201. AN ENLARGED SPLEEN FROM A FATAL CASE OF TYPHOID FEVER.

The surface shows several areas of necrosis due to toxic thrombosis of vessels. Widal's reaction positive. Micro-sections shew hyperæmia and the presence of *B. typhosus*. A similar enlargement is found sometimes in pneumonia (Seamen's Hospital, Greenwich).

1202. SPLENO-MEGALY IN CARDIAC DISEASE.

This spleen weighed fifty-two ounces and was taken from a man who died of malignant endocarditis. Numerous infarcts are present at the periphery, and streptococci were obtained in pure culture from this spleen six hours after death. The size of this spleen is in striking contrast to the type of spleen found in chronic cardiac disease in which a small spleen is the rule (Westminster Hospital).

1203. SPLEEN WITH ADHERENT DIAPHRAGM.

In the substance of the spleen is seen a ragged cavity which contained pus and was due to a suppurating infarct. From a girl, æt. 22, who died of malignant endo-carditis and from whose blood was cultivated an organism identical with the micrococcus rheumaticus (Westminster Hospital).

1204. PORTION OF A SPLEEN enlarged from Amyloid Disease (Westminster Hospital).

1205. PORTION OF A SPLEEN enlarged with numerous Large Caseating Tubercles.

This is an uncommon form of tuberculosis of the spleen in this country and was taken from an Egyptian. The form seen in this country is a small miliary tubercle. The large caseous form is found amongst animals. (Westminster Hospital). Tuberculin may aid in diagnosis.

1206. A SIMILAR TUBERCULOUS SPLEEN.

From a Chinaman (Seamen's Hospital, Greenwich). A micro-section is shewn.

1207. A SPLEEN much enlarged from Syphilis.

Gunumata are seen and the capsule is much thickened (perisplenitis). Wasserman's reaction may assist the diagnosis (Seamen's Hospital, Greenwich).

1208. SPLEEN showing a "hardbake" condition.

From a case of lymphadenoma in a sailor in whom the disease started as an enlargement of the inguinal glands. All the abdominal, mediastinal and cervical glands were affected (Seamen's Hospital, Greenwich).

1209. A PORTION OF A SPLEEN.

Showing a rather better "hardbake" condition, from another case of lymphadenoma in which the cervical glands were first affected. Sometimes only the mediastical and abdominal glands and spleen are affected with no superficial signs at all. Such cases are most difficult to diagnose. The blood shows a secondary anæmia, and perhaps a slight increase in the lymphocytes. (Westminster Hospital.)

1210. Micro-section of the spleen.

1211. TWO SPLEENS taken from children aged 8 years.

The upper spleen is a normal one, the lower one was removed with success for the condition known as splenic anæmia. The child had been ailing "some time," but for the six weeks she was under observation the spleen was found enlarged below the umbilicus and the liver was also easily felt. The blood counts showed a progressive anæmia and a marked leucopenia. Splenectomy was done with the result that both the anæmia was recovered from and the leucopenia disappeared. The child is well up to date.

Micro-sections of the spleen show hyperplasia and fibrosis. (Westminster Hospital.)

1212. Micro-section.

1213. AN ENORMOUS SPLEEN, from a case of spleno-medullary leukaemia.

The blood changes in this disease are diagnostic and consist of an enormous leucocytoses, the presence of myelocytes, eosinophile polymorphonuclear white corpuscles (in excess), and nucleated reds. (Seamen's Hospital, Greenwich.)

1214. Blood film.

1215. Micro-section.

1216. AN ENLARGED SPLEEN, from a case of lymphatic leukaemia.

Of the acute form in a boy, æt. 15. Duration of illness, 9 months. Besides enlargement of glands, the blood picture is diagnostic, consisting of a large leucocytosis and an enormous increase in the mononuclear white corpuscles. In the acute forms the large mononuclears are chiefly in excess and show signs of degeneration. In the more chronic forms the small mononuclears are in excess. Some spleens from these cases show lymphomata in their substance; this spleen does not show any. (Westminster Hospital.)

1217. Blood film.

1218. Micro-section.

A LARGE CANCEROUS MASS which is probably a Primary Sarcoma of the Spleen.

1219. The growth measures 11 inches and the remains of the spleen are seen stretched out over it. From a woman aged 57, in whom a tumour, starting in the left hypochondrium and having a well defined notch, was observed to grow slowly for two years. The tumour had invaded the liver, but there were no other secondary deposits. Micro-sections show sarcoma cells with well defined nuclei, arranged in irregular masses and festoons. It would appear to be of primary splenic origin. (Westminster Hospital.)

1220. Micro-section.

1221. HYDATID CYST OF THE SPLEEN. (Seamen's Hospital, Greenwich.)

II.—ULCERATIONS OF THE TONGUE.

This series is intended to show certain ulcerations of the tongue, particularly those due to syphilis, and also the relation of such chronic ulcerations to epithelioma.

1222. CHRONIC SUPERFICIAL GLOSSITIS.

From a woman, æt. 56. (Westminster Hospital.)

1223. LEUKOPLAKIA AND ULCERATION OF THE TONGUE.

From a woman, æt. 50. The microsections in this case and shew thickening of the mucosa with down-growth of the papillæ. (St. Bartholemew's Hospital.)

1224. THE MARGIN OF A TONGUE IN A CONDITION OF CHRONIC GLOSSITIS.

Which is much fissured, from a man, æt. 43, in whom the condition had been present two years and who had had syphilis 20 years before. The down-growth of the papillæ of the mucosa is much more marked than in the preceding two cases, and is in a condition bordering on epithelioma or "pre-cancerous stage." (Westminster Hospital.)

1225. Micro-section.

1226. A TONGUE, THE SEAT OF EPITHELIOMA.

Supervening on a condition of chronic superficial glossitis. Here the micro-sections shew that the down-growing papillæ no longer are regular in outline but have spread in all directions and "cell nests" are present. (Westminster Hospital.)

1227. Micro-section.

1228. EPITHELIOMA OF THE TONGUE.

Supervening on a dental ulcer which had started opposite a jagged tooth three years previously. From a man, æt. 48. (Seamen's Hospital, Greenwich.)

1229. LEFT HALF OF A TONGUE WITH THE SUB-MAXILLARY GLANDS.

Showing a large epitheliomatous ulcer.

Removed from a girl, æt. 23, who had had a dental ulcer of this region three months before, starting opposite two carious teeth. These carious teeth were removed 14 days after the ulcer was first noticed but no healing of the ulcer occurred and it became epitheliomatous. (Westminster Hospital.)

1230. Micro-section.

1231. A TONGUE, SHEWING A LARGE DEEP ULCER WITH INDURATED EDGES.

In the centre of the dorsum, leukoplakia and superficial ulceration are also present. Patient was a man, æt. 54, who had had

syphilis 27 years previously, and who had had this ulcer for some months. The tongue was removed because the ulcer was thought to be malignant, but micro-sections show a condition of chronic ulceration only and no signs of either gumma or malignant disease. (Westminster Hospital.)

1232. TONGUE, LARYNX AND TRACHEA.

The seat of extensive syphilitic ulceration. Edema of the larynx is present, for which tracheotomy was performed. From a patient, æt. 36 years, who had contracted syphilis two years previously. (Royal College of Surgeons.)

1233. TONGUE, LARYNX AND ADJACENT PARTS affected with Tuberculous Ulceration.

The ulcer of the tongue was for some time thought to be malignant. From a woman, æt. 41, who died of pulmonary tuberculosis of 18 months' duration: the ulcer of the tongue had been present for some months before death. (Royal College of Surgeons.)

1234. ANOTHER EXAMPLE OF A TUBERCULOUS ULCER OF THE TONGUE. (Middlesex Hospital.)

Other ulcerations of the tongue occur, such as those arising in connection with the various forms of stomatitis, in secondary syphilis, in actinomycosis, but examples of these are not shown.

1235. A TONGUE AND LARYNX, THE SEAT OF TUBERCULOUS ULCERATION.

An ulcer with crenated margins is situated on the dorsum near the middle line of the tongue. Its edges are not raised. The interior part of the larynx shows tuberculous ulceration. Cavities were present in the lungs.

Lent by the Middlesex Hospital.

CANCER OF THE TONGUE AND CONDITIONS WHICH MAY BE MISTAKEN FOR CANCER.

1. DIAGRAMS AND PART OF LECTURE BY MR. H. T. BUTLIN. "British Medical Journal," Feb. 11, 1905.

1236. WATER COLOUR DRAWING, by Miss Mabel Green.

CANCER.—From a man 60 years of age. Leucoplakia, with a red, smooth, circumscribed plaque, with a slight depression

in the centre. It felt quite thin, like a little piece of parchment in the mucous membrane. It had only been noticed four or five weeks. On removal it was found to be almost $\frac{1}{4}$ -in. thick, much more than had been suspected. And, on microscopical examination, it had infiltrated the muscles far below its apparent limit.

1237. MICROSCOPIC DRAWING of same case by Mr. Ford. Low magnification.

1238. Idem. Higher magnification.

1239. WATER COLOUR DRAWING, by Miss Mabel Green.

NOT CANCER.—From a man, æt. 74. Old leucoplakia, with one thick white patch, suspected to be cancer. Examined by the Imperial Cancer Research Fund and pronounced not to be cancer.

1240. WATER COLOUR DRAWING, by Miss Mabel Green.

CANCER.—From a man, 70 years of age. Old leucoplakia, with a slightly raised, glazed and granular epithelioma of short duration.

1241. MICROSCOPICAL DRAWING of same case by Mr. Ford.

Low magnification.

1242. Idem.

Higher magnification.

1243. WATER COLOUR DRAWING, by Miss Mabel Green, and TWO MICROSCOPICAL PRINTS.

CANCER. From a man, æt. 50. Leucoplakia of the tongue of many years' duration, with one slightly raised firm spot, where a small innocent wart had been cut out a year before. This spot was not excoriated or raw, and could only be distinguished from the surrounding white patches by its slight induration, which was quite superficial. Examined by the Imperial Cancer Research Fund and found to be a small but typical squamous—celled carcinoma. One of the smallest cancerous tumours of the tongue seen by Mr. Butlin.

1244. WATER COLOUR DRAWING, by Miss Mabel Green.

? CANCER. From a man, æt. 49. Old thin leucoplakia and chronic superficial glossitis, with one slightly raised spot,

red like a pimple. This was suspected to be epithelioma, and was examined by the Imperial Cancer Research Fund. Dr. Bashford could not be sure whether it was or was not an epithelioma.

1245. MICROSCOPIC DRAWING of same case by
Mr. Ford.

Low magnification.

1246. Idem.

Higher magnification.

1247. WATER COLOUR DRAWING, by Miss Mabel
Green.

? CANCER. From a man 70 years of age. Leucoplakia and chronic superficial glossitis of long standing. Red slightly raised area, suspected to be cancer. Examined by the Imperial Cancer Research Fund. Dr. Bashford could not be sure whether this was epithelioma or not.

1248. WATER COLOUR DRAWING, by Miss Mabel
Green.

NOT CANCER. A small slightly raised ulcer on the tongue of an old man, with very indurated border, feeling like cancer. It was attributed to the rubbing of a single prominent tooth in the lower jaw. The tooth was removed and the ulcer healed in the course of a few days. The tongue was otherwise healthy.

1249. WATER COLOUR DRAWING, by Miss Mabel
Green, and TWO MICROSCOPICAL PRINTS.

CANCER.—From a man over sixty years old. Warty epithelioma of the border of the tongue with a yellowish surface. Hard, but only indurated on the surface of the tongue. Just below it is a thin area of leucoplakia. The cancer developed in the site of a bite of his tongue several months previously.

1250. WATER COLOUR DRAWING, by Miss Mabel
Green.

CANCER.—Cancer in the form of a white, prominent, warty mass, with scarcely any induration except at its attachment to the surface of the tongue. Old leucoplakia tongue with little thick white patches and warts. Copy of a drawing which is in the museum of St. Bartholomew's Hospital, and which had been drawn from a patient in the hospital many years ago for Mr. Butlin.

1251. WATER COLOUR DRAWING, by Miss Mabel Green.

CANCER.—From a man sixty years of age. A white granular area of leucoplakia of many years' duration, which has recently become malignant. There is no ulceration or excoriation, but the plaque is harder than usual. Examined by the Imperial Cancer Research Fund. The cancer-cells were already beginning to pass down between the muscular fibres.

1252. MICROSCOPIC DRAWING of same case by Mr. Ford.

Low magnification.

1253. Idem.

Higher magnification.

1254. WATER COLOUR DRAWING, by Miss Mabel Green.

CANCER.—From a man about fifty years of age. Early condition of epithelioma in the form of a white, slightly raised, granular plaque, feeling as thick as a sixpenny-piece. Just below it is an area of thin leucoplakia.

1255. WATER COLOUR DRAWING, by Miss Mabel Green.

CANCER. From a doctor, age 30. Old areas of leucoplakia on the forepart of the border of the tongue. Excoriated, very slightly raised, area further back; red and glossy. Has had ulceration here for some time, but the place only became *a little* harder a fortnight before Mr. Butlin saw it.

1256. MICROSCOPIC DRAWING of same case by Mr. Ford.

Low magnification.

1257. Idem.

Higher magnification.

1258. WATER COLOUR DRAWING, by Miss Mabel Green, and TWO MICROSCOPICAL PRINTS.

CANCER. From a man 50 years of age. Small raised ulcer of the under-aspect of the right half of the tip of the tongue, with red borders and a yellowish, grey surface, indurated.

1259. WATER COLOUR DRAWING, by Miss Mabel Green, and TWO MICROSCOPICAL PRINTS.

CANCER. From a man 52 years old. Elongated, flat, red, nodular tumour of the frenum linguæ, showing the manner in which the surrounding mucous membrane is sometimes drawn in towards the cancer.

1260. WATER COLOUR DRAWING, by Miss Mabel Green.

NOT CANCER. From a man 60 years of age. Tongue the seat of tertiary syphitis, with areas of leucoplakia and old scars. The red, raised, glossy areas at the back were of only a few months' duration, and were suspected to be cancerous. Examined by the Imperial Cancer Research Fund and pronounced not to be cancerous.

1261. WATER COLOUR DRAWING, by Miss Mabel Green.

SPHEROIDAL-CELLED CARCINOMA. From a woman about 40 years of age. Shows a reddish, raised rounded lump just in front of the foliate papilla with a red button of granulations protruding through an orifice on the upper surface. It was very firm and fairly circumscribed, and was of several months duration. Examined by Mr. Shattock, Pathologist to the Royal College of Surgeons and pronounced to be a spheroidal-celled carcinoma. Very rare. The specimen is in the Museum of the Royal College of Surgeons.

1262. WATER COLOUR DRAWING, by Miss Mabel Green.

NOT CANCER.—From a woman, *æt.* 38. Flat, raised slightly granular plaque, raw on the surface. Very slightly indurated. Of six months' duration and caused by the rubbing of the tongue against a carious tooth. Recovered with treatment, leaving an area of leucoplakia.

1263. WATER COLOUR DRAWING, by Miss Mabel Green.

CANCER.—From a man *æt.* 40. Small, raised, very firm tumour, very fixed in the surface of the tongue, of about three months' duration. Not red, glazed, excoriated or ulcerated. Very slightly rounded on the surface, otherwise like the top of an almost flat button. Not granular or warty. About the same colour as the surface of the tongue, so that I did not at first notice it. The tongue was otherwise quite healthy. On section, dense white, cutting like gristle, not looking like epithelioma, but more like fibrous tissue. Very circumscribed against the muscle beneath. Examined by the Imperial Cancer Research Fund and by Dr. Goldman of Freiburg.

1264. MICROSCOPIC DRAWING of same case by Mr. Ford.

Low magnification.

1265. Idem.

Higher magnification.

1266. WATER COLOUR DRAWING, by Miss Mabel Green.

NOT CANCER.—From a man about forty years of age. Old leucoplakia, of long duration, with a chronic ulcer, looking like early carcinoma, squamous-celled, but not indurated at the border. It was neither raised nor depressed. It was rapidly cured by simple measures.

1267. WATER COLOUR DRAWING, by Miss Mabel Green, and TWO MICROSCOPICAL PRINTS.

CANCER.—From a man, æt. 50. Leucoplakia of the tongue of many years' duration. Raised area of small size in the middle of the leucoplakia, superficially indurated; surface red, smooth, glossy, so that the plaque looked and felt like a Hunterian chancre. It had only been noticed a few days.

1268. WATER COLOUR DRAWING, by Miss Mabel Green, and TWO MICROSCOPICAL PRINTS.

CANCER.—From a man, æt. 50. Old leucoplakia of many years' duration. Recent epithelioma in the form of a pale, red raised plaque, the lower border of which is undermined. Surface smooth, but not ulcerated or excoriated. Said to be of quite recent origin.

1269. WATER COLOUR DRAWING, by Miss Mabel Green.

ENDOTHELIOMA.—From a man about 40 years of age. Small button or pimple which appears to protrude through a circular aperture in the mucous membrane. Of about six weeks' duration. Attributed to the rubbing of a carious tooth. Examined by the Imperial Cancer Research Fund and thought by Dr. Bashford to be an endothelioma.

1270. MICROSCOPIC DRAWING of same case by Mr. Ford.

Low magnification.

1271. Idem.

Higher magnification.

1972. WATER COLOUR DRAWING, by Miss Mabel Green.

TUBERCLE.—From a woman, æt. 68. Shows a small ulcer, with undermined upper border. The border is generally red and a little swollen. The surface is covered with inspissated discharge. The tongue was otherwise healthy. Ulcer of about three or more months' duration. Glands in right submaxillary region enlarged and hard. Examined in the Pathological Department, St. Bartholomew's Hospital.

1273. WATER COLOUR DRAWING, by Miss Mabel Green.

CANCER.—Man, æt. about 60, with a squamous carcinoma in the form of a red, slightly raised, smooth, but fissured, polished plaque. Scarcely any induration. Leucoplakic areas. Disease of several months' duration on and off. Removed by Mr. Spencer. Examined by Imperial Cancer Research Fund. Patient died after removal of the glands in the neck which were cancerous; more advanced than the plaque on the tongue.

1274. WATER COLOUR DRAWING, by Miss Mabel Green.

CANCER.—Man, æt. 49, who had suffered from leucoplakia for many years. Seen by Mr. Butlin in 1906, when there were thick areas of leucoplakia in the places shown in the sketch. Again seen October 18th, 1909, when there were two circular slightly raised areas in the larger of the patches of leucoplakia. These areas were very slightly indurated, but with quite superficial induration. They were not raw, but pale pink and slightly granular on the surface. They were flat on the surface. The patient, a schoolmaster, was quite sure that they had formed within eight days of the time Mr. Butlin saw him. Removed by Mr. Godlee, and examined (one of the areas) by the Imperial Cancer Research Fund. Area reported to be epithelioma.

1275. WATER COLOUR DRAWING, by Miss Mabel Green.

CANCER.—Male, æt. 60, whose tongue had been the seat of leucoplakia for many years. The sore place in the area of leucoplakia on the left side had been in existence for about three months. It presented the appearance of a flat, moist ulcer, quite superficial, almost level with the surface of the tongue. Its borders were not raised or nodular. Had it not been that it felt like a very thin piece of gristle let into the surface of the tongue, Mr. Butlin would not have believed it to be malignant. The glands were not perceptible. After removal it was found to be as thick as "half a bean." Examined by the Imperial Cancer Research Fund. Rapidly growing squamous-celled carcinoma, with cells passing deep between the muscular bundles.

1276. WATER COLOUR DRAWING, by Miss Mabel Green.

CANCER. Multiple primary squamous-celled carcinomato of the border and under surface of the tongue and of floor of the mouth of a man 53 years old. He was only aware of

the existence of the cancer furthest back, and had known of it for six weeks. The drawing is not so accurate as the preceding, for the light was very bad when it was taken. The three cancers are all too large. That in front looked and felt like a flat wart, and was not ulcerated.

In the floor of the mouth on the right side was a white patch, with little thickening, which also proved to be carcinoma. In addition at the inner angle of the right orbit was a rodent ulcer of many years' duration. Examined by the Imperial Cancer Research Fund. The disease was removed by Mr. Spencer after the patient had consulted Mr. Butlin. July, 1910.

1277. MICROSCOPIC DRAWING of same case by Mr. Ford.

1278. *Idem.*

III.—MUSCULAR SWELLINGS.

This series is intended to illustrate some of the tumours that may rise in connection with the muscles. A general statement that muscular swellings are uncommon and present difficulties in differential diagnosis may here be made.

1279. HÆMATOMA OF MUSCLE.

Arising spontaneously from the rupture of diseased arteries in a case of renal disease. (Westminster Hospital.)

1280. HÆMANGIOMA OF MUSCLE.

A gracilis muscle in the substance of which is a large vascular tumour. Excised from a girl *æt.* 22, who had noticed a swelling about the size of a pigeon's egg for seven years, but which had given no trouble until lately, when pain and rapid increase in size had been noted. A well-marked bruit had been audible over this tumour. (Westminster Hospital.)

1281. CALCIFICATION OF MUSCLE.

Two thin irregular plates of dense bone in the substance of the muscles attached to the femur. The condition of progressive ossification of muscle known as myositis ossificans is either due to true transformation of muscle into bone (as in the case apparently) or a degeneration of muscle with subsequent calcification. (St. Bartholomew's Hospital.)

1282. GUMMA OF THE GASTROCNEMIUS MUSCLE.

Other signs of syphilis were present. (Westminster Hospital).

1283. FIBRO-SARCOMA OF THE GLUTEUS MAXIMUS MUSCLE.

From a woman, æt. 68. (St. Bartholomew's Hospital.)

1284. PRIMARY SARCOMA (ROUND-CELLED) OF THE MUSCLES OF THE ARM.

From a woman, æt. 34, who for four months had noticed pain and gradual swelling of the arm. The swelling started at the beginning of the humerus, and one month from the commencement of the symptoms had reached the wrist. Amputation was done, but death occurred 10 days after the operation. There were metastases in the kidneys. The articular end of the humerus has been invaded by the growth, and all the muscles of the forearm have been replaced by the growth, though their former outline is still retained. (St. Bartholomew's Hospital.)

1285. SECONDARY DEPOSIT OF SARCOMA (ROUND-CELLED) IN THE RECTUS ABDOMINIS MUSCLE.
(Westminster Hospital.)

1286. CYSTICERCUS CELLULOSÆ.

In the longissimus dorsi muscle of an old man. (St. Bartholomew's Hospital.)

1287. HYDATID CYST.

In the vastus internus muscle of a girl, æt. 17 years, who had noticed the swelling for 3 months. The daughter cysts are seen at the bottom of the jar. (St. Bartholomew's Hospital.)

Other causes of muscular swellings—pyæmic abscesses from the pyogenic cocci or *B. mallei*, and tuberculosis, and actinomycosis—may form muscular tumours. Examples of these are not shown. *Trichina spiralis* causes myositis, but no great localised muscular swelling.

1288. AN EXHIBIT CONSISTING OF SKIAGRAMS AND PHOTOGRAPHS, illustrative of hydatid of the heart, of bone, and of the lungs, etc.
(Arrived too late for a description to be included in the catalogue).

Lent by Mr. F. D. Bird, of Melbourne.

ACROMEGALY.

1489. SKULL, of a native of Shields, who was remarkable during life for length of his face.

The entire head is large, but the bones of the face, particularly the lower jaw, are enormously long. The ascending ramus of the lower jaw is greatly increased in length, whilst the bony ridges for muscular attachments are very well marked, especially those for temporal muscles. Note shape of glenoid fossæ and frontal sinuses.

This case is referred to in Todd's Encyclopedia of Anatomy Article. Face.

*Lent by London School of Clinical Medicine,
Greenwich.*

1490. LOWER END OF FEMUR.

Removed post-mortem, from a patient, age 27, showing true exostosis, many of the bones of the body were affected in this way. (V., Trans. Path. Soc., London, 1902.)

1491. CHRONIC ULCERATION OF FOOT OF UNKNOWN ORIGIN on the foot of Hindoo.

No evidence of malignancy in sections. Most nearly approaches one of *Paget's Eczema*.

1492. SPECIMEN, showing rupture of popliteal artery and vein, with subsequent gangrene, due to the backward dislocation of the tibia.

IV.—SPECIMENS ILLUSTRATING PAPER ON :
“AN INVESTIGATION OF THE EFFECTS
OF ARTIFICIAL RESPIRATION ON THE
STILL-BORN.”

By J. A. Braxton Hicks.

1293. LUNG (LEFT) OF A STILL-BORN INFANT, on whom Schultze swinging had been performed.

The other lung floated entire, and when cut into small pieces. A micro-section is shown.

1294. THE PARTIALLY INFLATED LUNGS OF A TWIN FÆTUS.

From a case of Cæsarian section, in which artificial respiration could only be done for a short while.

1295. THE LUNGS OF THE TWIN FŒTUS, to No. 1294, in which *no* artificial respiration was performed.

1296. STOMACH, from No. 1293.

Note the difference in volume of the lungs in these three cases.

The volume of No. 1293 is considerable, while the volume of No. 1294 is less than No. 1293 but greater than No. 1295, particularly if the upper lobes are examined. As previously mentioned, the lung in No. 1293 floated entire and in pieces, the lungs in case No. 1294 floated entire, but in No. 1295 sank. These two last specimens were not cut up into pieces in order that they might be preserved as specimens.

The differences in colour are not well seen in these specimens.

Thus 1293 was bright pink and mottled in places, No. 1295 was a dull purple, while No. 1294 was intermediate between these two. Owing to exposure to air and the difficulty of preserving the colour they have come to resemble each other in colour.

1297. STOMACH from previous specimen.

CUTANEOUS ULCERATIONS.

Series A. is intended to demonstrate that a certain proportion of cases of long-standing chronic ulcerations of the skin become cancerous.

Series B. is intended to show that ulceration at first not highly malignant may, if long continued, become so.

Series C. shows a few specimens of the less common acute infections of the skin.

SERIES A.

CHRONIC ULCER OF THE LEG.

1298. From a man æt. 50. It occupies the entire circumference and nearly the whole length of the limb. (Westminster Hospital.)

1299. Micro-section

1300. SQUAMOUS-CELLED CARCINOMA.

Of six months' duration supervening on a chronic ulcer (such as A. 1230) of twenty years' duration in a man æt. 68. (Westminster Hospital.)

1301. SQUAMOUS-CELLED CARCINOMA.

Arising in an old scar. (Seamen's Hospital, Greenwich.)

1302. CHRONIC DERMATITIS.

Due to X-rays of six years' duration, affecting three fingers of the left hand in a man who had been working with the X-rays for ten and a half years. A year previous to the removal of these fingers the index finger of the right hand had been removed for squamous-celled carcinoma. (See .) (St. Bartholomew's Hospital.)

1303. SQUAMOUS-CELLED CARCINOMA.

Affecting the index finger of the right hand and a sequel to X-ray dermatitis. From the same patient as . (St. Bartholomew's Hospital.)

SQUAMOUS-CELLED CARCINOMA OF THE HAND.

1304. Following a condition of chronic eczema of forty years duration. A similar cancerous condition may follow on any of the "occupation eczemas" if long continued. (Westminster Hospital.)

1305. Micro-section.

1306. A SIMILAR CASE. (Seamen's Hospital, Greenwich.)

1307. MELANOTIC SARCOMA OF THE HEEL.

From a woman who eighteen months previous to admission had trodden on a rusty nail. The ulcer so caused never healed, and three months after the accident a small mulberry-like tumour appeared, which gradually increased in size. The glands in the groin showed secondary deposits. (Westminster Hospital.)

1308. Micro-section

1309. A SIMILAR CASE.

In a male who six weeks previous to admission had run a rusty nail into his heel. (Seamen's Hospital, Greenwich.)

1310. INNER HALF OF LEFT FOOT IN VERTICAL SECTION.

A prominent fungating growth covers the dorsum. From a man æt. 63, the subject of congenital syphilis. The leg was amputated because it was thought that this gummatous ulcerating mass was becoming malignant. There is, however, no evidence of malignancy, and the tumour is merely a granuloma. (Royal College of Surgeons.)

1311. LEFT LEG OF A WOMAN.

Æt. 30, who died of pulmonary tuberculosis. An extensive serpigenous ulceration, due to lupus, but which at first was thought to be syphilitic, is seen. (Royal College of Surgeons.)

1312. TUBERCULOSIS CUTIS.

In the neighbourhood of the scar over a tuberculous joint. (Westminster Hospital.)

These last two specimens are examples of an ulceration which occasionally takes on an epitheliomatous character, but there are no specimens in this series illustrating this.

SERIES B.

1313. RODENT ULCER.

From the groin of a woman æt. 43, which had been present nine months. This is an unusual situation for a rodent ulcer. (St. Bartholomew's Hospital.)

1314. Micro-section.

1315. RODENT ULCER BECOMING EPITHELIOMATOUS.

From the thoracic wall of a woman, æt. 56. In 1902, micro-sections showed a typical rodent ulcer which healed under the X-Rays. In 1904, a rapid growth commenced, which showed a typical epithelioma with cell nests together with the appearances in parts of a rodent ulcer. (Westminster Hospital.)

1316. PAGET'S ECZEMA OF THE NIPPLE.

From a woman, æt. 80, in whom the raw ulcerated surface seen had been present for a year. Though at first Paget's eczema does not tend to give rise to metastases, after a while a condition of epithelioma develops, and secondary deposits occur in the glands, as had occurred in this case. The umbilicus may also be the seat of Paget's eczema. (Seamen's Hospital, Greenwich.)

1317. Micro-section of the secondary deposit.

SERIES C.

1318. GLANDERS OF THE SKIN.

Three small pustules which contain *B mallei*, and are characteristic of the terminal eruption sometimes met with in glanders. (Westminster Hospital.)

1319. TWO PORTIONS OF SKIN.

Showing the lesions of anthrax. Note the peripheral zone of vesicles and the purplish centre. B anthraxis was present in the fluid from the vesicles. These two patients had the occupation, of "leather worker" and "horse-hair curler" respectively. The lesions were excised and the patients both made a good recovery. (St. Bartholomew's Hospital.)

1320. INFLAMMATORY FOCUS.

Much resembling malignant pustule (anthrax), but due to staphylococcus aureus, excised from a boy, æt. 17 years. (Westminster Hospital.)

PLASTER CASTS OF DEFORMITIES OF THE HANDS AND FEET.

Exhibited by W. B. Parsons.

- 1321. Same case of talipes equino-varus in a boy aged 12.
- 1322. Right and left foot.
- 1323. The same, one year after treatment by repeated division of contracted tissues and manipulation of the feet.
- 1324. The sole of the foot in a case of flattened transverse arch showing the painful corn under the head of the 3rd metatarsal bone.
- 1325. Dupuytra's contraction of palmar fascia.
- 1326. A suitable splint for use after operation (in position).
- 1327. Hand and forearm of a child showing deformity arising from absence of radius.
- 1328. Contraction of the wrist in a child cured by stretching.
- 1329. Macrodoctyly.
- 1330. Idem.
- 1331. Idem.
- 1332. Constriction of legs by umbilical cord. (Intra uterine amputation).
- 1333. Idem.
- 1334. Supernumerary digits.
- 1335. Idem.
- 1336. Showing treatment of congenital equinovarus by splints.
- 1337. Idem.
- 1338. Idem.
- 1339. Congenital equino-varus in various stages of treatment.

1340. Articulated skeleton of a person who suffered from severe lateral curvature.

ORIGINAL DRAWINGS, by NOBLE SMITH.

1341. Bone inflammation.
 1342. Anatomy, from nature (Osteology).
 1343. Illustration by process blocks in black and white.
 1344. Selection of drawings for the Atlas of Histology (Klein and Noble Smith).
 1345. Syphilization (the sore at various ages).
 1346. Do. Do.
 1347. THIRTEEN ORIGINAL PAINTINGS FROM NATURE, by G. H. FORD, to illustrate W. Adams' "Reparative Process in Human Tendons."
 1348. SIX CHROMO PRINTS OF ORIGINAL DRAWINGS, by NOBLE SMITH, to illustrate Shepherd's Pulmonary Consumption.

A COLLECTION OF PREPARATIONS ILLUSTRATING SOME DISEASES OF THE JAWS AND TEETH.

Lent by Mr. A. Hopewell-Smith.

1449. DENTAL CYST ATTACHED TO ROOT OF MAXILLARY MOLAR.
 1350. LEFT MAXILLA WITH SMALL ? DENTAL CYST IN SITU.
 From man aged 45.
 1351. FIBROMA ATTACHED TO MANIBULAR CANINE.
 1352. AN EPITHELIAL ODONTOME.
 Associated with right mandibular third molar (multilocular cystic tumour).
 1353. MODEL OF FOLLICULAR ODONTOME.
 In mandible of boy 9½ years—with premolar removed from cyst.
 1354. SMALL COMPOSITE ODONTOME.

1355. AN EXTRA-CAPSULAR ODONTOCELE.

From patient aged 42.

1356. EPITHELIOMATA OF JAW (BURROWING EPITHELIOMA).

Arising from the periodontal membranes of the teeth. Patient aged 30.

1357. ROUND-CELLED SARCOMA OF RIGHT MAXILLA.

In man of 18 years of age. Invasion of antrum and surrounding tissues.

1358. MODEL OF OSTEOMA OF JAW.

Patient aged 42.

1359. ANKYLOSIS OF TOOTH TO BONE OF RIGHT MAXILLA.

Patient suffering from leontiasis ossium.

1360. MODEL SHOWING SYPHILITIC AFFECTIONS OF TEETH.

1361. EROSION OF TEETH.

In an Australian patient, probably due to gout. Patient aged 55.

1362. FIVE TEETH.

From jaws of patient of 38 years, suffering from an infective disease: showing absorption of roots.

XIIIa.—DERMATOLOGY.

A SERIES OF WAX CASTS, PLATES AND PHOTOGRAPHS OF SKIN DISEASES.

Lent by Dr. Stopford Taylor and Dr. R. W. MacKenna.

WAX CASTS OF SKIN DISEASES.

1363. CARCINOMA OF LEFT BREAST. Treated by a quack.

This patient placed herself under the treatment of a quack, for a "lump" in the breast. She was under his care for over two years, and when the destructive ulceration shown in the cast supervened, he assured her he was "burning out the roots." When she came under our observation the disease was irremediable, having invaded the ribs, axillary and supra-clavicular glands.

LUPUS ERYTHEMATOSUS.

1364. Note the grey mortary scales on the reddish base.

1365. From same patient.

1366. On side of nose. The patient's ears were also affected.

1367. LUPUS ERYTHEMATOSUS.

1368. CHILBLAIN LUPUS OF HANDS IN A YOUNG GIRL.

1369. LUPUS VULGARIS.

Note the scar tissue, where the disease has already been and subsided, and the advancing periphery of lupus nodules. Note also the mis-shapen ear.

1370. FOLLICULAR LUPUS (Tilbury Fox).

This is probably a toxi-tuberculide. The patient has apical phthisis.

1371. LUPUS VERRUCOSUS OF THIGH IN A CHILD.

1372. SCROFULODERMA.

The patient developed extensive disseminated scrofuloderma after an attack of Scarlatina.

1373. PSORIASIS.

Nummular patches on abdominal wall and chest of young woman.

1374. PSORIASIS OF ARM.

1375. PSORIASIS OF ARM.

1376. SCLERODACTYLY.

The hand of a young woman. See also photo and radiograph.

1377. ULCUS RODENS.

Incipient ulcer. Notice the "rolled edge."

1378. ULCUS RODENS.

1379. ERYTHEMA MULTIFORME.

Note how the scratch mark has become affected.

1380. HYDROA ÆSTIVALE.

A vesicular or bullous eruption produced by the sun's rays.

1381. ERYTHEMA BULLOSUM.

1382. FAVUS OF LEG.

Note the yellow cup-shaped scutula.

1383. LEPROSY.

1384. LEPROSY (Same Patient).

The patient is a boy of 9 years, born in the West Indies, and brought to England at age of 4 years. Showed first evidence of leprosy at age of 5 years. So far as is known had never been in actual contact with lepers. Father, mother and other children all healthy. Leprosy bacilli found in nasal secretion.

1385. ECZEMA PALMARIS.

Note the vesicles appearing under the unbroken skin of the palm.

1386. PITYRIASIS RUBRA PILARIS.

See also photographs.

1387. HERPES OF CHEST WALL.

1388. SEBORRHŒA CORPORIS.

1389. ICHTHYOSIS NIGRICANS.

WAX-CASTS OF SOME OF THE CUTANEOUS LESIONS OF SYPHILIS.

- 1390. PRIMARY SORE ON PENIS.
An ulcerating chancre, due to a mixed infection.
- 1391. CONDYLOMATA ON VULVA.
- 1392. PAPULAR ERUPTION OF FACE.
- 1393. LARGE PAPULAR SYPHILIDE.
- 1394. SYPHILIS OF PALM OF HAND.
- 1395. SERPIGINOUS SYPHILIDE.
- 1396. SERPIGINOUS SYPHILIDE.
- 1397. SERPIGINOUS SYPHILIDE.
- 1398. SYPHILITIC INFILTRATION EN PLAQUE.
- 1399. RUPIAL SORES.
- 1400. RUPIAL SORES.
- 1401. BROKEN DOWN GUMMA OVER KNEE-JOINT.
- 1402. TERTIARY ULCERATION.
- 1403. TERTIARY ULCERATION.
- 1404. CICATRIX FOLLOWING TERTIARY ULCERATION.

PLATES AND PHOTOGRAPHS OF SKIN DISEASES.

PITYRIASIS RUBRA PILARIS.

- 1405. The patient is a girl aged 12. Family and personal history good except for a taint of insanity on the father's side. The disease began about two months before these photographs were taken as a persistent erythema on the palms of the hands, with thickening of the skin. When first seen, the whole integument was of a dull reddish colour, the face was covered with coarse hard scales; the eyes could not be fully opened; the scalp was covered with a thick mortar-like deposit. The hair was coarse and dry; the trunk and limbs were studded over with hard acuminate papules of a brownish-red colour with a central orifice, either plugged by a horny cone or pierced by a hair. In places, *e.g.*, the flexures of the elbows and behind the knees, the papules were aggregated into patches. Over the back of the elbows and the front of the knees the lesions closely resembled

psoriasis. The hands were in a condition of coarse desquamation. From the character of the lesions the disease has been called Lichen-Psoriasis by Sir Jonathan Hutchinson.

The patient improved greatly under treatment, and remained almost free from the disease for four months, after which a relapse occurred ; but her present state is much better than her condition when the photographs were taken (July, 1909).

1406. Idem.

1407. Idem.

1408. Idem.

SYPHILIS.

1409. PRIMARY CHANCRE ON LIP AND LARGE PAPULAR SECONDARY ERUPTION.

This patient, age 65, was infected on the lip, through kissing her grandchild, an infant with congenital syphilis.

1410. GIANT CHANCRE ON EYEBROW.

The plate was painted when the chancre was about six weeks old, before any treatment had been instituted.

1411. FRAMBÆSIFORM SYPHILIS.

A case of syphilis in which the secondary lesions resembled those of frambæsia and consisted of moist, raised granulo-matous masses.

1412. VARIETIES OF SECONDARY SYPHILITIC RASHES.

- a. Medium sized papular eruption.
- b. Corymbose arrangement of large macules. A very rare type.
- c. and d. Papulo-erythematous eruptions.

1413. SECONDARY AND TERTIARY SYPHILITIC LESIONS.

Note the two paragraphs of the woman in whom the lesions resemble lupoid deposits.

1414. TYPES OF SYPHILITIC LESIONS.

1415. AN EARLY CASE OF SEVERE TERTIARY ULCERATION.

The tertiary ulcers appeared less than six months after the primary infection.

1416. ADENOMA SEBACEUM.

In father, son, and daughter. These three plates were taken from one family, and in each case the disease was congenital. Adenoma sebaceum frequently occurs as one of a triad of symptoms, the other two being epilepsy and idiocy. In dis-

tribution and superficial appearance it resembles follicular lupus of Tilbury Fox, but it differs from that disease in so far as in adenoma sebaceum the individual elements are hard and resistant, while in follicular lupus they are soft and gelatinous. Dr. A. W. Campbell, late pathologist at Rainhill Asylum, believes that the changes characterising the disease are the outcome of some evolutionary disturbance: "Arising during the last few months of foetal life, affecting the endothelium of blood vessels or lymphatics, and resulting in a form of structural hyperplasia or hetero-tropism."

1417. Idem.

1418. Idem.

1419. CASES OF ACNE TREATED WITH THE X-RAYS.

The cases shown in this and the following plate, were treated by fractional doses of the X-rays, before Sabouraud's method of exact dosage had been suggested.

1420. CASES OF COCCOGENIC SYCOSIS TREATED WITH THE X-RAYS.

1421. FAVUS OF THE LEGS.

The patient was a steward on an emigrant ship, and the probable source of infection was some bedding which had been used by an emigrant.

Note the yellow cup-shaped scutula, which were found thickly on both legs and thigh. The body and scalp were free. The typical *Anchorion* was found on microscopical and cultural examination.

1422. MYCOSIS FUNGOIDES.

Treated with the X-rays. The patient has remained well for for five years after treatment.

1423. EPIDERMOLYSIS BULLOSA HEREDITARIA.

This is a rare, congenital and hereditary disease, characterised by a tendency for the skin to blister if slightly injured. The patient was a woman, aged 30. All her life she had noticed that if she knelt, or knocked her knees or shins, a blister would follow. Scratching or pinching the skin would also produce bullæ. The lesions were most plentiful on parts of the body subject to slight injury, *e.g.*, the knees, the tibial regions, the buttocks (from sitting down) and the sides of the legs from friction of the clothes. The skin remained free on parts not exposed to injury, *e.g.*, the inner side of the thighs. The vesicles and bullæ in this case left some pigmentation and slight scarring after subsiding. The nails were atrophic and crumbled looking. The patient's daughter was also affected.

1424. EPITHELIOMA OF BACK OF HAND.

1425. INOPERABLE RODENT ULCER.

Of long standing, destroying the right eye, and a large portion of the superior maxilla.

DRUG ERUPTIONS.

1426. IODINE AND BROMINE ERUPTIONS.

Note the papula-pustular lesions. Iodine was discovered in the urine in cases 1, 2, 3.

1427. A SEVERE OUTBREAK OF IODO-DERMA.

Following the administration of potassium iodide. Patient had *morbis cordis and nephritis*.

1428. CHLORINE ACNE.

The patient is a labourer in a chemical manufactory, and in the course of his work is exposed to the action of small quantities of chlorine vapour. Until he began work under these conditions he was quite free from acne. As he works in a state of semi-nudity, a very large portion of his body is exposed to the vapour, and the distribution of the eruption coincides almost exactly with the uncovered area. A feature of the disease is the large number of sebaceous cysts of varying size, which the patient shows.

1429. ECZEMA PRODUCED BY CHEMICALS USED IN PHOTOGRAPHY.

The patient is a "toner" in a photographer's shop, and at work has to dip her fingers into various toning solutions consisting of borax, chloride of gold, potassium chloroplatinate, citric acid, and sodium hyposulphite and sulphocyanide of ammonium. The eruption on the face is secondary to that on the fingers, and is due to absorption.

1430. ARSENICAL PIGMENTATION.

With scarring due to herpes zoster arising from arsenical neuritis. Patient had taken liquor arsenicalis for a prolonged period for supposed Hodgkin's disease.

1431. ARSENICAL KERATOSIS.

Of palms and fingers.

1432. SCARS, ONE OF WHICH IS KELOIDAL, FOLLOWING "BROMIDE OF POTASSIUM ACNE."

1433. SEBORRHŒA CORPORIS.

The psoriasiform type.

1434. TYPES OF SEBORRHŒIC DERMATITIS.

1435. TYPES OF SEBORRHÆIC DERMATITIS.
 1436. TYPES OF SEBORRHÆIC DERMATITIS.
 1437. EPITHELIOMA ARISING FROM SEBORRHÆIC
 WARTS.
 1438. PSORIASIS.
 1439. PSORIASIS.
 Of hands and feet.
 1440. PSORIASIS OF NAILS.
 1441. PSORIASIS FIGURATA.
 1442. PSORIASIS FIGURATA.
 1443. VON RECKLINGHAUSEN'S DISEASE AND
 ELEPHANTIASIS IN THE PATIENT.

Observe the large number of neuro-fibromata, some of which are sessile and others pedunculated. The patient was a woman who had never lived abroad. The "elephantiasis" was due to lymphatic obstruction probably of a streptococcal nature.

1444. URTICARIA HÆMORRHAGICA.
 1445. BLASTOMYCETIC DERMATITIS.

This disease is rare in England, but common in America. It may readily be confused with some varieties of tuberculosis cutis. The fungus—the blastomyces—was found in this case on microscopical examination.

1446. TUBERCULOSIS CUTIS.
 Resembling blastomycetic dermatitis.

1447. GRANULOMA ANNULARE.

This rare condition developed in this patient, a girl of nine, after an attack of scarlatina. There was no history of rheumatism. The lesion exhibited was the only one on the patient.

1448. LUPUS VERRUCOSUS.

On back of hands and wrists.

1449. On palms and front of wrists—from same patient as preceding photograph.

1450. DISSEMINATED FOLLICULAR LUPUS (Tilbury Fox).

1451. This rare disease is a para-tuberculide. The distribution of the eruption on the face is very similar to that of *Adenoma Sebaceum* (see plates). The lesions are of a brownish

red tint soft and gelatinous, and are chiefly grouped about the chin, at the angles of the nose, below the orbits, and on the forehead, with a few on the nose.

1452. DISSEMINATED FOLLICULAR LUPUS.

1453. LUPUS ERYTHEMATOSUS DISCOIDES.

This patient has since been cured by liquid air and solid carbon-dioxide applications.

1454. Idem.

1455. LUPUS VULGARIS TREATED BY LINEAR SCARIFICATION.

1456. LUPUS ERYTHEMATOSUS.

Of 25 years duration affecting the scalp and face with epithelioma of the cheek.

1457. LUPUS VULGARIS WITH RODENT ULCER.

Below inner canthus of right eye.

1458. LUPUS ERYTHEMATOSUS.

With epithelioma on lip.

Same patient as No. six years after removal of epithelioma of lip, with recurrence on tip of nose.

1459. EPITHELIOMA DEVELOPING ON LUPUS VULGARIS.

Patient age 42. Twenty years ago lupus vulgaris began in the lobe of the left ear, which had been pierced by a brass ear-ring. The epithelioma developed about 16 years after the lupus. Note the enormously swollen and disfigured appearance of the face.

1460. SCLERODACTYLY. Photo- and Radiograph.

The fingers, especially the middle, ring and little fingers are markedly atrophic and parchment-like. No glycosuria nor Raynaud's Disease. See also cast No. taken 3 years after these photographs.

1461. RODENT ULCER ON LOWER EYELID.

Treated by scraping and the subsequent application of radium,

1462. RODENT ULCER TREATED BY RADIUM.

The treatment consisted in the application of five milligrammes of radium bromide in a glass tube for 13½ hours, spread over six weeks.

1463. PEMPHIGUS FOLIACEUS.

In the case of a man it began as a pemphigus vulgaris and drifted into pemphigus foliaceus.

In the case of the child, the disease broke out on shipboard between Cape Town and England.

1464. TRAUMATIC PEMPHIGUS.

The patient was a butcher, and the disease followed an injury to the hand with a meat-hook. The patient recovered.

1455. PITYRIASIS RUBRA.

1466. LICHEN SCROFULOSORUM.

The patient is a man aged 29. For years he has had enlarged cervical and submaxillary glands, one of which behind the angle of the jaw has recently broken down. About six weeks ago there was an outbreak of purplish raised papules, as shown in the photographs. The summit of many of these papules is pierced by a pilo-sebaceous follicle. Some of the papules are capped by a fine scale. The papules are at different stages of their evolution, and some have undergone retrogression, leaving pigment stains.

The distribution of the eruption in this case, and the absence of lesions from the trunk, is unusual, as is also the patient's age.

SERIES I.

SIX PHOTOGRAPHS TO ILLUSTRATE THE DERMATITIS CAUSED BY DAFFODILS AND BY HANDLING LARGE MASSES OF THE FLOWERS IN THE SCILLY ISLANDS.

Lent by Dr. David Walsh.

Investigation of a Plant Dermatitis amongst the daffodil gatherers in the Scilly Islands.

- 1467. Picking *Princeps* variety in field—one man with bare arms.
- 1468. Picking *Ornatus* variety in forcing house—gatherers all with bare arms. (The *Ornatus* comes next to *Campanelle* in virulence.)
- 1469. Collecting the gathered flowers in boxes.
- 1470. Collecting *Scilly White* variety in field. This variety comes low down in list as regards virulence.
- 1471. Carrying flowers—*Grand Monarque* variety—to packing house. *Grand Monarque* ranks third in virulence along with next (*Gloriosa*).
- 1472. "Bunching" the *Gloriosa* variety. Note bare arms of workers.

SERIES II.

1473. WATER-COLOUR DRAWING OF THE "CAMPANELLE," the most virulent variety.

The flower is small and deep yellow colour, and the leaves are smaller and more spiky than those of other kinds.

1474. PHOTOGRAPH OF THE "CAMPANELLE."
The most virulent kind.
1475. TWO PHOTOGRAPHS OF "SCILLY WHITE" VARIETY.
Fourth on list in virulence.
1476. COMMON DOUBLE DAFFODIL.
This kind has been known to affect some workers.

SERIES III.

1477. PHOTOGRAPHS SHOWING RASH FROM PICKING FLOWERS.
Usually affects face and hands. Various degrees of papular, vesicular, and pustular dermatitis; the rash sometimes becomes generalises. Most severe effects when there is a cut or broken skin.
1478. PHOTOGRAPH OF ARMS.
Recent case showing papular and vesicular dermatitis.
1479. CHRONIC DERMATITIS OF HANDS IN PICKER.
Note excoriations.

SERIES IV.

1480. MICROSCOPIC SECTION OF LESION on own forearm twenty days after inoculation of juice of *campanelle*.
A short-jointed mycelium and bacillus subtilis (the latter by culture) were found in the succus. Surface contact of the succus without abrasion of cuticle proved negative. A fairly severe reaction on inoculation, the process suggesting infection by a micro-organism.
1481. MICROSCOPIC SECTION OF TWO SMALL PIGMENTED WARTS from own left hand.
Worked with X-rays a great deal from 1896 to about 1903. Small pigmented maculæ and warts on both hands, always recur after accidental removal and grow very slightly but definitely larger.
1482. "The tissue is innocent. The warty condition consists of a hyperkeratosis, the stratum corneum being enormously thickened. There is very little corium to be seen in these sections, but in the thin strip removed there is a certain amount of inflammatory reaction in the shape of œdematous spaces and round-celled infiltration at base of papillæ." (Dr. Eastes' report).

1483. "This tiny overgrowth shows the same hypertrophy and keratosis of the stratum corneum as in the preceding one, but the incision has excluded all the true skin so that no opinion can be offered as to the presence of inflammation deep to the granular layer of the cuticle. The tissue is innocent." (Dr. Eastes' report.)

1484. AN IMPROVED FORM OF CARBONIC DIOXIDE SNOW COLLECTOR, which enables the surgeon to collect the desired amount of snow without waste, and to compress it into tablet form without handling it.

1485. A SET OF APPLICATORS, which enable the compressed snow to be applied without handling it, and to regulate the pressure as desired.

Lent by Dr. Hall Edwards.

DRILL BABOON.

Lent by Dr. Graham Renshaw.

1486. Adult, male, 15 years old. The largest specimen ever known in captivity. Coloration of face glossy, purplish black, margined by a thin salmon-coloured line. Forehead greenish black. Lower lip black with a carmine margin. Chin white. Note the inflation of the superior maxillæ.

1487. Same individual as No. 1486.

MANDRILL BABOON.

1488. Adult, male. Colour of face, brilliant ultramarine, grooved with deep purple, nostrils and middle line of face, deep scarlet. The maxillæ are both inflated, and deeply sculptured.

1489. Front view of same individual as No. 1488.

1490. RING-TAILED LEMURS.

Regional pigmentation. General body colour, reddish grey. Face and tail black and white, the colouration at each end of the body being similar.

1491. OCELOT CAT.

Body coloration consists of longitudinal black-edged blotches enclosing areas of darker colour than the general hue of the fur. A most unstable species, no two individuals being alike, and the two sides of the body in the same individual exhibiting different patterns.

1492. SERVALINE CAT.

Transitional colour pattern. Fur profusely sprinkled with small spots which tend to become blotches on the limbs. The inside of the foreleg shows two bands apparently formed by fusion of two or more blotches.

1493. CAPE WILD DOG.

The coloration consists of a confused marbling of black, white and ochre. Several large white blotches are seen, each more or less surrounded by a border of black pigment. No two specimens are alike, but the tail is always white. The forehead is bisected by a dark line (the "linea faciem percurrens" of Dr. Burchell).

1494. THYLACINE.

Striped pigment pattern, the stripes increasing in length from before backwards, being practically limited to the hinder half of the animal. This type of pigmentation occurs in species quite unrelated to each other. Thus it is found in the thylacine (marsupial) musk deer (ungulate) and hemigale (carnivore).

1495. GREVY ZEBRA.

Possibly the ancestral form from which all the other species of Zebra are derived. Note the equine build and the narrow stripes, which are mainly vertical in direction.

1496. BURCHELL ZEBRA.

Differs from Grèvy's species in the broad diagonal striping interspersed with fainter shadow stripes; it resembles a pony rather than a horse, and is smaller than the preceding species.

1497. EQUINE HYBRID (HORSE \times BURCHELL ZEBRA).

A case of palæogenesis, or reversion to a remote ancestor. Resemblance to the horse is seen in the overhanging mane and forelock, and in the dark body colour. Zebra characters are seen in the striping, but this resembles that of Grèvy's zebra (No. 1495) and not that of its parent—Burchell's zebra (No. 1496).

1498. MOUNTAIN ZEBRA.

Colour pattern of body consists of broad perpendicular stripes; thus it is more allied to Grèvy's species than to Burchell's general build asinine; tail and ears asinine.

1499. A PAIR OF GREVY ZEBRA.

Variation of pattern in individuals of the same species, as will be seen by comparing the striping on the neck and chest in the two individuals here shown.

1500. BURCHELL ZEBRA.

A variation of the typical form. The markings on the hinder half of the back tend to form a network.

1501. LLAMA.

Acroteric piebald pigmentation. The coloration of the head corresponds with that of the extremities ; the piebald face is associated with piebald feet.

1502. ARGALI WILD SHEEP.

Acroteric depigmentation. The white nose-patch is associated with white legs and feet.

1503. ROCKY MOUNTAIN GOAT.

General depigmentation. The only game animal which is white at all seasons. These goats are not albinos, as is shown by the pigmented eyes. The horns and hoofs are black.

1504. BEATRIX ANTELOPES.

Acroteric pigmentation. Triangular patch on the face and eye streak, blackish brown, as are also the legs and feet. These are young animals, the intensity of the dark pigmentation increasing with age.

1505. LEUCORYX ANTELOPE.

Acroteric pigmentation, brownish facial markings and neck associated with brownish patches near the axilla in the fore limb and about the hock in the hind limb.

1506. ADDAX ANTELOPE.

Seasonal change in pigmentation. The animal has almost entirely assumed the white summer coat, a few scanty shreds on the flanks, shoulder and neck representing the thick brown *pélieuse* of winter. The tuft of hair on the forehead remains unaltered at all seasons.

1507. BLUE WILDEBEEST.

Fore and aft pigmentation. The colour is the same at each end of the animal. The bunches of black hair on face and forehead and throat are associated with a long black tail. The general colour of the animal is bluish gray.

1508. BLACK WILDEBEEST.

Fore and aft depigmentation. Absence of colour at each end of the animal. White mane associated with long white tail. General body colour, amber brown.

1509. SPRINGBOK.

Specialised pigment pattern. General body colour, cinnamon fawn above, white below. Deep chestnut eye stripe, deep, chestnut lateral band on body. A type of coloration characteristic of the gazelle family.

1510. SOUTHERN ROAN ANTELOPE.

The magpie coloration of the face is remarkable. Note the large size of the white nose-patch. A curious switch of white hair springs from the side of the face.

1511. SENEGAMBIAN ROAN ANTELOPE.

Note the greater extension of black pigment on the face, and the corresponding reduction in size of the white switches and nose patch.

1512. SENEGAMBIAN ROAN ANTELOPE (same individual as No.).

The nose patch is almost divided by black pigment into a lesser (central) portion, and a larger white area situated above and behind the gape.

1513. WESTERN MARSH BUCK.

Intensification of pigment due to heat and moisture. A few white spots and lines appear irregularly in the coat.

1514. SELOUS MARSH BUCK.

Further intensification of pigment due to heat and moisture. The white markings seen in the previous species (No. 28) have almost entirely disappeared.

1515. MAXWELL'S DUIKER.

Self-colouration. Mouse grey above, paling to buff below. (Right-hand figure).

1516. COMMON DUIKER.

Contrast coloration. Yellowish grey above, white below. (Left-hand figure).

1517. HIPPOPOTAMUS thirteen months' old.

The body generally is already deeply pigmented. The head and face still show unpigmented areas behind the ears, around the orbit, and about the lower part of the face.

1518. AN EXHIBIT OF PICTURES OF SKIN AFFECTONS, &c.

Lent by Sir Jonathan Hutchinson.

1519. HIPPOPOTAMUS, two years old.

Skin now almost entirely invaded by pigment. The unpigmented areas about the eye and ear seen in No. 1496 have almost disappeared, and the lower part of the face is entirely saturated with pigment.

1520. HIPPOPOTAMUS, two years old.

The entire skin is saturated with closely-set pigmented moclæ.

1521. INDIAN ELEPHANT.

The hide is of a general dusky hue without obvious pigmented maculae. The so-called white elephants are merely individuals in which the skin is blotched with unpigmented areas.

1522. WHITE RHINOCEROUS.

The skin during life is of a uniform slaty gray colour.

1523. BLACK RHINOCEROS.

General body colour uniform slaty gray, and but little darker than No. 1522. The sun shining on the animal makes it appear lighter coloured than it really is.

1524. BABIRUSA.

Loss of hair due to semi-aquatic habits associated with (1) pigmentation of skin, (2) formation of dermal outgrowths. These latter are seen as granules profusely dotted over the body, neck and legs. With advancing age the hide along the back tends to become rough, chipped and scaly like the bark of a tree.

1525. WART HOG.

Loss of hair associated with (1) skin pigmentation, (2) dermal outgrowths. A prominent wart-like protuberance is seen projecting a little below the pinna. The wrinkled skin is dotted over with small pigment patches. The remnant of the original hairy covering appears as a straggling untidy mane.

1526. SABLE ANTELOPE.

Regular pigment pattern, a smart contrast of dark chestnut and white.

1527. GIRAFFE.

Irregular pigment pattern. The outlines of the blotches are almost amæbic in their irregularity. The pigment is darkest along the spine.

1528. CHART SHOWING FAMILIAL INCIDENCE OF FAVUS OF THE HAIRY SCALP.

Lent by Dr. Halls Dally.

WATERCOLOUR DRAWINGS.

Lent by Dr. Phineas Abraham.

1530. Acne in an infant.

1531. Syphilitic pemphigus, following vaccination.

1532. Black currant and "mulberry" nævi.

1533. Pityriasis rubra pilaris.

- 1534. Oriental Sore.
- 1535. Xanthoma diabetorum.
- 1536. Impetigo annulata
- 1537. Lymphangioma.
- 1538. Senile lupus.

COLOURED PHOTOS.

- 1539. Ideopathic blackening of the skin.
- 1540. Xanthoma diabetorum.
- 1541. Papular syphilede.

PHOTOGRAPHS.

- 1542. Pityriasis rubra pilades, following Pityriasis rubra.
- 1543. Artificial keloid.
- 1544. X-ray dermatitis.
- 1545. Leprosy.
- 1546. Bubonic plague.
- 1547. Crateriform epithelioma.
- 1548. Chancre on lip.
- 1549. Impetiginous ulcer simulating syphilis.
- 1550. Keloid after burn.
- 1551. Lichen ruber accuminatus.
- 1552. "Cauliflower" nolos.
- 1553. Yaws.
- 1554. Severe pemphigus.
- 1555. Tar acne.
- 1556. Universal lupus erythematosus.
- 1557. Erythema lupus simulating psoriasis.
- 1558. Dermatitis herpetiformis.
- 1559. Impetigo ciccinata.
- 1560. Tiia ciccinata.
- 1561. Syphilitic ulcer.
- 1562. Syphilitic onychia.
- 1563. Pustulo squamous syphilide.
- 1564. Pemphigus foliacus.
- 1565. Pemphigus vegetans.
- 1566. Mycosis fungoides.

XIV.—OPHTHALMOLOGY.

Hon. Curator - Dr. MAYOU.

"LUMIÈRE" AUTOCHROME PHOTOGRAPHIC PLATES ILLUSTRATING VARIOUS OPHTHALMIC DISEASES.

FRAME A.

Lent by Dr. Morax (Paris).

- 1567. STAPHYLOMA CORNEÆ (instantaneous exposure).
- 1568. SPOROTRICOSIS ORBITO-PALPEBRALIS (time exposure)
- 1569. HERPES ZOSTER OPHTHALMIC (instantaneous exposure).
- 1570. GUMMA OF THE EYE-BROW (time exposure).
- 1571. PIGMENTED SCLERA (instantaneous exposure).
- 1572. IRIDO-CYCLITIS IN LEPROSY (instantaneous exposure).
- 1573. KERATITIS NEUROPARALYTICA (instantaneous exposure).
- 1574. DERMOID OF THE LIMBUS (time exposure).
- 1575. INTERSTITIAL KERATITIS (instantaneous exposure).
- 1576. IRIDO-CYCLITIS (METASTATIC) (instantaneous exposure).
- 1577. CHRONIC BLEPHARITIS (instantaneous exposure).
- 1578. HYPERTROPHY OF THE PALPEBRAL PART OF THE LACRYMAL GLAND (instantaneous exposure).
- 1579. PIGMENTED NÆVUS OF THE LIMBUS (instantaneous exposure).
- 1580. PIGMENTED NÆVUS OF THE LIMBUS (instantaneous exposure).

FRAME B.

Lent by Dr. Magilot.

DEVELOPMENT OF THE HUMAN RETINA.

- 1581. 8MM. EMBRYO (4 weeks).
- 1582. 8MM. EMBRYO.

Communication with telecephalus.

1583. 12MM. EMBRYO (6 weeks).
Transverse section showing the optic nerve in process of formation.
1584. 22MM. EMBRYO (8 weeks).
Beginning differentiation of multipolar cells.
1585. CILIARY PART OF A YOUNG RETINA IN A 22MM. EMBRYO (8 weeks).
1586. 99MM. EMBRYO.
Complete differentiation of multipolar cells and nerve fibres—above undifferentiated layer.
1587. CILIARY PART OF THE RETINA IN A THREE MONTHS' FETUS.
1588. FIRST DIFFERENTIATION OF THE FOVEAL CONES IN A FOUR MONTHS' FETUS.
1589. RODS AND CONES IN PROCESS OF DEVELOPMENT—FIVE MONTHS' FETUS.
1590. SECTION OF THE WHOLE RETINA IN A FIVE MONTHS' FETUS.
With cones and rods in development.
1591. RETINA OF A SEVEN MONTHS' FETUS.
1592. CONES AND RODS IN A FULLY DEVELOPED RETINA.
1593. CASE OF SPECIMENS from Central London Ophthalmic Hospital, showing a new method of mounting specimens.

Lent by Dr. Mayou.

DRAWINGS OF CONGENITAL CATARACT.

Lent by Dr. N. Bishop Harman.

1594. FAIR-SIZED LAMELLAR CATARACT, seen by focal illumination. Several riders and outlying masses.
× 5.5.
Male, at .15. Teeth honeycombed. * Small physique, rickety.
No fits.

1595. DRAWING OF SAME LAMELLAR CATARACT as seen with retinoscopy mirror. $\times 5.5$.

Iris cut away at *i* to show clear cortex *c* and lens ligament *ll*,
o = main opacity ; *r* = rider.

1596. LARGE-SIZED LAMELLAR CATARACT, in typically ricketty child. $V = \frac{6}{18}$ through the opacity. $\times 7$.

1597. LAMELLAR CATARACT, of moderate size, with remarkable "rider" and looped "spokes."

Female, æt. 33, diagnosed æt. 10. $V = 6/18$ with pupils dilated.
 Teeth normal.

1598. SMALL DENSE LAMELLAR CATARACT, no riders or outlying opacities. Focal illumination. $\times 5.5$.

Mrs. H., æt. 35. Optical iridectomy gives $V = 6/18$. Teeth normal. Mother of 7 children, of whom 4 have cataract. (See next drawing for one of these).

1599. VERY DELICATE LAMELLAR CATARACT, with dense central star in anterior layer. Focal illumination, $\times 5.5$.

Hereditary cataract in several generations. (See preceding drawing for mother's).

1600. PEDIGREE OF FAMILY in whom the two preceding cases of cataract were found.

19 cases of cataract were traced in four generations. (As published in the "Treasury of Human Inheritance," 1910).

1601. DOUBLE-SHELLED LAMELLAR CATARACT, seen by focal illumination. $\times 5.5$.

Hereditary cataract in several generations.

1602. DIAGRAMATIC SECTIONS of:

Lamellar cataract.

Discoïd cataract.

Delicate lamellar cataract, with anterior star capacity.

1603. DISCOÏD CATARACT, usual simple form, Bilateral. $\times 5.5$.

Opacity appears dark against illuminated fundus. (See previous picture for section of lens.) Hereditary.

1604. CONGENITAL ANTERIOR POLAR AND PERIPHERAL
DOT CATARACT. $\times 3.5$.

Girl, æt. 18, mentally defective. Only child of unknown parents.

1605. STELLATE CATARACT opacity along line of union
of ends of lris fibres, in anterior oposterior
lamella. $\times 5.5$.

Drawn from line drawing of Adams. Hereditary in several generations.

1606. MICROPTHALMIA AND ANTERIOR POLAR CATERACT,
cornea only 7.5 m.m diameter (average 11.6)

Hereditary in several generations. Mental defect, Focal illuminations. $\times 5.5$.

1607. POSTERIOR POLAR OR HYALOID CATARACT, with
anterior polar and fine axial opacity. $\times 5.5$.

Lighted from left and viewed from right hand side. Hereditary through several generations.

1608. UNDEVELOPED LENS, contractions, with ciliary
processes exposed on front of cataract.

Girl, æt. 17. Other eye highly astigmatic.

1609. ORBITO-NASAL (ETHMOIDAL) EXOSTOSIS.

Removed by operation from patient (F.), æt. 20, who had proplosis, diplopia and diminished (2/60) vision of right eye, also right nasal obstruction. The tumour consists of cancellous bone with a covering of dense ivory: Nature of growth doubtful. Patient has to a great extent recovered vision and remained well six months after operation.

Lent by Dr. T. Jefferson Faulder.

1610. TWO FRAMES OF PICTURES representing cases of
and family choroiditis described in the reports of the
1611. Ophthalmological Society.

These pictures come from a very prolific family which has been traced for six generations. A large proportion of the members of the family are affected. The disease consists in an exudation of white spots occupying the disc-macula area. At the early stage it may be grouped either near the macula or near the disc. Some spots overlap the disc and a few have been seen actually on the disc. The youngest case noted is 20, but they seldom occur before 30, and perhaps they are more common from about

40 to 50. A remarkable feature about them is the small degree in which visual acuity is affected, though the appearances may be very gross. In extreme old age, however, they pass into atrophy, leaving the patient practically blind. In other respects the family is hale and hearty and long-lived.

Another family has been traced back by Dr. Doyne, as originally living within a few miles of the family from which these pictures are taken. An attempt is being made to link up the two families; this has not yet been successful.

Lately a good many other cases have been noted, and it is probable that it is not so very uncommon, though the family characteristic has not been noted before.

Lent by Dr. Doyne.

1612. PEDIGREE OF CATARACT to show "Anticipation" or "Antedating" of the disease in successive generations.

Black circles=persons with cataract; clear circles=normal; ♂ male, ♀ female. In generation II. the wife (2) and husband (3) were operated on for senile cataract at *æt.* 72 and 84 respectively, having had very good sight until long after 50. Of their children in generation III., No. 8 was operated upon for cataract at *æt.* 54, No. 13 at 53, and No. 12 had well-marked cataract at 48, whilst the three other blacked circles show persons who had slight opacities in the lens when examined at ages between 58 and 47. In generation III., Nos. 34 and 35, and in generation IV., Nos. 10, 11, 16, 19, and 29, had slight lenticular changes, some of which, from their character, were probably congenital when examined at ages between 18 and 39.

Lent by Dr. E. Nettleship.

1613. FIVE PEDIGREES OF GLAUCOMA

Showing "Anticipation" or "Antedating" of the disease in successive generations. The ages of the affected individuals when the disease was diagnosed, or when the case was operated upon, are shown by the numbers against the black circles.

Lent by Dr. E. Nettleship.

1614. A PEDIGREE OF DIABETES MELLITUS

Showing "Anticipation" in successive generations. Generation II., No. 3 died of diabetic coma at 69 in 1909. Three of her four children—viz., generation III., Nos. 2, 3, and 5, died of diabetic coma at 59, 27, and 18 respectively. One of these three, III., 2, lost a daughter (IV. 1) from the same disease at 25; the next III., 3, also lost a daughter (IV. 3)

from the same disease and before puberty ; and another daughter of III., 3, viz., IV. 5, now aged 26, has had occasional but very slight signs of the disease. From the family records it is almost certain that generation I. 1 and generation II. 1, both of whom lived to old age, had diabetes.

Lent by Dr. E. Nettleship.

1615. DRAWING—SYM'S KERATOME AND TROWEL-HANDLED KNIFE.

Lent by Dr. H. Herbert.

1616. DRAWING.—THE PUNCTURE : SMALL FLAP INCISION.

1617. DRAWING—INCISION MARKING END OF FLAP : SMALL FLAP INCISION.

1618. DRAWING—IRIDO-DIALYSIS CAUSED BY KERATOME : SMALL FLAP INCISION.

1619. DRAWING—CUTTING THE SIDES OF THE FLAP : SMALL FLAP INCISION.

1620. DRAWING—THE INCISION COMPLETE : SMALL FLAP INCISION.

1621. SMALL FLAP CUT WITH NARROW KNIFE.

1622. ORBITAL RIGID EYE-GLASS FRAMES.

These frames are maintained in place by two wires fitting the inner margin of the orbit. Their free ends lying under the skin of the eyebrow.

Lent by Dr. Rayner D. Batten.

1623. THE HYDROPHTHALMOSCOPE.

1. Fitted for examination of the eye under water—and treatment of the eye by suction.
2. Fitted as a continuous douche.

DESCRIPTION.—The instrument consists of a metal eye-cup, of a somewhat similar shape to the ordinary eye-bath, with smooth rounded edges. A short metal tube is soldered into its upper and lower surfaces, to which india-rubber tubing can be affixed. The upper india-rubber tube is short—about 2 in. long—and can be closed by a clip. The lower india-rubber tube is about one yard in length, and connected with a reservoir. The anterior surface is a plane glass. The cup should be not less than $\frac{5}{8}$ inch in depth at its shallowest part, so as to give room for the coming forward of the lids and globe.

1624. SCOTOMAGRAPH, for mapping out blind or anæsthetic areas of the retina, or for ordinary perimetric investigations.

Lent by Dr. J. H. Tomlinson.

1625. PROJECTION SPECTROSCOPE, for testing colour perception, and for giving spectral colours for use with the Scotomagraph.

TESTS FOR COLOUR BLINDNESS.

1626. COLOUR PERCEPTION LANTERN.

Lent by Dr. Edridge Green.

CONSTRUCTION.—The lantern consists of four discs: three, carrying seven coloured glasses, and one carrying seven modifying glasses. Each disc has a clear aperture. The other mechanical details are:—an electric or oil lamp with projecting accessories, a diaphragm for diminishing the size of the light projected, handles for moving the discs, and the indicator showing the colour or modifier in use.

DIAPHRAGM.—This is graduated in respect to three apertures to represent a $5\frac{1}{2}$ inch railway signal bullseye at 600, 800 and 1,000 yards respectively when the test is made at 20 feet.

COLOURS.—Three of the discs contain —

Clear.	Blue.
Yellow.	Purple.
Pure Green.	Red 1.
Standard Green.	Red 2.

One disc contains the following modifying glasses:—

Clear.	Neutral 2.
Ground Glass.	Neutral 3.
Ribbed Glass	Neutral 4.
Neutral 1.	Neutral 5.

METHOD OF USING.—The colours are brought successively into view by moving one or more of the handles to position, denoting the colour or modifier in use, on the scale at the top of the lantern.

DEGREES OF COLOUR PERCEPTION.—The classification is as follows:—

Heptachromic appreciating

in the spectrum Red Orange Yellow Green Blue Indigo Violet

Hexachromic " " " Red Orange Yellow Green Blue Violet

Pentachromic " " " Red Yellow Green Blue Violet

Tetrachromic " " " Red Yellow Green Violet

Trichromic " " " Red Green Violet

Dichromic " " " Red Violet

Monochromic appreciating light and shade only.

A Dichromic may vary with more or less gray patch between red and violet.

There are also, alone or in combination with the above, cases of colour blindness due to shortening of the red or violet end of the spectrum, or to the defective sensibility to rays of certain wave-length when the intensity is reduced, or the retinal image is small.

NOTES ON TESTING.—Show each colour in one disc, and the modifying glasses in combination, and *obtain a name* for each.

Colour ignorance demands rejection.

The candidate should be seated at a distance of 15 or 20 feet from the lantern. He should be asked to name the colour of the light produced by a coloured glass alone or in combination with the modifying glasses or the coloured glasses. A candidate should be rejected (I.) if he call the red, green, or the green, red, in any circumstances. (II.) If he call the white light in any circumstances red or green or *vice versâ*. (III.) If he call the red, green, or white lights, black, in any circumstances. A candidate who makes mistakes other than those mentioned above should be put through a very searching examination.

The examiner should on no account conduct the examination on any regular plan, because the candidate, anxious to pass, finds out from persons who have already passed, the order and method of the examination; and so, though colour blind, might obtain a certificate. Any one of the slides may be first shown and the candidate required to name the colour of the light. The following will serve as an example of the method to be employed in testing a candidate. The standard red slide having been placed in the lantern, the candidate is required to name its colour. Then a blue or green slide may be substituted, then one on the neutral, ground, or ribbed glass slides should be inserted; not the slightest intimation being given to the candidate of the nature of the slide. He should be asked to name or describe the light, and the answer if incorrect, together with his other replies, carefully recorded. The other slides may then be shown, a combination of the neutral, ground, ribbed and coloured glasses being used at intervals. Twenty correct answers may be considered sufficient for a pass certificate.

One incorrect answer to any of the questions under test A suffices for rejection. The examinee giving a doubtful answer to question 6 in test A or to any of the questions in tests B, C, and D should be subjected to a very searching examination. The procedure should be varied in every case. Questions with doubtful answers should be repeated after an interval of other questions. Answers should on no account be commented on.

1627. POCKET TEST FOR COLOUR BLINDNESS.

Lent by Dr. F. W. Edridge-Green.

1628. THE POCKET CLASSIFICATION TEST.

Consists of nineteen small pieces of white cardboard upon which are threaded fourteen single pieces of wool in accordance with Dr. Edridge-Green's system as explained pp. 129-124 of his book "Colour Blindness and Colour Perception." The size of each card is 1 in. by 1½ in., and the set are conveniently fitted in a small leather-covered case. The threads are numbered consecutively, with the exception of the end threads of each row. The end threads of the first four rows are numbered from I. to VIII., in Roman numerals, and form the tests. They are orange, violet, red, blue green, rose, pure green, yellow green and electric blue. The series of colours are selected and arranged so as to confuse the colour blind and force them to be guided by their colour perception, while the quantity of colour is quite sufficient for the normal sighted to pick out the colours with ease.

The special advantages of this test are :—

- (1) The colour blind can be ranged definitely in their proper classes.
- (2) Central scotoma can be detected with its aid.
- (3) Colours are arranged so as to confuse the colour blind, but offer no difficulty to the normal sighted.
- (4) Test is extremely portable.
- (5) Wools are kept clean and no important colour is likely to be lost.

1629. WOOL BOX CLASSIFICATION TEST.

Consists of a large number of skeins of wool of various colours and four primary colours, also skeins of coloured silks, coloured glasses, and pieces of coloured cardboard. Patient is given one primary and told to pick out all wools containing same colour. Test is repeated with silks, glasses, or cards.

Lent by Dr. Edridge-Green.

1630. COLOUR TEST APPARATUS.

Lent by Dr. Maitland Ramsay.

The improved model of the instrument is constructed with a brass rectangular case supported at a convenient angle. At the lower end which faces the electric lamp are two slits controlled by drums, which drums are graduated in wave lengths. These slits are placed in the principal focus of the collimating lens immediately above which is the prism

grating. Consequently, in looking towards same from the eyepiece, the upper half of the collimating lens is seen filled with homogeneous light, the colour of which is indicated on one drum. The other drum controls the colour of the lower half of the collimator. The intensity of the illumination is regulated by the width of the slits, and adjusting screws are provided. Above the prism is a diaphragm with various sized openings, the smaller of which allow the light from part of the lower half only of collimator to pass. Means are provided by an unsilvered plane reflector to mix the colour in the lower half with white light. A regulating shutter which can be opened and closed by a milled head is adjusted to the reflector. In the eyepiece is a double image prism (which can be turned aside when not required). This enables a combination patch of any two colours to be made, the primary colours being shown above and below same. This same prism also doubles the small spots of colour given by the small apertures in the diaphragm and is useful in comparing central with peripheral vision.

XV.-- LARYNGOLOGY.

Hon. Curator - Dr. HARMER.

RHINOLOGY.

1631. A LONG CHAIN OF ORGANICALLY CONNECTED NASAL POLYPI.

Lent by Dr. Harmer.

Removed by Mr. Christopher Heath with forceps. (Museum, University College Hospital.)

1632. LARGE NASAL POLYPUS.

Removed from a female adult by Mr. Herbert Tilley.

1633. ANTERIOR PART OF A LEFT INFERIOR TURBINAL, SHOWING A SMALL TUBERCULOUS ULCER.

Removed by Mr. Herbert Tilley from patient also suffering from tuberculous glands in the neck, and tuberculous disease of the wrist joint.

1634. ANTERIOR PORTION OF A LEFT MIDDLE TURBINAL, SHOWING CYSTIC ENLARGEMENT.

Removed by Mr. Herbert Tilley.

1635. A LARGE NASO-ANTRAL POLYPUS.

Removed by Mr. Herbert Tilley from a boy age 13. Its site of attachment was the posterior, inner and lower wall of the left antrum.

1636. A NASO-ANTRAL POLYPUS, SHOWING ITS ATTACHMENT WITHIN THE ANTRUM.

These polypi make their way through the maxillary ostium, and then project into the posterior naris or nasopharynx.

1637. FRAGMENTS OF A VERY LARGE VASCULAR FIBROUS TUMOUR OF THE NASOPHARYNX AND LATERAL NASAL WALL.

Removed by four operations at intervals of several months. Patient was quite well and free from recurrence four years after last operation. (*Vide* Tilley. Proc. Laryng. Soc London: 1902.)

1638. CALVARIUM

From female—age 22—who died from osteomyelitis of the calvarium, following an operation for bilateral fronto-ethmoidal suppuration. (*Vide* Tilley. "B. M. J.," 1899; Vol. II., p. 994.)

1639. EXTREME ATROPHY OF MIDDLE AND INFERIOR TUBINATED BODIES.

A dissecting room specimen to which no history was attached. The right nasal chamber presented an exactly similar appearance.

1640. BASE OF SKULL SHOWING THE ACCESSORY SINUSES OPENED FROM ABOVE.

The specimen shows an ethmoidal cell in the crista galli. The cell communicates with the nasal cavity through a frontal bulla cell. The specimen illustrates the difficulty in dealing with suppuration of the ethmoidal cells in such a case.

1641. NASO-ANTRAL POLYPUS.

The polypus was removed from the naso-pharynx: the stalk was seen to come through the membranous wall of the middle meatus: the maxillary antrum in this case had not yet been opened.

1642. The polypus which was attached close to the junction of the outer wall and floor of the antrum passed through a large aperture in the posterior part of the nasal wall of the antrum and reached the naso-pharynx. It was removed through a large opening in the canine fossa: a number of small polypi also occupied the antrum

1643. SMALL POLYPI FROM MAXILLARY ANTRUM.

A number of small polypi occupied the interior of the antrum in addition to the large naso-antral polypus shewn in the collection.

1644. POLYPUS GROWING IN ANTRUM.

A post-mortem specimen showing a large polypus occupying the cavity of the maxillary antrum.

DRAWING OF NASO-ANTRAL POLYPUS.

1645. From Kubo's paper, showing an antral polypus passing into the nasal cavity.

1646. From Kubo's paper: Polypus seen in the choana.

X-RAY PHOTOGRAPHS OF RHINOLOGICAL CONDITIONS.

Lent by Drs. W. G. Porter and A. Logan Turner.

1647. Malignant tumour involving right nasal and the accessory cavities.
1648. Healthy adult, with very high palate. A piece of silver paper marks the position of the palate. Note the floors of the antra dipping slightly into the alveolar processes.
1649. Healthy child, æt. 5, showing well-marked frontal sinus. Note small antra and the unerupted permanent teeth.
1650. Adult male showing suppuration in the right antrum and frontal sinus ; there is also right ethmoidal suppuration.
1651. Adult male, showing suppuration in the left frontal, ethmoidal and maxillary sinuses.
1652. Adult female, showing suppuration in all the sinuses.
1653. Adult female, showing a large mucocele of the right frontal sinus. There is no left frontal sinus. The nasal septum is deflected to the right.
1654. Adult female, showing a suppurating mucocele of the right frontal sinus. There was pus in the right antrum.
1655. Adult female, with suppurating dental cyst occupying the right antrum ; the dark shadow of cyst is seen internally and inferiorly ; the unoccupied part of antrum superiorly and externally is clear. The diagnosis was confirmed by operation.
1656. Adult female with dental cyst occupying almost whole of right antral cavity. A small light area of antrum is seen externally.
1657. Adult male, suppuration in left antrum ; an alveolar sequestrum was removed ; a narrow light area shows the position which it occupied.
1658. Adult female with sarcoma of left nasal cavity, left antrum, ethmoid, and roof of orbit.
1659. Lateral view of skull of same patient.
1660. Brain and skull cap with large cerebral tumour ; the dark area on the right is normal brain tissue ; the large mottled area is tumour. At the left vertex is the area of the decompression operation.
1661. Skull (antero-posterior view) of Australian aboriginal. The frontal sinus on the left side has been opened.
1662. Adult, showing double ethmoidal disease. Note cell in crista galli and antra with large alveolar recesses.
1663. Right-sided antral disease. Note the large antra with marked alveolar recesses.

- 1664. Unilateral frontal and ethmoidal disease, the diseased frontal sinus being the larger. Left antrum is under treatment.
- 1665. Stereoscopic picture of skull, antero-posterior view. Mounted for inspection of sinuses from the front.
- 1666. Stereoscopic picture of skull, antero-posterior view. Mounted for inspection of sinuses from the back.
- 1667. Stereoscopic picture of lateral view of skull. Mounted for inspection of sinuses from without.
- 1668. Stereoscopic picture of lateral view of skull. Mounted for inspection of the sinuses from within.
- 1669. Stereoscopic picture of mastoid region of skull. Mounted for inspection from without.
- 1670. Stereoscopic picture of mastoid region of skull. Mounted for inspection from within.
- 1671. Stereoscopic picture of lateral view of head and neck of adult. Shews very large sphenoidal sinus.
- 1672. Choanal polypus with diseased antrum on left side. Note unusual configuration of frontal sinuses.
- 1673. Unilateral disease of the antrum. The frontal sinuses are large.
- 1674. Frontal sinus (left) after a Killian operation. Cured.
- 1675. Healthy child, æt 4. Note small antra and absence of frontal sinuses.
- 1676. Suppuration in right antrum and ethmoid. The right frontal sinus is small and is probably diseased.
- 1677. Left antrum after radical operation. Front view of skull showing sinuses.

X-RAY NEGATIVES OF NASAL SINUSES.

Lent by Mr. H. Tilley.

- 1678. From a patient whose left frontal sinus was opened by Mr. Herbert Tilley. Note the extension of the left sinus towards the right across the middle line, where it overlaps the smaller right sinus.
- 1679. The same skull in profile.
- 1680. From a patient whose left frontal sinus was opened by Mr. Herbert Tilley for chronic suppuration. Note the darkness of the shading over the left sinus as compared with the healthy right sinus.
- 1681. Glass negative from a Cingalee gentleman, whose frontal sinuses were opened by Mr. Herbert Tilley for chronic suppuration. Note that there is almost a complete subdivision of the left sinus by a median vertical septum about half-inch from the middle line.

1682. Radiogram exhibiting a foreign body (small antral plug) in the right maxillary antrum.
1683. Skull showing a symmetrical frontal sinuses, ethmoidal cells, sphenoidal sinuses and antra. The sphenoidal sinuses are seen immediately above the superior choanal margin.

Lent by Drs. W. G. Porter and A. Logan Turner.

1684. Skull showing the frontal sinuses opened and a piece of tinfoil lying upon an incomplete septum within each sinus. The sphenoidal sinuses are well seen. The alveolar recesses of the antra lie below the plane of the nasal floor.
1685. Lateral view of skull showing anterior and posterior clinoid processes, and sella turcica. The sphenoidal sinus is well developed.
1686. Large left frontal sinus opened, also a large ethmoidal cell extension into the roof of the orbit. The right frontal sinus is unopened. The irregular lines in the lower area of the sinuses above the supra-orbital margins indicate the uneven floor of the anterior cranial fossa.
1687. Diseased right antrum before operation.
1688. An ethmoidal cell seen in the crista galli.
1689. An adult head showing absence of right frontal sinus. There is indication of a very small left frontal sinus.
1690. Boy æt. 4. Healthy nose; small antra; no frontal sinuses.
1691. Child æt. 5. Showing at this early age well-developed frontal sinuses.
1692. Child æt. 12, with small frontal sinuses and well-marked orbital extension of ethmoidal cells.
1693. Adult female, J. D., showing suppuration in the left antrum. The frontal sinuses are large.
1694. Adult female, Mrs. P., showing suppuration in the left antrum and ethmoidal cells.
1695. Adult female, Mrs. A., showing bilateral antral and ethmoidal suppuration. The frontal sinuses show a suspicious shadow.
1696. Mrs. A. Right frontal and antral suppuration.
1697. E. M. Bilateral antral and ethmoidal suppuration under treatment. Both frontal sinuses suspected as suggested by blurring of sinus margins.
1698. Mucocoele of right frontal sinus. The cavity contained clear mucoid fluid; note the well-defined margin of cavity contrasted with blurring in suppuration. There is no left frontal sinus.
1699. Mrs. B. Suppurating mucocoele of right frontal sinus. Contrast the blurring of margin of sinus with the sharp definition of the cavity containing clear mucoid fluid.

1700. Diseased left antrum, [associated with choanal polypus. Note unusual outlines of frontal sinuses.
1701. Suppuration in the left antrum cured by radical operation. The shadow closely resembles that of a diseased antrum.
1702. Left frontal sinus after a Killian operation. Cured.
1703. Malignant tumour involving right nasal chamber, ethmoid cells, antrum and floor of orbit.
1704. Head of girl with acromegaly, showing large size of sella turcica and tongue and characteristic appearance of lower jaw.
1705. Oblique lateral view of head of normal adult, showing mastoid cells.
1706. Absence of frontal sinuses in a child, æt. 15.
1707. Lateral view of skull, showing mastoid region.
1708. Head of child, æt. 10, showing dental cysts in lower jaw.
1709. Lateral view of head of boy, æt. 19, showing base of skull and nasopharynx and large spheroidal sinus extending into the basi-occipital region.
1710. Healthy adult with very high palate. A piece of silver paper marks the position of the palate. Note the floors of the antra dipping slightly into the alveolar processes.
1711. Healthy adult with V-shaped palate. Floor of antra can be distinctly seen in the alveolar processes.
1712. Double antral suppuration: the right frontal sinus shows a suspicious shadow.

1713. RHINOLITH.

Removed from a male, æt. 22. It was lying in the left inferior meatus, and had caused obstruction and a discharge of mucus for six months. There was an operation for the removal of adenoids six years earlier.

Lent by Dr. F. H. Rose.

1740. Removed from a woman, æt. 24. It was lying in the right middle meatus of the nose. It had caused obstruction and a purulent discharge for two years. No history of a previous operation, or of a foreign body.
1715. Removed from the right middle meatus of a youth aged 16. Six years earlier an operation had been performed for the removal of a cherry stone from his nose. From that time onwards he had noticed a discharge from the nostril, an unpleasant smell, and occasional bleeding.

1716. FIBRO-SARCOMA OF NOSE, removed after temporary ligature of both external carotid arteries and laryngotomy.

(i.) Tumour.

(ii.) Photograph showing condition before operation.

(iii.) " " " after "

Case reported in Proc. Roy. Soc. Med. 1910. Vol. III.
No. 5, p. 122.

Lent by Dr. Douglas Harmer.

1717. SKIAGRAM SHOWING FRONTAL SINUSES OF UNUSUAL EXTENT (By A. Howard Pirie).

Lent by Mr. Douglas Harmer.

DISEASES OF THE PHARYNX.

MAMMALIAN TONSILS.

1718.)
to } TWELVE VARIOUS SPECIMENS.
1729.) *Lent by Dr. G. Seccombe Hett.*
1730.)
to } SIX SPECIMENS, illustrating the anatomy of the
1735.) human tonsil.
1736. TUBERCULOSIS OF THE TONSIL.
1737. MALIGNANT DISEASE OF THE TONSIL, removed
by operation.
1738. Idem.
1739. Idem.
1740. MICROSCOPIC SLIDES, showing the relations of
the supratonsillar fossa.
Lent by Dr. H. G. Butterfield.
1741. MICROSCOPIC SLIDES, showing the relations of
the capsule of the human tonsil.
1742. MICROSCOPIC SLIDES, showing the relations of
supratonsillar fossa and capsule of the tonsil
in mammals.
1743. MICROSCOPIC SLIDES OF PATHOLOGICAL
TONSILS.

1744. TUBERCULOUS ADENOID.

Removed from the naso-pharynx of a girl, aged 21. At a later date Mr. d'Arcy Power removed glands from the neck which contained caseous foci. A guinea pig was inoculated and died with tubercles in its spleen. No evidence of tubercle could be found in the chest (Dr. Drysdale.)

Lent by Dr. F. H. Rose.

1745. Removed from the naso-pharynx of a women, aged 26. Signs of phthisis were found at the apex of one lung. No animal experiment.

1746. SUBSTERNAL CYSTIC ADENOMA OF THYROID.

Diagnosis. By Tracheoscopy

History.—Sudden dyspnœa due to double abductor paralysis. Tracheotomy. After potassium iodide internally for three weeks, recovery of left vocal cord. Right abductor paralysis disappeared in six weeks, and tracheotomy tube was removed. Later, gradually increasing stridor and dyspnœa. Six months after removal of tube examined by direct tracheoscopy. Trachea found to be flattened by lateral external pressure at level of supra-sternal notch. Nothing seen or felt in neck. Tumour in the left lateral lobe of thyroid gland containing cystic adenomata. Removed by transverse incision over lower part of neck. Recovery.

Lent by Dr. Douglas Harmer.

1747. BONE REMOVED BY ŒSOPHAGOTOMY.

Patient had swallowed the bone while travelling in a train in Italy. Six days after, on arriving in England, he was unable to swallow liquids. Chloroform was administered, but attempts to pass the œsophagoscope failed owing to œdema of mucus membrane at upper part of œsophagus. The bone was then removed from the upper part of the gullet by œsophagtomy. The patient recovered.

DISEASES OF THE LARYNX.

1748. PAPILLOMATOUS MASSES

Removed from larynx of a boy, age 8.

Lent by Mr. Herbert Tilley.

1749. LARYNX.

Showing œdema of epiglottis and aryepiglottic folds. (Museum University College Hospital.)

1750. PAPILLOMATOUS GROWTH

From larynx of a young woman who died of suffocation. (Museum University College Hospital.)

1751. PAPILLOMATA OF LARYNX.

From child who died of suffocation while tracheotomy was being performed. (Museum, University College Hospital.)

1752. LARYNX.

Showing necrosis of portion of right thyroid cartilage, the result of tertiary syphilis. (Museum, University College Hospital.)

1753. LARYNX

of a patient from whom Mr. Herbert Tilley removed the right vocal cord and arytenoid thirteen years ago. The scar is still visible and healthy. On the left vocal chord is seen a fresh epitheliomatous growth, which caused the death of the patient thirteen years after the operation on the right vocal cord.

1754. MALIGNANT DISEASE OF THE LARYNX, removed post mortem.

Lent by Dr. G. Seccombe Hett.

1755. MALIGNANT DISEASE OF THE LARYNX, removed removed by laryngotomy.

1756. MALIGNANT STRICTURE OF ŒSOPHAGUS.

Specimen removed post-mortem from a woman, æt 58, in extreme emaciation. She had refused gastrostomy. Microscopic examination shewed epithelioma.

Lent by Dr. H. Tilley.

1757. KERATOSIS OF THE LARYNX.

Male, æt 64, complained of hoarseness for 12 months: nose, fauces and pharynx shewed no abnormal condition. The right vocal cord and posterior part of right false cord with the anterior two-thirds of the left false cord presented a grayish mamillary appearance. The condition resembled a membrane made up of pin point excrescences projecting above the mucosal surface. It consisted of layers of cornified epithelium.

1758. PREPARATION SHEWING ABSCESS OF THE LARYNX.

The abscess cavity is filled with horse-hair.

Lent by Dr. Biggs.

1759. TUBERCULOUS LARYNGITIS.

This patient, a man of 20 years of age, was admitted to Guy's Hospital in November, 1900, for dysphagia and cough. His

father and two brothers had died of tuberculous enteritis and peritonitis. Two years ago he began to cough and had hæmoptysis; his voice then left him, and on examination he was found to be suffering from tuberculous laryngitis. Tubercle bacilli were found. He rapidly lost flesh and died. Post-mortem, there was adhesion of the right pleura, cavitation at both apices, diffuse caseation and fibrosis, enlarged bronchial glands and extensive ulceration of both large and small intestine. It will be seen that the mucous membrane on the epiglottis and supra—and subglottic spaces is thickened and markedly pitted. The edge of the epiglottis is "mouse-nibbled," and the disease has attacked the glosso-epiglottic space and folds. The site of the true and false cords is easily seen, but the cords themselves are entirely destroyed. The disease is limited below by the crico-thyroid space.

1760. EPITHELIOMA starting in the aryteno-epiglottidean folds and spreading to the pharynx.

1761. SYPHILITIC CONSTRICTION.

There is a vegetation in the constriction which allowed the patient to inspire with ease, but caused great difficulty in expiration. This gave rise to a diagnosis of asthma. The patient had repeated attacks of dyspnœa and died suddenly in one of them. There were no other evidences of syphilis.

1762. TUBERCULOUS ULCERATION OF THE TRACHEA, spreading to the larynx.

1763. SYPHILITIC CONSTRICTION OF THE TRACHEA.

1764. TUBERCULOSIS affecting the base of the epiglottis and false vocal cords especially the right.

The ulceration has gone right through the thyro-hyoid membrane and out on to the skin, forming a sinus through which liquid passed when the patient swallowed. Both lungs were extensively involved with tuberculous vomicae.

(Presented by Dr. Patterson).

1765. CARCINO-SARCOMA OF THE LARYNX.

Section of a tumour removed from the larynx. One portion of the growth an Epithelioma whilst another portion has the appearance of a spindle-celled sarcoma.

A SERIES OF CASES ILLUSTRATING SUDDEN DEATH FROM ASPHYXIA DUE TO LARYNGEAL CONDITIONS.

Lent by Dr. Logan Turner.

1766. Piece of fish impacted in the larynx. Post-mortem specimen from a woman with old syphilitic stenosis of the pharynx. She died suddenly from asphyxia while eating her dinner.
1767. Acute œdematous pharyngitis and laryngitis due to pneumococcal infection. G. S., æt 46, suffered from sore throat of two days' duration. Dyspnœa for 8 hours, then rapid asphyxia. Œdema of left palatal pillar and ary-epiglottic folds: laryngeal obstruction.
1768. Acute œdema of larynx. A man with tubercular ulceration of the larynx was suddenly attacked with difficulty in breathing; within twenty minutes he died from asphyxia before surgical help could be obtained. Upper laryngeal aperture obstructed by œdematous ary-epiglottic folds.
1769. Acute œdema of larynx. No history of illness reported. Patient while sitting quietly, suddenly clutched his throat, gave a few convulsive gasps, became cyanosed and within ten minutes was dead. Upper laryngeal aperture obstructed by œdema of arytenoid mucosa: epiglottis accidentally removed *ab sectio*.
1770. Primary laryngeal diphtheria. Adult male with severe dyspnœa rapidly became worse and ceased to breathe. Knife inserted into crico-thyroid membrane and artificial respiration carried on.
1771. Extensive tubercular ulceration of the larynx and trachea. Specimen removed post-mortem from a woman who died suddenly. It was kindly lent by Professor H. Littlejohn, who regarded the cause of death to be asphyxia. The tubercular disease of the mucous membrane is very extensive.
1772. Micro-Photograph from the case of extensive tubercular ulceration of the larynx and trachea.
1773. Papilloma of larynx. Boy, æt 10, was found dead in bed. The lumen of the larynx was completely blocked by the tumour and a small piece of bread. It was thought that the bread had possibly become detached from between the teeth during sleep and had been inspired causing complete obstruction and asphyxia. The child spoke and played like other boys and had never sought medical advice, there being no hoarseness or dyspnœa.

1774. Multiple epithelioma of larynx. Woman, æt 56, had suffered for four years from hoarseness. When it was first noticed she was examined by Dr. Turner, who advised operation, but she refused treatment. Half-an-hour before death she was doing her work as a charwoman, but she suddenly became asphyxiated.
1775. Micro-photograph from the same case.

ARTIFICIAL ŒDEMA OF THE LARYNX.

These specimens illustrate how œdema may spread through the loose submucous tissue in the ary-epiglottic folds, in the mucous membrane covering the arytenoid cartilages and in the false cords, thus readily closing the upper laryngeal aperture

1776. Obstruction of upper laryngeal aperture. Carmine-gelatine in fluid condition was injected into the glosso-epiglottidean fossæ, which were rapidly filled by it. The fluid did not pass over the free margin of the epiglottis because the mucous membrane was bound down to it. The ary-epiglottic folds were also readily injected.

SHOWING OBSTRUCTION OF LUMEN OF LARYNX.

1777. Vertical section of larynx with injection of ary-epiglottic folds with carmine gelatine demonstrating how the larynx may be obstructed by œdema.
1778. Vertical antero-posterior section through the larynx showing injection of ary-epiglottic folds, false cords, true cords and subglottic wall.
1779. Carmine gelatine was injected in the region of the tonsil to show how œdema will spread from the pharynx downwards to the larynx. The glosso-epiglottidean fossæ and ary-epiglottic folds are also injected.
1780. Drawing illustrating the post-mortem experiments upon the artificial production of œdema of the larynx.
1781. Idem.
1782. Idem.
1783. Idem.

1784. SYPHILITIC DISEASE OF TONGUE AND LARYNX.

Specimen removed post-mortem from a young woman who was found dead in the street. There is an ulcer at the tip of the tongue and an inter-arytenoid infiltration. No post-mortem evidence of tubercle.

1785. FIBRO-LIPOMA OF EPIGLOTTIS.

A recurrent tumour removed by Dr. McBride with the electric snare, which is left in position.

1786. CONGENITAL? NARROWING OF THE LARYNX AND TRACHEA.

Post-mortem specimen from an old man of 70 years. He had never suffered from dyspnoea. There was no glandular enlargement or tumour in the neck or mediastinum. The aorta was dilated.

1787. DIPHTHERIA OF LARYNX AND TRACHEA.

Post-mortem specimen showing false membrane in the larynx and an exudation spreading downwards into the trachea and bronchus. The Klebs-Löffler Bacillus was found in the larynx, trachea and bronchus.

1788. MALIGNANT DISEASE OF LOWER PHARYNX, INVOLVING THE LARYNX.

Woman, æt 48, had suffered from difficulty in swallowing for seven years: slight hoarseness for two or three months. The tumour involved the lower pharynx, arytenoids and ary-epiglottic folds: the right vocal cord was fixed. The specimen was removed by operation.

1789. MALIGNANT DISEASE OF PHARYNX INVOLVING THE LARYNX.

Specimen removed post-mortem from a man, æt 56, who had suffered from dysphagia and increasing difficulty in swallowing. The disease has spread on to the back of the larynx.

1790. SHRIMP impacted in the trachea of a child æt. 12 months.

*Lent by London School of Clinical Medicine,
Greenwich.*

1790A. SKIAGRAM SHOWING RABBIT'S BONE IN LARYNX.

Diagnosed during life as diphtheria. (Post-mortem skiagram by A. Howard Pirie.)

Lent by Dr. Douglas Harmer.

1791. THE HYOID BONE, LARYNX AND FIRST PART OF THE TRACHEA.

From the posterior aspect of the larynx and to the left of the middle line is a large pendulous tumour $7\frac{1}{2}$ " long. Micro-sections show it to be a lipoma.

From a male æt. 80, who for 12 years had suffered from huskiness and choking fits.

Four years before death, while vomiting, this tumour had protruded through the mouth and had to be rapidly replaced to prevent suffocation. Death occurred suddenly from the tumour getting impacted in the airway during a fit of choking.

Lent by Westminster Hospital.

1792. THE RIGHT HALF OF THYROID CARTILAGE AND ARYTENO-EPIGLOTTIDEAN REGION.

From the right arytено-epiglottidean fold is a large smooth, softish sessile tumour. Microscopically: this is a round-celled sarcoma.

From a man æt. 60, obstructive symptoms had been present for some time, and the right half of the larynx was excised to remove the growth and relieve obstruction. Patient died soon after the operation.

1793. THE LOWER PART OF THE ILEUM FROM THE ABOVE CASE.

The Peyer's patches and lymphoid follicles are much swollen from hyperplasia of the round-celled elements.

X-RAY NEGATIVES OF FOREIGN BODIES.

1794. Metal cap of a lead pencil impacted in the left bronchus and removed by Mr. Herbert Tilley by Brüning's bronchoscope. (Patient, a girl age 13).

Lent by Dr. H. Tilley.

1795. An open safety pin lying in the œsophagus of a child, three months. Removed by Mr. Herbert Tilly with Brüning's bronchoscope.

FOREIGN BODIES REMOVED BY MEANS OF BRÜNING'S INSTRUMENT.

1796. A penny lodged for 13 days in the œsophagus of a girl age 14. (*Vide* Proc. Laryngology Sect., R.S.M., 1910).

1797. A fragment of mutton bone removed by Mr. Tilley from right bronchus of a lady in whom it had been lodged for 10 days. (*Vide* account of case by Mr. Godlee, "Lancet," June 18; 1910).

1798. The teat of a "comforter" removed by Mr. Herbert Tilley from a child 4 days old. *Vide* "Lancet," 1909.

1799. Portion of a large pin removed by Mr. Tilley from left bronchus of a girl age 17. (*Vide* "Lancet," Nov. 7, 1908).

1800. Metal cap of lead pencil removed from left bronchus of a girl aged 13. Mr. Herbert Tilley. (*Vide* Radiogram).
1801. Safety pin removed by Mr. Tilley from œsophagus of a child three months old. (*Vide* Radiogram).
1802. A farthing : patient, female, aged 2 years and 7 months, swallowed the coin (½d.) about 11.30 a.m. on Thursday, July 7th, 1910. The child was brought to University College Hospital. When examined by X-rays, the coin was seen situated in the gullet immediately above the level of the manubrium sterni.
- It was removed by the direct method (Brüning's Bronchoscope at 5.30 p.m. by Mr. Herbert Tilley. The patient was under chloroform during the removal.
1803. TRACHEA, CERVICAL STRUCTURES AND SUPERIOR MEDIASTINUM, with enlarged lymphadenomatous glands.

MACROSCOPIC SPECIMENS OF DISEASES OF THE LARYNX.

Lent by Dr. Jobson Horne.

MALIGNANT DISEASE (EPITHELIOMA) OF THE LARYNX.

1804. The entire larynx was removed during life, and the patient recovered.
Vide "Proceedings of the Laryngological Society of London," June 7th, 1907, Vol. XIV., p. 109.
1805. The entire larynx was removed during life, the patient recovered, but died within twelve months of the operation.
Vide "Proceedings of the Laryngological Society of London," June 7th, 1907, Vol. XIV. p. 109.
1806. MALIGNANT DISEASE, EXTRINSIC, (EPITHELIOMA) OF THE LARYNX.
1807. THE LARYNX, THE LUNGS AND MÆDIASTINUM, from a case of thoracic lympho-sarcoma.

This specimen shows :—

- (1) The localised œdema over the right arytenoid. The œdema has somewhat subsided in the process of preserving the specimen.
- (2) The puckered scar in the fold of mucous membrane, passing down between the cartilages of Sartorini and Wrisberg, and described by the author as the vulnerable spot of the larynx as a source of systemic infection.

Vide "Proceedings of the Laryngological Society of London," April 5th, 1907, Vol. XIV., p. 84. Proceedings of the British Medical Association Annual Meeting at Swansea, July, 1903.

1808. CYSTOMA OF THE LARYNX.

The specimen presents a cyst on the lingual aspect of the epiglottis. A condition rarely preserved in pathological collections.

Vide "Journal of Laryngology Phinol. and Otol." Vol. XXII. No. 6, June 1907.

Vide "Proceedings Laryngological Society, London" January 4th, 1907, Vol. XIV., p. 32.

1809. PACHYDERMIA LARYNGIS.

Vide "Proceedings British Laryngological Phinol. Otol. Assoc.," May 13th, 1904. "Journal of Laryngological Phenol, Otol." Vol. XIX, 1904, p.p. 464-468.

1810. PACHYDERMIA LARYNGIS.

Vide "Proceedings Laryngological Society, London," Vol. VII., p. 42, January 5th, 1900.

1811. OEDEMA OF LARYNX AND POCLAPSE OF MUCOUS MEMBRANE, being the Ventricle, secondary to necrosis of cartilage from a gumma.

Vide "Proceedings of Laryngological Society, London," Vol. VII., p. 41, January 5th, 1900.

1812. PAPILLOMA OF TRACHEA AT THE BIFURCATION

XVI.—OTOLOGY.

Hon. Curator - Dr. SYDNEY SCOTT.

ANATOMICAL.

LANTERN SLIDES OF MICRO-PHOTOGRAPHS OF HISTOLOGICAL SECTIONS OF THE HUMAN LABYRINTH, &c.

Lent by Dr. Sydney Scott.

I.—NORMAL SERIES include those obtained from a child
1½ hours after death. (Described and figured in
Journ. of Anat. and Physiol. 1909.)

1813. A vertical coronal section through the vestibule and base of the stapes. It shows the ampulla and crista of the superior semi-circular canal, facial nerve, base of stapes, hooded margin of the promontory of the cochlea, fossula rotunda, &c. Within the vestibule the utricle, opening into the superior ampulla above, and into the ampulla of the posterior semi-circular canal below, is seen.

(Note a slight artefact in wall of utricle.)

1814. Another section cut parallel with and anterior to No. 1813 from the same bone. The section is in front of the inferior ampulla and behind the fenestra rotunda.

1815. From the same series, anterior to No. 1814. The section passes in front of the superior ampulla and across the fenestra vestibuli, and fenestra cochleæ with the membrana secundaris. The opening of the cochlea into the vestibule is shown.

1816. From the same series, a little further forwards, where the utricle is becoming narrower in diameter.

1817. Another section from the same series still further anterior, where the diameter of the utricle is smaller, and a portion of the adjacent saccule appears.

1818. A section in the region of No. 1813 under higher power, to show the facial relation of the facial nerve to the external ampullary nerve.

1818A. The same section under higher power to show the appearance of the crista of the ampulla of the superior canal.

1819. A similar section photographed to show the cilia and cupola of the crista ampularis.

1820. Photograph of a projection drawing (camera lucida) of the epithelium of the crista showing the cilia, some of which are displaced during the process of preparation.
1821. Photograph of a reconstruction diagram of the cilia and the ampullary nerve endings. Attention is drawn to the continuity of the intra and extra-cellular portions of the cilium. The apertures shown are from actual specimens. (Drawn to scale.)
1822. Vertical section of the lowest coil of the cochlea, below the modiolus.
1823. The same more highly magnified.
1824. Reissner's membrane spread out flat, showing pavement cells.
1825. Section of Reissner's membrane with membrana tectoria and basilar membrane. The tectorial membrane appears longer than it actually is, because the section is not perfectly radial, and it appears thinner owing to the effect of reagents.
1826. Organ of Corti in radial vertical section. The photo-microscope was focussed on the neck of one of the middle hair cells. (From the second coil of the cochlea.)
1827. Organ of Corti (from the same series) showing a beaded nerve fibril traversing the tunnel of Corti.
1828. Hair-cells of the organ of Corti, in radial vertical section, magnified 1,000 diameters.

II.—PATHOLOGICAL SERIES.

1829. (Case 52.) Acute streptococcal labyrinthitis secondary to otitis media chronica. Section of the cochlea showing the round cell infiltration. (From a boy who died of meningitis serosa maligna, described in Arch. of Otology, 1908.
1830. (Case 90.) Acute infective labyrinthitis secondary to continued otitis media in an infant. Section of the cochlea showing round cell infiltration. Child died of consecutive lepto-meningitis.
1831. Section of the vestibule from the same case. The utricle is involved in the extensive inflammatory cell infiltration.
1832. (Case 164.) Section of the cochlea and modiolus in the region of the spiral ganglia. (From a child who died with lepto-meningitis secondary to otitis media.)
1833. Photograph of a section through the ductus cochlea of the same labyrinth.
1834. Section through the vestibule and utricle showing the diffuse inflammation in the same case.
1835. (Case 163.) Streptococcal labyrinthitis. Section of the cochlea with scala vestibuli and lamina spiralis. (From a child

who died with otitis media and consecutive leptomeningitis nineteen days after admission to the hospital, with streptococcal tonsillitis and pharyngitis.)

1836. (From the same case.) Section of the fenestra rotunda and membrana secundaria.
1837. Another part of the same cochlea stained by Gram's method (low power).
1838. Same section magnified 800 diameters, showing masses of streptococci in situ.
1839. (From the same case.) Section of the membrana secundaria stained by Gram's method, showing streptococci in the membrane which is partially disintegrated by the inflammatory process.

N.B. In the child from which the specimens represented in the lantern slides Nos. 1848 to 1852, streptococci with the same bio-genetic characters, were isolated from the fauces, tympanum, and lastly from the cerebro-spinal fluid. The organisms photographed in the labyrinth presented identical morphological characters. The temporal bone and labyrinth on the opposite were unaffected.

1840. Section of the mastoid antrum from a fatal case of scarlet fever complicated by streptococcal otitis media. (Proc. Roy. Soc. Med. 1909-10).
1841. Section of the same bone stained by Gram's method showing a "ball" of long chain streptococci in situ.
1842. A similar specimen.
1843. Decalcified portion of the base of the skull with the cerebellum and pons in situ. A horizontal section at the level of the internal auditory meatus showing the relation of the labyrinth and mastoid cells to the cerebellum, pons and fourth ventricle.
1844. Photograph of a schematic table illustrating the tone range of a series of cases examined with Bezold's continuous tone forks and whistles. The cases illustrate the classes of deafness of the middle ear type, the type of "nerve-deafness," tone gaps and tone islands in cases of deaf mutes, and in a case of tabes dorsalis, &c.

NORMAL ORGANS OF HEARING, showing the topography of the middle ear and labyrinth.

Lent by Prof. Dr. Politzer, of Vienna.

1845. Chalk deposit in the tympanic membrane.
1846. Specimen showing changes similar to those seen in the last specimen.
1847. Perforation of the drum and chalk deposit in the tympanic membrane.

1848. Adhesion of the tympanic membrane with the inner wall of the tympanic cavity.

1849. Specimen showing similar changes as the last specimen.

1850. Large osteoma of the mastoid process.

1851. PEN AND INK DRAWINGS, showing the anatomical changes in labyrinthine suppuration.

1852. WATERCOLOUR DRAWINGS (by *Prof. Politzer*), showing pathological changes in the tympanic membrane.

1853. ILLUSTRATING THE ANATOMY OF THE LOWER TYMPANI WALL.

Lent by Dr. C. E. West.

Vertical section, oblique to the sagittal plane, through a left fibrous bone fallopian aqueduct in red : below this, the promontory in black, and above, the external arcuate eminence in black.

1854. ILLUSTRATING THE ANATOMICAL RELATIONS OF THE FACIAL NERVE and the areas concerned in the vestibulotomies.

Facial canal opened and coloured red, vestibulotomy areas in black. Right fibrous bone.

1855. ILLUSTRATING THE RELATION OF THE POSTERIOR SEMICIRCULAR CANAL TO THE CEREBELLAS FOSSA, and its connection with cerebellas abscess.

Canal laid open and coloured red. Right petrous bone.

1856. ILLUSTRATING THE RELATION OF THE BASE OF THE COCHLEA and inner wall of the vestibule to the fundus of the internal auditory meatus, and their importance in the ætiology of meningitis.

Parts in question coloured red. Horizontal section through left petrous.

1857. THE OPERATIVE OPENING OF THE VESTIBULE ABOVE THE FACIAL NERVE.

Area concerned coloured red. Left temporal bone.

1858. THE COMBINED OPENING OF THE VESTIBULE
ABOVE AND BELOW THE FACIAL NERVE.

"Double vestibulotomy."—Areas concerned coloured red, a narrow strip of paper has been passed through the cavity of the vestibule from the upper to the lower opening behind the aqueduct of Fallopius.

1859. THE OPERATIVE OPENING OF THE VESTIBULE
AND PROMONTORY BELOW THE FACIAL NERVE.

Inferior vestibulotomy. Area concerned coloured red.

1860. THE OPERATIVE OPENING OF THE VESTIBULE
BEHIND THE DESCENDING PART OF THE FACIAL
NERVE.

The area concerned coloured red ; a narrow strip of paper has been passed through the opening and out at the fenestra ovalis.

NORMAL MEMBRANOUS LABYRINTHS.

MAMMALIA.

(Prepared by and presented to the Royal College of
Surgeons of England by Dr. Albert Gray.)

Lent by the Royal College of Surgeons.

- 1861. PRIMATE *Homo sapiens* (Man).
- 1862. UNGULATA *Equus caballus* (Horse).
- 1863. SIRENIA *Halicore australis* (Sea-cow).
- 1864. MONOTREMATA *Echidna* (Porcupine ante-eater).

AVIS.

- 1865. RATITÆ *Struthio masai* (Ostrich).

REPTILIA.

- 1866. OPHIDIA *Pytho sebæ* (Python).
- 1867. MICROSCOPICAL SECTION, INTERNAL EAR OF THE
CAT.

Showing the whole course of the ampulla nerve, passing through the bone to the crista acustica.

Note.—The ganglion cells, which are twice diameter of spiral ganglion cells. Also the hair cells of the crista. Stained with carmine, mounted in balsam.

Lent by Dr. Urban Pritchard.

1868. MICROSCOPICAL SECTION, LAMINA SPIRALIS
OSSEA OF THE PORPOISE.

Showing the very large ganglion spirale. Stained with carmine, mounted in glycerine over 35 years ago.

1869. MICROSCOPICAL SECTION THROUGH THE UPPER
PART OF THE MAGPIE'S COCHLEA, WHICH
FORMS THE LAGENA.

Showing the vestibular-like nerve cells with cilia projecting into the mucoid layer as in the macula acustica of the vestibule.

Note.— A similar lagena is found in the duck-bill, but in no other mammal. Stained with carmine, mounted in glycerine.

1870. MICROSCOPICAL SECTION THROUGH THE
FÆNESTRA OVALIS OF THE DUCKBILL
(*Ornithorhynchus Platypus*).

Showing a columella, not a stapes as other mammals; another similarity to the bird. Stained with carmine, mounted in glycerine.

1871. MICROPHOTOGRAPH. TRANSVERSE SECTION
THROUGH LOWER TURN OF THE KITTEN'S
COCHLEA.

Showing the general arrangement of the scala media (ductus cochlea) with membrane of Reissner in position $\times 50$ diam.

1872. MICROPHOTOGRAPH. COCHLEA OF CAT.

Transverse section—showing nerve, spiral ganglion, membrana basilaris with rods of corti, ligamentum, cochlea with stria vascularis $\times 50$ diam.

1873. MICROPHOTOGRAPH. TRANSVERSE SECTION OF
LAMINA SPIRALIS OF KITTEN'S COCHLEA.

Showing organ of corti almost perfect, rods and cells on the membrana basilaris, and the membrana tectoria above $\times 200$ diam.

1874. MICROPHOTOGRAPH. COCHLEA OF CAT.

Showing form of adult rods of corti, on the membrana basilaris. $\times 200$ diam.

1875. MICROPHOTOGRAPH. COCHLEA OF DUCKBILL
(*Ornithorhynchus Platypus*).

Showing the mammalian type: that is, three scalæ, not two as in the bird $\times 40$ diam.

1876. MICROPHOTOGRAPH. COCHLEA OF BIRD.
(Magpie).

Transverse section through cochlea tube, showing only two scalæ. The scala tympani below containing the acoustic nerve and ganglion. The combined scala (vestibular and media) above.

NOTE.—There are no rods of Corti, $\times 50$ diam.

1877. MICROPHOTOGRAPH. VESTIBULE OF CAT.

Transverse section of macula acustica of saccule—showing nerve, nerve filaments, nerve cells with cilia covered with the mucoid layer, which contained otoliths before decalcification, $\times 250$ diam.

1878. THE RIGHT MEMBRANOUS LABYRINTH OF A
SKATE (*Raja batis*) with a portion of the
dorsal cranial wall and skin of the head.

There are two utriculi continuous respectively with the anterior and horizontal and with the posterior canals. The sacculus, as in all elasmobranchs, is connected with the exterior by an open ductus endolymphaticus.

Lent by the Royal College of Surgeons.

1879. THE RIGHT MEMBRANOUS LABYRINTH OF A
WHITE SHARK (*Carcharias lama*) with part
of the skull and overlying skin.

The connection between the posterior utricle and the saccule is dilated, and is the seat of a large macula neglecta.

1880. A SIMILAR PREPARATION OF THE LEFT
LABYRINTH OF THE SAME FISH, in which
parts of the external walls of the sacculus,
anterior utriculus, and recessus utriculi have
been removed.

A black bristle has been passed from the horizontal canal along the anterior utricle into the anterior canal. A red rod marks the canalis recessu saccularis and a blue rod the posterior canalis utriculo saccularis.

1881. THE LEFT MEMBRANOUS LABYRINTH OF A
PORT JACKSON SHARK (*Cestracion philippi*)
exposed in position within the skull and seen
from the outer aspect.

Relative to the size of the fish, which was 3 ft. 4 in. (100 cm. in length; the labyrinth is very small.

1882. THE RIGHT MEMBRANOUS LABYRINTH OF THE SAME FISH, dissected from the inner side.

1883. THE RIGHT MEMBRANOUS LABYRINTH OF A GREENLAND SHARK (*Læmargus borealis*) with parts of the cranial walls and skin of the head.

The ascending portions of the two utriculi touch above the sacculi.

1884. A SIMILAR SPECIMEN OF THE LEFT MEMBRANOUS LABYRINTH OF A GREENLAND SHARK (*Læmargus borealis*) in which the outer walls of the anterior utricle, recessus utriculi, sacculus and lagena have been in part removed.

1885. PART OF THE LEFT SIDE OF THE CRANIUM OF A GREENLAND SHARK (*Læmargus borealis*) with the membranous labyrinth exposed from the outer aspect.

The mesial and lateral walls of the ampullæ are thickened by masses of soft cartilage that project considerably from the general surface, forming flat oval bosses.

1886. THE AMPULLÆ, WITH THEIR NERVES, FROM THE RIGHT LABYRINTH OF THE SAME FISH, mounted side by side (those of the anterior, horizontal, and posterior canals in succession from left to right).

1887. THE RIGHT MEMBRANOUS LABYRINTH OF *Notidanus griseus*, with parts of the cranial walls and overlying muscle.

The ascending portions of the utricles are more closely applied to each other than in *Læmargus*.

1888. THE LEFT MEMBRANOUS LABYRINTH OF THE SAME SHARK, in which parts of the outer wall of the anterior utricle, recessus utriculi, sacculus, and lagena have been removed.

1889. THE RIGHT MEMBRANOUS LABYRINTH OF A FOX SHARK (*Alopecias vulpes*) with parts of the cranial walls and skin.

The union of the ascending portions of the two utricles is so close that they appear to form a single verticle tube resembling the sinus superioris utriculi of higher vertebrates.

1890. A SIMILAR SPECIMEN OF THE LEFT LABYRINTH in which the outer walls of the recessus and sacculus have been removed.

1891. THE RIGHT MEMBRANOUS LABYRINTH OF *Lamna Cornubica* with the nerves attached.

1892. LEFT MEMBRANOUS LABYRINTH OF A PORBEAGLE (*Lamna Cornubica*) with portions of the cranial roof.

The outer walls of part of the anterior utricular, of the recesses utriculi, and of the sacculus have been removed. The utricle opens by means of a long slit, as in *alopecias*, into the recessus utriculi, canalis recessu-saccularis and sacculus.

1893. THE RIGHT AND LEFT MEMBRANOUS LABYRINTHS OF A SEA CAT (*Chimæra monstrosa*).

The utriculus approaches in certain respects to the teleostean type. Its ascending parts, which in elasmobranchs are completely separate, are here fused to form a single tube (sinus superior utriculi) that opens below into the middle of a horizontal part that corresponds to the united horizontal portions of the two utricles of an elasmobranch. The common utricular cavity opens by a single utriculo-sacculine passage into the sacculus in place of the two present in elasmobranchs.

1894. THE RIGHT AND LEFT MEMBRANOUS LABYRINTHS OF A STURGEON (*Acipenser sturio*).

The utriculus conform to the teleostean type. The ductus endolymphaticus is vestigial.

1895. THE RIGHT AND LEFT MEMBRANOUS LABYRINTHS OF A FISHING FROG (*Lophius piscatorius*).

The sinus-superior utriculi is remarkably short, the sinus anterior very long.

1896. THE RIGHT MEMBRANOUS LABYRINTH AND THE MEMBRANA TYMPANI AND COLUMELLA AURIS OF A BULL FROG (*Rana catesbiana*).

In the specimen the saccule, lagena and utricle form an oval mass, in which the several parts are indistinguishable, surmounted by the semicircular canals and the sinus superioris utriculi.

1897. A SMALL PART OF THE LEFT SIDE OF THE HEAD OF A TURTLE (*Chelone sp*) from which the integument has been removed to show the membrana tympani.

The tympanic cavity has been opened, displaying the whole length of the columella auris, and the tympanal end of the eustachian tube. The membranous labyrinth is also shown still enveloped in its perilymphatic sheath.

1898. THE COLUMELLA AURIS AND MEMBRANOUS LABYRINTH OF THE LEFT SIDE OF A TURTLE (*Chelone sp*) isolated.

The perilymphatic sheath has been partly removed.

1899. THE RIGHT HALF OF THE HEAD OF A BARN OWL (*Strix flammea*) in which the external auditory meatus has been opened from below by a horizontal section.

The margins of the opening into the meatus are produced as fleshy lips which are bordered by a circlet of feathers: thus a structure is formed analagous to the pinna of mammalia.

1900. THE RIGHT HALVES OF THE SKULLS OF TWO CORVINE BIRDS.

In one the bony labyrinth has been fully exposed *in situ* with a portion of its inner wall removed. An isolated left labyrinth and columella auris are mounted separately.

1901. A PIECE OF SKIN FROM THE SIDE OF A PORBEAGLE SHARK (*Lamna cornubica*).

Showing the lateral line canal (into which a green rod is passed) and the numerous apertures (indicated by black bristles) that pass obliquely from it to the surface.

1902. A PIECE OF SKIN FROM THE HEAD OF A GREENLAND SHARK (*Læmargus borealis*) upon the

deep surface of which a nerve-trunk belonging to the lateral line system has been exposed to show the innervation by it of some ampullæ of Lorenzini, and the sense-organs in a short portion of one of the lateral line canals.

1903. A SMALL STARRY RAY (*Raia radiata*) with the skin removed from the left side of the back to show the arrangement of the lateral line canals and the mucous tubes.
1904. A SIMILAR SPECIMEN, showing the lateral line canals and the mucous tubes upon the ventral surface.
1905. THE LEFT HALF OF THE FORE PART OF A SKATE (*Raia batis*) dissected from above to show the innervation of the lateral line and ampullary sense-organs upon the ventral surface of the head.
1906. A SIMILAR PREPARATION OF THE RIGHT HALF OF THE SAME FISH, showing the innervation of the canals and clusters of ampullæ upon the dorsal surface.

PATHOLOGY.

1907. A CEREBELLUM, in the left hemisphere of which is an irregularly shaped abscess cavity. Its superior and external walls are composed of a very thin layer of brain-matter, and the interior is lined with a dark red pyogenic membrane.

From a girl, aged 8, who was admitted for an abscess behind the left ear, with facial paralysis. There was a history of otorrhœa during many months. The skull was trephined above the external auditory meatus, and a foul extradural abscess was drained. Death occurred on the third day after the operation. At the autopsy a softening thrombus was found in the left lateral sinus, and an abscess in the cerebellum filled with foetid pus, the surrounding brain-matter being green and sloughy. There was no general meningitis.

1908. PART OF SKULL with a small ulcerated aperture on the anterior surface of the petrous bone, through which a bristle is passed into the internal ear.

In the substance of the adjacent part of the brain there is a large and deep cavity with irregular broken walls, the consequence, apparently, of acute inflammation and suppuration supervening on disease of the internal ear.

1909. THE BASE OF A SKULL in which a tumour is attached by a narrow base to the dura mater covering the posterior and inner part of the right petrous bone. The tumour is composed of a firm, pale, "caseous" substance, and is invested with a tough thin membrane.

The patient was a woman 32 years old when admitted to the infirmary. Four years previously she received a severe blow behind the right ear, which stunned her for several minutes and from this time she had never been free from uneasy sensations about the head, and occasionally severe headache, which was relieved by nothing but blood-letting. Subsequently she suffered from giddiness and paralysis of the right side. After some weeks she was seized with a severe epileptic paroxysm, became quite insensible, and was violently convulsed on the left side. A fortnight afterwards she had a second epileptic seizure, which was fatal.

1910. LEFT HALF OF A SKULL.

Springing from the superior aspect of the petrous portion of the temporal bone is a rounded tumour two inches in diameter; its surface is finely nodulated, the nodules being formed by numerous small cysts filled with colloid substance.

The patient, a man aged 61, was first seen in December 1886, on account of a tumour behind the ear. This was excised, but returned.

1911. SEQUESTRUM OF LEFT COCHLEA.

Removed as a free mass through the external auditory meatus.

1912. SEQUESTRUM OF THE POSTERIOR PART OF THE LABYRINTH, LEFT SIDE.

Involving the inner wall of the vestibule, the whole of the posterior canal, and parts of the superior and external canals with the fundus of the internal auditory meatus. This sequestrum was deeply buried, and lay in contact with the dura mater of both middle and posterior fossæ.

1913. PLATE CULTURES ON BLOOD ORGAN.

Illustrating the bacteriology of chronic nasopharyngeal catarrh.

1914. CANNULÆ.

By means of which material may be removed from the nasopharynx for bacteriological examination without contamination from the nose or mouth.

1915. SECTION OF THE ORGAN OF CORTI OF THE COMMON MOLE. ...

Oil immersion.

Lent by Dr. Albert Gray.

1916. TEMPORAL BONE FROM A CASE OF OTOSCLEROSIS, showing fixation of the stapes in the oval window.

The bony change in the capsule of the labyrinth is seen from the vestibular aspect in the neighbourhood of the oval window.

1917. SECTION THROUGH THE CAVERNOUS VASCULAR TISSUE, which occupies a considerable portion of the tympanic cavity in the porpoise.

1918. BRAIN with abscess in the left temporo-sphenoidal lobe, pus in the left lateral ventricle, and basal meningitis.

Specimens from St. Mary's Hospital. Curator, Dr. Spilsbury.

1919. TEMPORAL BONE from the same patient as previous specimen. There was extensive suppuration in the middle ear. Granulations protrude through the tegmen, and through the dura mater. They caused the brain abscess.

From a girl aged 10 years, who was admitted in a moribund condition. She had suffered from severe headache 12 days previously, and had vomited. Optic neuritis was present. She rapidly became comatose and died. August, 1904.

1920. A TEMPORAL BONE with well-marked hyperostosis of the walls of the external auditory meatus.

1921. THE TWO TEMPORAL BONES OF A DEAF-MUTE, divided to show the middle and internal ears,

which during life were filled with pus and caseous material.

From a girl aged 19 years who had scarlet fever and bilateral otitis, which led to the complete loss of hearing, at the age of 5. She is said to have lost the power of speech soon afterwards, and she died of tuberculous peritonitis.

1922. A LARGE SEQUESTRUM OF THE LABYRINTH, which was removed from the ear of a young girl by syringing.

The bone includes the three semi-circular canals, the internal auditory meatus, and the capsule of the cochlea, with a part of the apex of the petrous bone. The length of the specimen from base to apex is 22 millimetres. The patient was a victim of congenital syphilis.

1923. RIGHT TEMPORAL BONE WITH ADJACENT BRAIN, with an abscess in the temporo-sphenoidal lobe, which was produced by middle ear disease. A rod has been passed from the middle ear through the tegmen along a track of granulations into the abscess cavity.

From a woman aged 44, who had suffered from suppurative otitis media six years previously. A recurrence of discharge took place seven weeks before the patient's admission to hospital, where she was operated upon. An extra-dural abscess was opened and drained, but the patient died four days later.

1924. TUMOUR PRESSING UPON THE CEREBELLUM.

This patient was admitted suffering from headache, nerve deafness of right ear, occasional vomiting, optic atrophy, marked tendency to fall to the right side with inco-ordination of movement. Cerebellar tumour of the right side was diagnosed. Operation was performed and part of the tumour was removed, not without considerable injury to the cerebellum. Post-mortem. The remaining part of the tumour was lying close to the pons and medulla. It is probable that this tumour arose from the sheath of the eighth nerve. (See Arch. Otolaryngology, 1908, XXXVII., No. 6, p. 469).

Lent by Dr. Sydney Scott.

- 1924A. ABSCESS OF THE TEMPORO-SPHENOIDAL LOBE.

1925. LARGE GLIOMA affecting region of left seventh and eighth nerves and outer portion of cerebellum.

The left petrous portion of the temporal bone has been mounted to shew infection by the growth, a piece of which is attached. (See Lancet, 1909, July 3).

MACROSCOPIC SPECIMENS OF THE EAR.

Lent by Dr. Jobson Horne.

1926. A TEMPORAL BONE carved and mounted to demonstrate the surgical anatomy, the difficulties, and the accidents incidental to the mastoid operation.

PREPARATIONS ILLUSTRATING THE SURGICAL AND MORBID ANATOMY OF AN UNUSUAL COURSE OF LABYRINTHINE SUPPURATION with the formation of a circumscribed interdural abscess at the site of the saccus endolymphaticus.

1927. Shows the lateral sinus laid open in its entire extent. A white rod stretches across and above the sinus and lies within the abscess sac. The abscess has perforation in two directions, below, causing septic thrombosis of the sinus from that point downwards, and a bristle passes through a perforation in the posterior wall of the sac, through which pus escaped into the posterior fossa, and caused meningitis and death. Another white rod is placed in the internal auditory meatus.

- 1927A. The dura mater has been reflected inwards; the petrous portion of the bone and the groove of the lateral sinus are laid bare. A glass rod is placed between the position of the aqueductus vestibuli and the internal auditory meatus. Across the rod stretches that part of the dura mater which enters the fissure in the bone at the site of the orifice of the aqueduct and the saccus endolymphaticus. Within this prolongation of dura mater pus has tracked to form the abscess sac, which is shown reflected, together with the dura mater, inward and immediately to the inner side of the glass rod.

Vide Proc. Otol. Soc. of United Kingdom, March 7th, 1904.

1928. CEREBELLAR ABSCESS secondary to suppurative disease of the ear.

1929. EXTRA-DURAL ABSCESS secondary to suppurative disease of the ear.

Vide Catalogue of Museum of Sixth International Otolog. Congress, London, 1900, p. 91, No. 665.

1930. A COLLECTION OF FOSSIL SPECIMENS OF THE EAR.

1931. "THERMO-POLITZERISER."

An apparatus for inflating the middle ear with hot air. It consists of a hollow cylinder with a platinum spiral, which is heated by electric current; a stream of air is blown through the heated space and injected by means of an Eustachian catheter into the tympanum.

Lent by Dr. Andrew Wylic.

HISTOLOGY OF THE HUMAN LABYRINTH.

Prepared and Lent by Sydney Scott.

NORMAL STRUCTURE.

1932. A section of the aditus through the posterior crus of the incus, and its suspensory ligament. The section includes that part of the external semi-circular canal, which is most frequently the site of a pathological fistula.
1933. Section of the vestibule showing the fenestra vestibuli with the stapes and the fenestra cochlea (rotunda) with membrana secundaria. (Mallory.)
1934. A similar section which includes the tympanic membrane and its attachments. (Hæmatoxylin.)
1935. A similar section showing the ampulla of the superior semi-circular canal with its entrance into the vestibule. (Mallory.)
1936. A similar section. (Mallory.)
1937. A similar section. (Mallory.)

PATHOLOGICAL CONDITIONS.

DIFFUSE STREPTOCOCCAL (PYOGENIC) LABYRINTHITIS (Unilateral).

1938. Section of the cochlea of a boy who died with meningitis serosa maligna. He suffered from chronic otitis media, and developed labyrinthitis after an operation on the middle ear, and died 9 days later. The path of infection through the fenestra vestibuli, and along the pia-arachnoid sheath was demonstrated; a complete bacteriological examination established the character of the infection.

DIFFUSE INFECTIVE LABYRINTHITIS (Unilateral).

1939. Section of the cochlea of a child who died from basal leptomeningitis secondary to labyrinthitis which arose in connection with otitis media. The pathway to the labyrinth was not obvious, for there was no fistula of the semi-circular canals or of the vestibule; the fenestra rotunda, however, was not examined histologically.
1940. Section of the vestibule and utricle in the same bone, shewing diffuse inflammatory changes.

DIFFUSE STREPTOCOCCAL LABYRINTHITIS (Unilateral).

1941. From another child, who suffered from acute otitis media, which followed streptococcal tonsillitis. Cochlea in tangential section, shewing round cell infiltration of the scala vestibuli and scala tympani. The child died from leptomeningitis.
1942. Similar section stained by Gram's method, showing masses of streptococci in the cochlea.
1943. Section of the cochlea through the fenestra cochlea (rotunda) showing the appearance of the membrana secundaria in the same labyrinth.
1944. A similar section stained by Gram's methods displaying streptococci in the disintegrating membrana secundaria.

SERO-FIBRINOUS LABYRINTHITIS, SECONDARY TO CEREBRO-SPINAL MENINGITIS (Bilateral).

1945. Sections of the labyrinth, showing changes met with in a case of meningococcal meningitis (non-otitic in origin).
1946. Section of the right cochlea through the modiolus and helicotrema.
1947. Similar section under higher power, showing the fibrinous exudate into the scala adjacent to the modiolus.
1948. Section of the corresponding part of the left cochlea, revealing a similar condition.

TUBERCULOUS DISEASE OF THE TEMPORAL BONE (Bilateral).

1949. Coronal section through the region of the mastoid antrum, the tegmen of which was destroyed by a mass of tubercle, which projected upwards into the middle cranial fossa. There were no adhesions between the mass and the pia-arachnoid of the temporo-sphenoidal lobe. The middle ear track on both sides was affected in a similar manner. From a child who succumbed to general tuberculosis, with recent miliary tubercles along the cerebral arteries.
1950. A similar section stained by Mallory's method.

1951. ANATOMICAL PREPARATION.

Lent by Mr. G. J. Jenkins.

1952. THE LABYRINTH OF THE HUMAN EMBRYO.

1953. A RECONSTRUCTION MODEL OF THE AUDITORY APPARATUS OF A 16MM. HUMAN EMBRYO.

Prepared by the Wax-Plate Method of Born, by Mr. G. J. Jenkins.

1954. A DISSECTION OF THE HUMAN SKULL, showing the chief features of the anatomy of the temporal bone in situ.

Prepared and lent by Mr. G. J. Jenkins.

1955. INJURIES TO THE TEMPORAL BONE.

A specimen shewing a fracture of the temporal bone involving the middle ear, without rupture of the tympanic membrane.

Lent by Mr. G. J. Jenkins.

1956. SPECIMEN OF TEMPERO-SPHENOIDAL ABSCESS.

Lent by Dr. G. Seccombe Hett.

1956A. IDEM.

1957. TUBERCULOSIS OF THE LINING MEMBRANE OF THE MIDDLE EAR, with an illustration of the microscopical section.

Lent by Dr. Arthur H. Cheatle.

Right temporal bone of an infant who died of general tuberculosis.

A perforation is present in the posterior segment of the membrane, through it the lining membrane is seen to be thick and nodular. The middle ear contained cheesy pus. The ossicles are intact. Section of this lining membrane removed from over the external semi-circular canal show tuberculosis. Tubercle bacilli can be seen. A drawing of a microscopical section of the lining membrane is also shown.

1958. TUBERCULOSIS OF THE MIDDLE EAR, with Caries of the promontory.

Left temporal bone of an infant who died of general tuberculosis. There is complete loss of the membrane. The neck, short process, and handle of the malleus, and the articular process of the incus are lost by caries. The stapes is in position. There is caries of the tympanic plate, and of the promontory. The middle ear was full of brown pus.

1959. *TUBERCULOSIS OF THE TEMPORAL BONE with invasion of the labyrinth.

Right temporal bone of an infant who died of general tuberculosis.

The antrum had been opened during life and the roof of the middle ear tract was found to be carious, exposing roughened dura mater. The disease can be detected spreading through the bone, the diseased parts being white and porous. The fallopian canal and external semi-circular canal are opened by disease, and the facial nerve is destroyed. The promontory is carious and the vestibule invaded. The oval and round windows are irregularly enlarged.

Sections of the exposed dura mater showed tuberculosis.

1960. TUBERCULOSIS OF THE TEMPORAL BONE with invasion of the labyrinth, etc.

Left temporal bone of an infant who died of general tuberculosis.

The antrum was opened during life, and the roof of the middle ear tract was found to be carious with exposure of dura mater. There is caries of the promontory and the whole of the labyrinth is invaded. There is a perforation in the external semi-circular canal. Perforation has taken place from the interior of the labyrinth into the middle fossa, through the superior semi-circular canal, and into the posterior fossa through the posterior canal.

1961. AN EXHIBIT OF 14 SPECIMENS.

Lent by St. Thomas's Hospital.

1961A. AN EXHIBIT OF PHOTOGRAPHS AND MICROSCOPICAL SPECIMENS.

Lent by Dr. J. S. Frazer.

Inflammatory Affections of the Brain.

1962. PORTION OF CEREBRUM, exhibiting an abscess in its anterior lobe, which communicated with the lateral ventricle of the same side.

Sent in anonymously.

The patient was a man, 40 years old, who appeared to die exhausted by syphilis and the effects of mercury. The only

cerebral symptoms were extreme restlessness and delirium at night. The case is related by Mr. Earle in the Medical and Physical Journal, Vol. XXXIII., p. 89. London, 1810.

1963. PNEUMOCOCCAL MENINGITIS.

The brain of an infant, showing pneumococcal meningitis in a typical form. The pia-arachnoid is the seat of a diffuse greenish-yellow deposit of pus. No part of the brain surface is free, but the vertex is rather more affected than the rest. In places the pus follows the course of the blood vessels.

From an infant aged 7 months, who died on the day following admission to the Hospital. The clinical history of the case is lacking. Post-mortem examination showed that the spinal cord was also involved in a purulent meningitis. There was early broncho-pneumonic consolidation at both bases, and over a large part of the right lung a fibrino-purulent deposit, but no empyema in the ordinary sense of the term.

1964. STREPTOCOCCAL ABSCESS.

Part of a left cerebral hemisphere, showing a large abscess in the frontal lobe. The upper part of the hemisphere has been removed by a horizontal section. Occupying the greater part of the frontal lobe is an abscess-cavity, containing greenish pus. The brain-substance forming the outer wall of the abscess is thin, and protrudes to form a rounded eminence. There is no evidence of meningitis.

Bacteriological examination of the pus after death yielded a pure culture of streptococcus pyogenes.

From a boy aged 11 years. One day, while at school, he suddenly became unable to understand his studies. Half an hour later he was seized with epileptiform convulsions of a Jacksonian type, each convulsion commencing with deviation of the eyes to the right. In the intervals between the convulsions he seemed quite normal, and showed no signs of paralysis. Three days later vomiting commenced, accompanied by irregularity and slowness of the pulse, and by optic neuritis. The patient was at this stage able to talk and write. No more convulsions occurred, but coma gradually supervened, leading to death on the twelfth day of the illness. Post-mortem examination threw no light on the source of the infection. Presented by W. Langdon Brown, M.D.

1965. CEREBRAL ABSCESS.

The right hemisphere of a brain in which an abscess has formed in the temporo-sphenoidal lobe, as the result of suppuration in the middle ear, (see next specimen); the outer wall of the abscess cavity has been cut away, in

order to expose more fully the cavity itself. About one inch behind the abscess is a ragged wound in the cerebral substance, caused by a trephining operation, which was performed ineffectually two days before death for the relief of symptoms.

From a man, aged 29 years, who had suffered from purulent discharge from both ears for many years. An abscess in the brain was diagnosed and the skull trephined with a view to evacuate the pus; after exposing the brain, a director was passed through the ragged wound in the direction of the abscess; no pus escaped; two days later the man died; at the post-mortem examination it was found that the director had passed into the abscess, but that the brain substance, by closing round the instrument, had prevented the detection of the pus.

1966. TEMPORO-SPHENOIDAL ABSCESS.

Right hemisphere of the brain of a woman, *æt.* 21 years. It shows a large abscess cavity in the temporo-sphenoidal lobe, which had appeared as a sequela of otitis media. There was localised meningitis over the roof of the tympanic cavity, and here the dura matter was grey and sloughing, and there was a small opening connecting the middle ear with the abscess in the temporo-sphenoidal lobe. This lobe was much swollen, and its convolutions were much flattened. The lateral sinus was sound and normal. (Fixed in formalin and preserved in glycerine).

1967. ABSCESS IN CEREBELLUM, FOLLOWING OTITIS MEDIA.

A cerebellum in which there has formed a large abscess on the lateral margin of the left semilunar lobe, consequent on suppuration in the middle ear; the abscess cavity has been evacuated and hardened in its distended condition.

From a man, aged 26, who had suffered from discharge of the ear as long as he could remember.

1967A. ABSCESS OF CEREBELLUM.

The specimen was obtained from the body of a woman, *æt.* 26 years. In the right lobe of the cerebellum there is an abscess nearly 1 inch (2.5 cm.) in diameter, which at the time of the autopsy contained about half-an-ounce (14 grms.) of greenish, fetid pus, and had originated in the posterior peduncle. Only a thin layer of brain matter separates the abscess cavity from the floor of the fourth ventricle, which is flattened and bulged upwards. From the main abscess pus had made its way forwards through a small opening to

the superficial part of the middle peduncle of the cerebellum. (A glass rod has been inserted through this opening.) The middle peduncle has been eroded to the depth of a quarter of an inch (.6 cm.) over an area of an inch (2.5 cm.) in diameter. The superficial origin of the facial and auditory nerves had been so involved in this abscess that they are indistinguishable.

The ventricular cavities contained a slight excess of turbid serum, but there was no disease of any other part of the brain, inside or outside. The cavities of the right internal and middle ear were natural.

Clinical note. Four years before the patient suffered from pyæmia following upon necrosis of the tibia, for which amputation was performed. For three weeks before admission she had headache and the face was drawn to the left a week later. On admission the face was drawn to the left, the right eye could be only partially closed, there was weakness of the right rectus externus, marked nystagmus, but good vision and sensation, deafness of the right ear and difficulty of deglutition, drowsiness and paralysis of the right masseter and protrusion of the tongue to the right. A few days later she became comatose and died.

1967B. CEREBELLAR ABSCESS.

The right half of a cerebellum showing an abscess cavity in the upper portion of the lateral lobe. The cavity is prolonged outwards and has a communication with the upper and outer surfaces of the hemisphere.

The patient was a girl 14 years of age, who had suffered for two months from otorrhœa on both sides; for a week she had experienced severe frontal headache. Vomiting was present, her pulse was infrequent—54 per minute, and she had well-marked optic neuritis in the right eye. There were no localising symptoms, and she died three days after admission to the hospital without an operation.

1968. PNEUMOCOCCAL MENINGITIS.

The brain of an infant showing pneumococcal meningitis in a typical form. The pia-arachnoid is the seat of a diffuse greenish-yellow deposit of pus. No part of the brain-surface is free, but the vertex is rather more affected than the rest. In places the pus follows the course of the blood vessels.

From an infant, aged 7 months, who died on the day following admission to the Hospital. The clinical history of the case is lacking. Post-mortem examination showed that the spinal cord was also involved in a purulent meningitis. There was early broncho-pneumonic consolidation at both

bases, and over a large part of the right lung a fibrino-purulent deposit, but no empyema in the ordinary sense of the term.

New Growths affecting the Brain.

1969. SARCOMA OF THE CEREBELLAR MENINGES.

A cerebellum and pons, showing a sarcoma of the meninges covering the right hemisphere. The tumour is roughly spherical in outline, with a nodular surface, it is situated on the anterior aspect of the hemisphere, and its inner surface is in close relation to the pons, which has been compressed and displaced to the left. The tumour possesses a delicate capsule and has displaced, rather than infiltrated, the cerebellar substance. Its cut surface is of a greyish yellow colour, mottled with hæmorrhages.

Microscopic examination. The tumour is a mixed round and spindle-celled sarcoma.

The patient was a man, aged 47, who was admitted to the hospital for vomiting and loss of sight. He had partial paralysis of both arms and legs, and the external rectus on the right side was paralysed. He was quite blind, and both eyes showed marked papillitis. Two months after admission he had an attack of convulsions, and a month later suffered from proptosis of the right eye and paralysis of the right facial nerve. He died thirteen months after the first onset of his symptoms. At the post-mortem examination the right wing of the sphenoid was found to have been eroded by the pressure of the tumour.

1970. PSAMMOMA OF DURA MATER.

A right temporal bone, to which is attached a hard, pale, nodular tumour. The base of the growth is firmly adherent to the dura mater, from which it has originated. It projects backwards into the posterior cerebral fossa just external to the internal auditory meatus.

Microscopic examination. The tumour is composed of fibro-sarcomatous tissue with many spindle cells. There are numerous concentric calcareous concretions embedded in the tissue.

From a woman between 50 and 60 years of age, who died of well-marked general paralysis in Banstead Asylum, of which she had been an inmate for six months. She had right facial paralysis and neuralgia of the right side of the face, but there was no headache, cerebellar ataxia, vomiting or deafness,

The under surface of the right lateral lobe of the cerebellum was extensively hollowed out by the pressure of the tumour, but was not invaded.

- 1970A. PSAMMOMA. Part of the base of a skull in the left middle fossa of which is a rounded tumour about three-quarters of an inch in diameter.

It is firm and encapsuled, and springs from the dura mater opposite the posterior clinoid process. The tumour had formed a cavity in the apex of the temporo-sphenoidal lobe,

Microscopic examination : The growth is a psammoma. The patient, a woman of 65 years of age, died of sarcoma of the lung. She had shown no symptoms of cerebral tumour.

1971. AN EXTERNAL EAR, the seat of a large growth of Epithelioma.

The disease occupies the whole thickness of more than half the auricle, projecting alike on its external and internal surfaces, and leaving only its upper and anterior borders and lobule free. It forms a flat, lobed and fissured growth, the overhanging margins of which are in parts sinuous, and have everted the adjacent skin of the auricle. The middle of the posterior border of the auricle is, with part of the cancer, completely destroyed by ulceration. The general texture of the cancer is soft, shreddy, and very vascular ; the microscopic structure was well marked, according to the types of epithelioma.

A small superficial ulcer, with a scab, had existed on the outer surface of the ear for six years, the scab being frequently detached and removed. The growth here shown had been in progress of increase and ulceration for six months before it was removed. The patient was a strong man, 76 years old.

1972. AN EPITHELIOMA OF THE EXTERNAL EAR.

- 1972.A AN EPITHELIOMA, INVOLVING THE RIGHT AURICLE.

The disease occupies a large portion of the external surface of the auricle, including the concha and anti-helix, but it does not penetrate through its whole thickness. The growth forms an irregular sprouting mass, which is in parts coloured black with blood. Microscopically, the growth is a typical epithelioma.

From a man, aged 62, who noticed a small pimple on his ear eighteen months before the operation. The growth remained quiescent for fifteen months, and then rapidly increased in size, and began to ulcerate.

1973. CANCEROUS ULCER. A left ear with a portion of the adjoining skin showing a large cancerous ulcer.

The growth has destroyed the upper third of the pinna, and a large area of skin above and in front of it. The ulcer is deep, with indurated, but not everted edges, and an irregular, warty floor.

Microscopic examination shows that the growth is a squamous called carcinoma.

Removed by operation from a man aged 70 years. The ulcer had commenced on the helix of the ear eighteen months before the operation, and had gradually involved the skin of the temporal region.

1974. EPITHELIOMA OF EXTERNAL AUDITORY MEATUS.

A left external auditory meatus showing an epithelioma of its deeper parts. A red glass rod indicates the course of the meatus. At the inner extremity its walls are infiltrated, and its lumen obliterated by a reddish growth with a warty and ulcerated surface.

Microscopic examination shows that the growth is a squamous-celled carcinoma.

Removed by operation from a man aged 41 years, who had been treated for a "meatal growth" three years previously. The treatment had consisted of repeated cauterization. For five months he had suffered constant pain in the affected ear.

1974A. GLIO-SARCOMA OF BRAIN.

Lent by London School of Clinical Medicine, Greenwich.

Injury to the Brain.

1975. PISTOL WOUND OF THE CRANIUM.

A skull, with the brain *in situ*, prepared in such a way as to show the course of a bullet fired upwards from the mouth. The bullet has traversed the hard palate, the ethmoid and the frontal portion of the brain, leaving a track along which a black rod has been passed. The bullet was extracted from an abscess which formed twenty days after the injury behind the coronal suture; the remains of it are still visible. The lateral ventricle was not opened. The layers of arachnoid around the aperture are adherent, but there is no other evidence of meningitis. The portion of the

brain corresponding with the left frontal lobes, which were disorganised, appear to be contracting by a process of cicatrization.

From a man, aged 38, who shot himself through the mouth with a revolver. He survived the injury one month, and during this time remained in a state of stupor unless he was roused, when he was cheerful and possessed some memory.

1975A. CINEMATOGRAPH PHOTOGRAPHS OF THE EYE-BALL shewing the nystagmus produced by pressure in a case of fistula of the external semicircular canal. (Dr. Sydney Scott's case).

The photographs were taken by Kinora, Limited, and will be shown by the same firm.

History. Annie B. age 17, was first seen 29th October, 1909. She had bilateral otitis media chronica, dating from infancy. The tympanic membranes were perforated posteriorly close to the tympanic ring, and foul mucopus was seen in the meatus. On the right side there were polypoid granulations which were removed, but without material diminution of the discharge from the ear. The discharge from the left ear greatly lessened under routine syringing &c.

When at her best, the patient could hear Politzer's acoumeter at about 10 centimetres from either ear. Rinne's test was negative and Schwabach was positive. There was no Paracusis Willisii. The highest tone audible on Edelmann-Galton whistle was 22,000 on the right side and 44,000 on left. The lowest tone at maximum amplitude audible was 36 on the left and 45 on the right side Bazold-Edelmann forks. Owing to the persistent formation of granulations in the right tympanum in spite of continuous attention, the patient had to be admitted to the hospital and was operated upon 10/2/10. The radical mastoid operation was performed on the right ear. The membrane and remains of malleus were removed. The stapes was found to be in its place. There was no fistula of the external canal, although the eminence was flatter than usual. A skin graft was applied to the surface of the bone. On April 1st, after the patient had left the hospital, she was seen in the out-patient department, and it was found that the whole of the cavity was well healed except over an area in the attic and aditus above the facial nerve, where there was a small mass of granulations. When the ear was syringed with water at body temperature, the

patient forcibly turned the head to the left, and nystagmic movements were produced. When the eyes were attentively fixed towards the right, the force of syringing produced an initial movement horizontally to the left, followed immediately by jerking movements which were sometimes faster to the left than to the right and sometimes faster to the right than to the left, and sometimes the eye-balls moved to right and left to and fro at equal rate. When the patient looked attentively straight ahead, the eye-movements produced were the same as when the patient looked to the right. When the patient directed her eyes voluntarily to the left, forcible syringing caused rotatory nystagmus with the rapid jerk to the right. (A distinct horizontal movement could not be detected apart from the rotatory motion when the eyes were directed to the left). The same phenomena could be elicited by touching a small area of the granulations with the end of a fine probe. But no movements or sensations were set up by touching any other part of the cavity.

Strong intra-meatal compression (with a Politzer's bag connected with the ear by a rubber tube, which was fitted tightly into the meatus) produced strong horizontal nystagmus, when the patient was looking straight ahead. It was not possible to say that the rate of the alternating movements was faster in one direction than in the other. On one occasion a weak compression produced the sensation as if the stool on which the patient was seated was suddenly pushed direct forwards. It was not possible to reproduce this sensation, in spite of several attempts to do so. The sensations invariably produced on other occasions were that the room was rotating towards the patient's right with a slight undulation up and down, and secondly that the patient herself was also turning towards the right as in waltzing. The forced movements of the head and body however were always in the opposite direction, *i.e.*, the patient turned her head towards the left around a vertical axis, when the region of the external semi-circular canal was touched; in other words, there was contra-deviation of the head and eyes, to each stimulus applied to the area of the canal. These observations were repeated again and again to make certain that the observations which were taken down at the time were in accordance with fact.

On one occasion when the probe came in contact with the area on the inner wall of the cavity, the patient made such a sudden forced and involuntary movement that the

probe unintentionally entered more deep than usual into the granulations. The nystagmus which accompanied this stimulus lasted 30 seconds after the probe was withdrawn, and it was feared that some hæmorrhage must be going on into the labyrinth. The sensation of giddiness out-last-ed the persistence of the nystagmus on this occasion. The area was swabbed with a 5 per cent. mixture of izal, which produced a burning sensation for a few minutes but did not cause the return of giddiness. The cavity was packed with gauze. During the act of packing nystagmus was again produced at each act of pressure.

In about 10 days' time the granulations had disappeared, and a little later no pressure reactions could be obtained. There was no spontaneous giddiness or nystagmus.

A few weeks afterwards the patient was examined on the rotation chair, and by the caloric tests, and showed signs of normal reactions for the superior and external semi-circular canals.

In the present state of our knowledge the exhibitor is of the opinion that the phenomena were due to softening and absorption of the bone over the external semi-circular canal during the process of healing. Probably the bone was unusually thin before the process of healing began.

The photographs were taken, during the period when nystagmus was elicited by intra-meatal compression.

1975B. CINEMATOGRAPHIC PHOTOGRAPHS OF THE EYE-BALL showing post-rotary nystagmus, evoked by rotating about a vertical axis with head erect.

The exhibitor permitted himself to be rotated for these observations, through ten revolutions, in some 25 seconds. On stopping suddenly, the head was placed on a previously-arranged frame and photographs of the eye-ball taken.

1975C. CINEMATOGRAPH PHOTOGRAPHS OF LIP-READING EXERCISES FOR THE INSTRUCTION OF THE DEAF.

Lent by Kinora, Limited.

1975D. AN EXHIBIT.

Lent by Dr. H. H. B. Cunningham.

1975E. AN EXHIBIT.

Lent by Dr. Wyatt Wingrave.

The Toynbee Collection

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SERIES I.—THE EXTERNAL EAR.

1975. A model of the external ear of a child, in which there was no meatus externus. (See "Medical Times and Gazette," No. 311, June 17, 1856.)

SERIES II.—MEATUS EXTERNUS.

ABNORMAL CONTENTS.

ACCUMULATION OF CERUMEN, AND ITS EFFECTS.

1976. Various specimens of cerumen, some of them containing a large quantity of hair.
1977. Mass of cerumen filling the external meatus, and moulded upon the surface of membrana tympani.
1978. Portions of cerumen, presenting casts of the external surface of the membrana tympani.
1979. A large mass, presenting a cast of membrana tympani.
1980. Masses of cerumen with hair and epidermis.
1981. Osseous meatus dilated by cerumen.
1982. Meatus dilated by cerumen.
1983. Meatus dilated by cerumen. Membrana tympani ossified. Auditory nerve and membranous vestibule atrophied. *History.*—Male, æt. 79. Could not hear a shout; had been deaf 40 years.
1984. Left ear. Cerumen in external meatus; absorption of part of the anterior wall. Membrana tympani thick and white.
1985. Osseous meatus, diseased from presence of cerumen. Membrana tympani thick and white; it is flat and connected to inner wall of tympanum by firm membranous bands.
1986. The meatus was full of cerumen and epidermis. The anterior osseous wall is thin and perforated by orifices, one as large as a pea. The lower wall is rough, and presents a worm-eaten appearance. The membrana tympani is dull; the dermoid layer at the upper part is detached from the surface of the radiating fibrous layer, and there is a space between them; it is connected by membranous bands to the inner wall of the tympanum.

1987. Meatus dilated from cerumen ; osseous wall partly absorbed ; posteriorly communicating with mastoid cells, inferiorly with the jugular fossa ; cerumen projected into the mastoid cells.
1988. Posterior wall of meatus rough, and dilated by cerumen ; membrana tympani concave and uneven.
1989. Meatus dilated from cerumen ; inferior wall partly absorbed. Membrana tympani very concave, the cartilaginous ring exposed from the dilation of the meatus.
1990. Right ear. From a male, æt. 80. Deaf 12 years. The meatus slightly dilated at its aperture ; stapes ankylosed.
1991. Left ear, from preceding case. Meatus dilated from cerumen ; portion of posterior wall absorbed ; stapes partially ankylosed.
1992. Meatus dilated by cerumen ; walls much thinned.

FOREIGN BODIES.

1993. Meatus dilated by cotton wool and epidermis ; aperture into mastoid cells ; membrana tympani atrophied ; malleus partly destroyed ; stapes ankylosed ; labyrinth very thick and opaque.
1994. From a male, æt. 88. Very deaf. Meatus dilated and diseased from cotton wool and epidermis.
1995. Portions of lint removed from the ear in a case in which the membrana tympani was perforated.
1996. A piece of paper which had been in the meatus for six months.
1997. A fragment of slate pencil, which was in contact with the membrana tympani.
1998. Some husks of rye-seeds, removed from the meatus of a petrous bone ; otherwise healthy.

EPIDERMIS.

1999. Epidermis, forming a complete cast of meatus externus and membrana tympani.
2000. A similar cast.
2001. A similar cast.
2002. Thickened epidermis from the meatus.
2003. Very thick, discoloured epidermis from meatus.
2004. Portions of thickened epidermis.
2005. A portion of the same.
2006. Very thick epidermis from the same.
2007. Meatus, containing diseased epidermis attached to thickened membrana tympani.

B.—EFFECTS OF INFLAMMATION.

DERMOID LAYER, THICK AND CONGESTED.

2008. Dermoid layer, thick and congested.

C.—POLYPI.

FIBRO-GELATINOUS.

2009. Two large fibro-gelatinous polypi, with small roots.

D.—MOLLUSCOUS TUMOURS AND THEIR
EFFECT ON THE BONE.

2010. Small molluscos tumour, causing destruction of upper third of membrana tympani.

2011. Molluscos tumour *in situ*.

2012. Right ear. A molluscos tumour has caused absorption of upper wall of meatus, and also of the superior wall of the tympanum, so that the dura mater is in contact with it.

2013. Absorption of the posterior wall of meatus to a slight extent from the presence of a molluscos tumour.

2014. The same disease of greater extent, the cancellous structure being exposed.

2015. Absorption of posterior wall near to membrana tympani, from the same cause.

2016. The meatus contained three molluscos tumours, one at the lower part of the orifice, a second in the substance of the superior osseous wall, near the membrana tympani, the contents of which projected into the tympanic cavity; a third in the lower part of the posterior wall between the circular cartilage of the membrana tympani and its sulcus.

2017. The outer part of the meatus contained cerumen, the inner half was occupied by a molluscos tumour which had caused considerable dilation of the meatus. This tumour had caused the whole of the long process of the malleus to disappear by absorption, and had pressed the membrana tympani (which remained entire) inwards, so that its inner surface was in contact with the whole outer surface of the incus. The head of the malleus remains firmly attached to the incus. At the lower wall of the meatus the tumour had caused absorption of the bone near to the membrana tympani, and had produced an aperture into the tympanic cavity. The stapes was fixed more firmly than natural. The semicircular canals contained a large quantity of otoconie. (John Brown, æt. 87, 1850.)

2018. Osseous wall of meatus partly absorbed at lower and inferior part from presence of molluscos tumour.

2019. A small molluscos tumour has caused absorption of the bone at the upper wall of the meatus. The membranous labyrinth was thick. *History*.—Male æt. 72. Could hear a very loud voice with this ear. Deaf for many years, but much worse about four years before his death.

2020. A molluscos tumour, as large as a hazel-nut, occupied the whole of the posterior part of the meatus, and projected into the mastoid cells and tympanic cavity. It had also caused

absorption of the superior wall of the tympanum, producing atrophy of the dura mater, which was but slightly adherent to the bone. Inferiorly in the meatus it had caused absorption of the lower wall, near to the membrana tympani, so that the inferior margin of that membrane was unattached, and in the tympanic cavity it had produced absorption of the lower wall, and the fossa jugularis was laid open; anteriorly it had produced an orifice in the osseous lamina, separating the cavitas tympani from the carotid canal. The superior half of the membrana tympani was entirely destroyed, and the remaining part was very thick, and had fallen in. *History*.—R. Wood, æt. 66. Acute pain in right ear, from which there was profuse discharge. He died of apoplexy.

- 2021. Portion of the contents of the above tumour.
- 2022. Meatus greatly enlarged by a molluscous tumour, which penetrated to the cerebral cavity and caused death by abscess in the middle lobe of the brain. (See "Trans. Path. Soc.," vol. xi, p. 2, 1860.)
- 2023. Molluscous tumour in external meatus extending into cranial cravity, and filling the tympanum, causing death by abscess in the cerebellum. From a woman, æt. 24, who had had discharge from the ear for five years. Case of M. W. (See "Med.-Chir. Trans.," vol. xlv, v. 55.)
- 2024. A small sebaceous tumour, extending from meatus into tympanic cavity. (See "Med.-Chir. Trans.," vol. xlv, p. 67. Case 14, 1861.)

C.—OSSEOUS WALLS.

LOWER WALL PARTLY DEFICIENT.

- 2025. A small orifice in inferior wall of meatus.
- 2026. The inferior wall of meatus incompletely developed.
- 2027. The inferior wall of meatus incompletely developed.
- 2028. A small orifice in inferior wall of meatus near membrana tympani.
- 2029. An orifice of considerable size near the membrana tympani.
- 2030. Osseous wall of meatus deficient at lower and inner part; the jugular vein was in contact with its lining membrane. Bands of adhesion in tympanum.

MEATUS DILATED.

- 2031. Meatus dilated, especially at upper and outer part; superior wall of the tympanum imperfect.
- 2032. Meatus dilated, chiefly at anterior part; superior wall of tympanum imperfect.
- 2033. Meatus dilated, chiefly at upper and anterior part; superior wall of tympanum imperfect.
- 2034. Meatus externus very large.

MEATUS CONTRACTED.

2035. The anterior and posterior surface of the lower wall of the meatus present a bulging, by which the calibre of the tube is diminished.
2036. Meatus contracted near the membrana tympani by bulging of the anterior and inferior walls. The layer of bone between the mastoid cells and lateral sinus very thin.
2037. Meatus narrowed by hypertrophy of anterior and inferior walls.
2038. Meatus externus contained dark purulent matter. Its osseous walls are in so highly diseased and thickened a state that the passage is almost obliterated. The inferior wall is dark in colour, rough, and carious. The membrana tympani is reduced to a dense mass of fibrous tissue, about one third of its natural size. The cavitas tympani is much diminished in size by the enlargement of its osseous walls and thickening of its lining membrane. The ossicula, however, still retain their position. The dura mater was attenuated and firmly adherent to the superior wall of the tympanum, and more particularly to that portion of the bone which formed the upper boundary of the meatus. The lateral sinus, also, was very firmly attached to the bone corresponding to the mastoid cells. The carotid canal is much narrowed by the increased thickness of its parietes, especially of the lower wall, which partakes of the thickening of the adjacent wall of the meatus. The coats of the internal carotid artery, at the point of constriction, are greatly attenuated, the external tunic having almost disappeared, and the internal one having become hard and brittle and of an opaque whiteness. The internal carotid artery of the right side has undergone a similar change, though to a less extent.
2039. Stricture of the meatus from bulging of the inferior osseous wall. Membrana tympani greatly hypertrophied, white and opaque.
2040. Meatus very small, about half the natural size.
2041. The opposite ear, presenting a similar narrowing of the meatus.
2042. Meatus much narrowed by bulging of the lower wall.
2043. Meatus contracted near the membrana tympani by bulging of the inferior and posterior walls.
2044. Meatus flattened and contracted; lower wall partly deficient.
2045. Meatus contracted by bulging inwards of the anterior wall; membrana tympani red, thick, and tense.

MEATUS CONTAINING BONY GROWTHS.

2046. Meatus contracted to about half its natural size by bony growth, chiefly from the posterior surface; surrounding bone exceedingly dense. Superior wall of tympanum imperfect.
2047. Meatus contracted by bony growth from the posterior wall.

2048. Meatus contracted by bony growth from inferior and posterior wall; osseous substance very dense.
2049. From a man æt. 57. Meatus contracted by a bony growth at the posterior part.
2050. Meatus greatly contracted by bony growths from anterior and posterior walls. Membrana tympani very concave, of a dark leaden hue. The tympanum contains numerous adhesions, connecting the malleus and membrana tympani to the promontory.
2051. In each meatus there is a bony growth from the lower half of
2052. the posterior wall.
2053. From a man æt. 59. A bony growth at the lower part of the meatus.
2054. Meatus greatly contracted by a bony protuberance from the posterior wall.
2055. Meatus contracted by bony growth from the posterior wall. Cavitas tympani contains broad bands of adhesion.

OSSEOUS WALLS PARTLY ABSORBED FROM INFLAMMATION.

2056. From a patient who died of smallpox. Mucous membrane of tympanum congested; chronic inflammation of fibrous layers of membrana tympani and of osseous meatus. The meatus contained a large mass of cerumen. The fibrous laminae of the membrana tympani have undergone ulceration. They have entirely disappeared in the upper third of the membrane; the mucous layer, having fallen inwards, had become attached to the promontory and stapes, and formed a septum, dividing the tympanic cavity into two, which had no communication with each other. The lower one was continuous with the Eustachian tube, the upper one with the meatus externus. The long process of the incus had been absorbed; the body remained attached to the malleus; the upper wall of the tympanum was very thin and of a dark colour, a considerable quantity of blood which filled the posterior portion of the tympanic cavity was distinctly seen through it. A portion of the upper wall of the meatus externus, close to the ulcerated portion of the membrana tympani, has been absorbed.
2057. Left ear. The membrana tympani is very thick and white, especially at its circumference; it is more flat than natural. The lining membrane of the meatus is red and soft, and the epidermis very thick. The upper and posterior osseous wall of the meatus close to the membrana tympani presents an orifice about the size of a small pea, so that at this point the circumference of the membrana tympani is free and has no attachment to the bone. The stapes is fixed more firmly than natural. The tympanum contains mucus, its lining membrane is thickened.

2058. Left ear. Lower wall of the meatus is partially absorbed. Stapes more fixed than natural.
2059. Meatus externus was full of cerumen; the upper and posterior wall, at its inner extremity, has been removed, apparently by absorption, and it no longer gives attachment at this part to the membrana tympani. The inferior third of the membrana tympani is white and thick like parchment. To this part is attached the inferior extremity of the long process of the malleus. The upper two-thirds of the fibrous laminae have been entirely destroyed, leaving the mucous lamina alone persistent. This mucous lamina is concave, extremely thin and transparent, and gives attachment to the incus and malleus; its upper and posterior part is adherent by a firm membranous band to the stapes and promontory. The head of the malleus is firmly ankylosed to the upper wall of the tympanic cavity; it is also immovably attached to the body of the incus by means of dense ligamentous fibres. The posterior cricoid process of the incus has been entirely absorbed, its long process is disconnected from the stapes. The stapes is connected more firmly than natural to the circumference of the fenestra ovalis. Posterior to the incus, where the osseous wall of the meatus has been absorbed, there is a thin septum of mucous membrane, which separates the cavity of the mastoid cells from that of the meatus. The tensor tympani muscle is atrophied. The carotid canal is one third less than natural, and the internal carotid artery is not quite half the size of that on the opposite side. The upper wall of the tympanum is thicker than natural, and its cerebral surface has lost its smooth aspect. The Eustachian tube is healthy. *History*.—Male æt. 60. Was able to hear the click of the nail. Period of deafness unknown.
2060. The lower wall of the meatus is rough, partly absorbed, and appears to have been inflamed. Lower wall of tympanum imperfect.
2061. Meatus was filled with cerumen and epidermis. The bone forming the posterior wall was rough and partly absorbed. *History*.—Male æt. 68. He had a discharge from the ear some time since, and portions of dead bone came away,

OSSEOUS WALLS CARIOUS.

2062. The meatus, at the lower and posterior part, presents a rough carious excavation, about three lines in each diameter.
2063. A thin lamina of dead bone, from the meatus of a child æt. 5 years.
2064. Portions of dead bone, from the meatus after chronic inflammation, in a child æt. 5 years. Discharge had existed

from a month after birth, and the exfoliation of the bone was preceded by the formation of a polypus. The removal of the bone was followed by complete recovery.

2065. A portion of dead bone from the meatus.

SERIES III.—MEMBRANA TYMPANI.

A.—EPIDERMOID LAMINA.

2066. The epidermoid lamina of membrana tympani thick and opaque. The stapes partially ankylosed. Otoconic more abundant than natural.

2067. A mass of thickened epidermis, nearly the size of a bean, removed from the surface of the membrana tympani. The patient (æt. 21) was deaf, and affected with noise in the head and giddiness; the removal of the mass of epidermis was followed by entire recovery.

2068. The epidermoid and dermoid layers of the membrana tympani much thicker than natural. The dermoid layer vascular and soft.

2069. The epidermoid and dermoid layers of membrana tympani thicker than natural.

2070. Epidermoid lamina thick, with general thickening of the

2071. membrana tympani.

B.—DERMOID LAMINA.

2072. Dermoid lamina of membrana tympani thick.

2073. A small growth (? polypoid) from the surface of the dermoid lamina of the membrana tympani. The membrane is adherent to the promontory; mucous membrane of tympanum thick.

C.—RADIATE FIBROUS LAMINA.

2074. Radiate fibrous lamina thickened. The stapes was firmly attached to circumference of fenestra ovalis by thickening and solidification of the connecting membrane.

2075. The opposite ear, presenting similar disease.

2076. Radiate fibrous lamina very thick.

2077. Radiate fibrous lamina very thick.

D.—CIRCULAR FIBROUS LAMINA.

2078. Circular fibrous lamina thick and white. The incus was ankylosed to stapes.

2079. Circular fibrous lamina thickened. There was a small quantity of mucus covering the inner portion of the meatus, the membrane was softened. The tympanic cavity contained

- mucous and rhomboid crystals. *History*.—Male æt. 23. Died from smallpox on the thirteenth day. Was delirious several days; not deaf.
2080. Circular fibrous lamina thick, white, and dense, causing the membrane to be more rigid than natural.

E.—BOTH FIBROUS LAMINÆ.

2081. Both fibrous laminæ thickened, especially the radiate.
2082. Both fibrous laminæ very thick.
2083. Both fibrous laminæ slightly thickened.
2084. The membrana tympani is fallen in, so as to lie nearly flat against the promontory; fibrous laminæ inflamed and thickened. Mucous membrane of tympanum thick; cavity full of yellow mucus.
2085. Degeneration of the fibrous laminæ after ulceration. Membrana tympani concave, very thick and yellow like cartilage; there is a large orifice anteriorly. The canalis caroticus is contracted.
2086. Membrana tympani yellow and very concave. Anteriorly to the malleus the fibrous laminæ have been destroyed, and the mucous lamina is exposed over a surface three quarters of a line in diameter. The bone at the superior part of the membrana tympani has been absorbed over a surface about a line in diameter, and the mucous membrane of the tympanum is exposed. The tympanic cavity is full of bands of adhesion. The carotid canal is contracted.
2087. Fibrous laminæ ulcerated over a circular spot about a line in diameter in the anterior portion of the membrane. Mucous lamina persistent.
2088. A small orifice in fibrous laminæ at posterior part of membrana tympani. Mucous lamina persistent.
2089. Right ear. The fibrous laminæ of the posterior and superior third of the membrana tympani are destroyed, the mucous lamina remaining; this portion is very concave, and adheres to the stapes. The posterior and inferior two thirds of the membrane are very thick and white. The carotid canal contracted to half its natural size.
2090. Left ear. In the same state as the former specimen. The inferior extremity of the long process of the incus is absorbed, and the stapes is firmly attached to the membrana tympani.
2091. Right ear. Membrana tympani more concave than natural; the posterior half is extremely thin; the fibrous coats apparently having been destroyed by ulceration, the mucous lamina only remains; it is extremely thin and flaccid, and its inner surface is adherent to the inferior extremity of the long process of the incus. The anterior half of the membrana tympani is thick and white like cartilage, especially at its circumference; near to the handle of the malleus it is very

vascular, the vessels being large and tortuous. The superior osseous wall of the tympanum is very much thicker than natural, and it presents towards the cavity of the skull an exostosis about a line in depth, and four or five lines in circumference. The stapes is attached to the fenestra ovalis much more firmly than natural. *History*.—Male æt. 62. Hard of hearing for many years; about three years before his death became much more deaf after a violent cold, so that he required to be spoken to in a loud voice. Could hear the click of the nail.

2092. Fibrous laminae of membrana tympani ulcerated at posterior and superior part; mucous lamina remaining.

2093. Membrana tympani of a man æt. 65. It is concave and thick; at the posterior part, close to the handle of the malleus, there is an orifice of oval shape, about a line in its longest diameter. The remaining portion of the membrane is white and thick like parchment, and tense. The meatus contained cerumen. The mucous membrane of the tympanum is thicker than natural.

2094. Right ear. Meatus very red and soft, especially at the inner third. The membrana tympani consists only of some delicate fibres lined by mucous membrane; it is fallen in (with the malleus) so as to be in contact with the promontory. The head of the stapes, disconnected from the incus, pushed out the membrana tympani and formed a slight projection. By the falling in of the membrana tympani, what was the cavity of the tympanum now forms part of the meatus. *History*.—Male æt. 53. Thirty-seven years before his death he had an attack of fever, which caused deafness in the right ear. Thirteen years ago, after another attack of fever, he became deaf in the left ear also. With the right ear he could hear a loud voice at a distance of two feet. On the left side he required a loud voice close to the ear.

F.—MUCOUS LAMINA.

2095. Membrana tympani of a boy æt. 5 years, who died from scarlet fever. Deaf. The membrane was vascular, the mucous lamina thick. The tympanum was completely filled with mucus.

2096. Membrana tympani of a girl æt. 10 years, who died from smallpox on the twenty-second day after the appearance of the eruption. Deafness originated from the attack of smallpox; she heard well previously. Her mother was deaf. Left ear. The membrana tympani is white, but the surface reflects the light and is smooth. The mucous lamina is very thick and white. It is three or four times as thick as the membrana tympani itself when in a natural state. There is a small space, about a line and a half in diameter, towards the centre of the membrane, which is less thick. The tympanic cavity

was completely full of thick and very tenacious mucus: this mucus consists of very large corpuscles, composed of a membranous envelope enclosing distinct rounded granules. Some of the cells are full of granules, others contain only a few. The mastoid cells contained blood; mixed with the blood discs were granules and fine transparent scales or lamellæ. The mucous membrane of the tympanum was very thick. It partially concealed the ossicles, binding them together more firmly than natural. The epithelial cells covering this thick mucous membrane were globular, and they stood out from the surface like the vesicles of the leaves of the ice plant.

2097. Left membrana tympani of a boy æt. 21 months, who died of fever. The mucous lamina is very thick. The tympanic cavity is nearly filled with thick white mucus, and its lining membrane is very thick, red, and soft. The internal auditory meatus was very large.

2098. Membrana tympani of a woman æt. 20, who died from typhus fever; was very deaf for five days before death. Left ear. The membrana tympani is thicker, softer, and whiter than natural. The mucous membrane of the tympanum was very thick, and firmly encircled the stapes, which is almost concealed. The fossa fenestræ rotundæ was concealed by it. The blood-vessels of the cochlea were distended with blood. The stapes was fixed more firmly than natural in the fenestra ovalis, owing to rigidity of the connecting membrane.

2099. Membrana tympani of a woman æt. 50, who died from pneumonia. The mucous lamina is thick; the tympanum contained bands of adhesion.

2100. Membrana tympani. Mucous lamina thick.

2101. Membrana tympani. Ossific matter deposited on its inner surface.

G.—ALL THE LAMINÆ.

2102. From a man æt. 74, who died from apoplexy, having been deaf some years. Right ear. The membrana tympani is white, thick, concave; bands envelop the ossicula. The base of stapes is enlarged and fixed more firmly than natural to fenestra ovalis.

2103. From a man, æt. 76. Deaf for thirty-six years; probable cause, the noise of cannon during naval engagements; could hear the click of the nail. Right ear. Membrana tympani very thick, its structure being converted into a yellow, irregular mass, nearly as hard as bone. It is fallen in, so as to be barely in contact with the promontory.

2104. Left ear. All the laminæ of membrana tympani thick.

2105. Membrana tympani. All the laminæ thick and adherent to each other.

2106. Membrana tympani. Anterior and inferior part thick and white.

2107. Membrana tympani of a man æt. 74. Deaf for forty years; could not hear a shout. It is thick like cartilage. At the lower part there is a large calcareous patch. Anteriorly there is an orifice about a line in diameter.

H.—CALCAREOUS.

2108. Left ear. A crescent-shaped calcareous deposit in the membrana tympani. The inferior extremity of the long process of the incus was much atrophied, and the articulation between it and the stapes much larger than natural. Stapes partially ankylosed, its base thicker than natural, and the lower border projected into the cavity of the vestibule, the crura of the bone appearing to have been pressed down or drawn downwards by bands of adhesion.

2109. From a man æt. 70. The membrana tympani contains a small white deposit at its upper and posterior portion.

2110. From a man æt. 70. Deaf. Right ear. The membrana tympani contains a crescentic calcareous deposit near its lower border. Stapes partially ankylosed. The membranous labyrinth was of a dark colour, as if blood had been effused and partly absorbed. The vessels of the modiolus of the cochlea were distended; the lamina spiralis was of a dark colour, and covered by a dark soft substance.

2111. Membrana tympani calcareous in parts.

2112. Membrana tympani contains a large calcareous deposit anteriorly, the posterior part destroyed. The edges of the orifice are adherent to the stapes.

2113. The membrana tympani contains a calcareous deposit.

2114. } Small calcareous deposits in the membrana tympani.
2115. }

2116. Membrana tympani containing two large oval deposits of calcareous matter in its anterior and posterior portions respectively. At its lower part the fibrous laminæ are destroyed over a circular spot about a line and a half in diameter.

2117. Right ear, in the same state.

2118. Membrana tympani deficient posteriorly, the anterior part with calcareous deposits. From a man æt. 60.

2119. Membrana tympani calcareous with an orifice, and adherent to promontory.

2120. Membrana tympani calcareous with an orifice, and adherent to the stapes.

2121. Membrana tympani calcareous with an orifice.

I.—CONCAVE, ATROPHIED, AND RELAXED.

2122. Left ear. The membrana tympani is more concave than natural; its surface has somewhat the aspect of ground glass, having numerous white spots upon it, which are produced by thickened epidermis. The incus and stapes are connected together and to the promontory by bands of adhesion. The base of the stapes is expanded, and it projects somewhat into the vestibule.
2123. From a man *æt.* 70. Hard of hearing for seven or eight years. Right ear. Membrana tympani very concave. Stapes partially ankylosed. Cochlea contains abundant pigment.
2124. From a man *æt.* 75. Relaxation of membrana tympani. Each
2125. meatus contained several hairs. The epidermoid layer of each membrana tympani was thick and opaque, presenting the aspect of ground glass. Instead of presenting the usual convexity posterior to the malleus, each membrana tympani at the part had a lax and shrivelled aspect. When the tympanic cavity was distended with air by means of a blowpipe this portion assumed its natural convex aspect, but returned to its former state as soon as the pressure was removed. When pressed by a probe, it felt quite flaccid, and had the appearance of silver-paper. Each carotid canal was slightly contracted.
2126. Malleus partly detached from membrana tympani. From a man *æt.* 46. Not deaf. Left ear. The membrana tympani is of normal thickness, but more flat than natural. The inferior third of the long process of the malleus is detached from the membrana tympani, and projects into the cavity of the tympanum.
2127. From a man *æt.* 72. Became deaf about five years before his death, with giddiness. Suffered much from noises in the ears, especially on the right side. Twelve months before his death he required to be spoken to in a distinct voice near to him. Right ear. Membrana tympani much more concave than natural, the lower extremity of the handle of the malleus being much drawn inwards. Upon looking at the internal surface it is observed to have the shape of a funnel. The lower extremity of the long process of the malleus is detached from the membrane, and projects into the cavity of the tympanum. Membranous bands fill the greater part of the tympanum surrounding the ossicles, and somewhat impeding their motions. One, which is very broad and strong, connects the membrana tympani to the promontory. The cochlea contains much black pigment. The membranous labyrinth is congested.
2128. Left ear. The membrana tympani, like that of the right ear, is very concave, and the inferior extremity of the long process of the malleus is partly detached from it, *i.e.*, only a few

scattered fibres connect them. Some of the fibres of the radiate lamina are very much atrophied, and others appear to have been ruptured. These changes are no doubt to be attributed to the drawing in of the membrana tympani and malleus by the membranous bands which connect them to the promontory. The circular fibres have also been ruptured in parts.

2129. From a man æt. 85. Right ear. The membrana tympani is delicate and atrophied, except at the part around the malleus, which was yellow and thick.
2130. Left ear. The membrana tympani is very thin, flat, and seems to have lost its attachment to the malleus, which projects into the tympanic cavity. This atrophied condition is probably the result of inflammation of the fibrous layers.

K.—CONNECTED BY BANDS TO THE INNER WALL OF TYMPANUM.

2131. Right ear. Membrana tympani thickened, and connected by bands to the promontory.
2132. Left ear. Membrana tympani thickened, very concave, and adherent to the promontory.
2133. From a man æt. 55, deaf in left ear. Right ear. Membrana tympani healthy in structure, adherent by a broad band to the promontory.
2134. Left ear. Membrana tympani flat, and much thicker than natural; it is firmly adherent to promontory.
2135. Membrana tympani thick and opaque; at the anterior part is a narrow elongated band of calcareous matter. It is connected to the inner wall of tympanum by numerous bands.
2136. Membrana tympani more concave than natural, tense, its inner surface connected to the promontory by strong bands of adhesion; ossicula rigid.
2137. From a man æt. 65, deaf for thirty years, the deafness commencing in right ear about ten months after an injury, occasioned to it by the report of a cannon. Could only hear a very loud voice; subject to noises in the head. Right ear. Membrana tympani very thick, white, and opaque, especially at the posterior part; it is fallen in and adherent to the promontory, the tympanic cavity being nearly obliterated. Stapes partially ankylosed. Lamina spiralis of the cochlea very thick.
2138. Membrana tympani. All the laminae thick.
2139. Membrana tympani connected to promontory by membranous
2140 bands.
2141. Membrana tympani concave, thick, and white, connected by bands to the promontory.

- 2142. Membrana tympani connected by a broad membrane to stapes and promontory, very concave.
- 2143. Membrana tympani adherent to promontory.
- 2144. Membrana tympani united by a thick, white, membranous band to the promontory.
- 2145. Membrana tympani partly destroyed, fallen in, connected by bands to stapes and promontory.
- 2146. Membrana tympani connected by thin bands to promontory.
- 2147. Membrana tympani adherent by bands to promontory.
- 2148. Membrana tympani adherent by a broad band to promontory.
- 2149. Membrana tympani adherent by a broad band to stapes and canal for portio dura nerve.
- 2150. Membrana tympani adherent by bands to inner wall of tympanum.
- 2151. Membrana tympani and incus adherent to bands to promontory.
- 2152. Membrana tympani fallen in, connected to inner wall of tympanum by numerous firm bands of adhesion.
- 2153. Membrana tympani perforated, and adherent to stapes and promontory.

*L.—FALLEN IN AND ADHERENT TO THE
INNER WALL OF TYMPANUM.*

- 2154. From a man æt. 59, deaf. Died from pneumonia. Right ear. Membrana tympani nearly destroyed by ulceration; a portion at the posterior part is fallen in, and adheres to the stapes and promontory. Mucous membrane of the tympanum very thick; it was covered with purulent matter. The osseous walls of the tympanum are thick and soft, while to the upper one the dura mater adhered very firmly. From the extension of the disease the carotid canal is diminished in size. The internal carotid artery was so contracted, that on being opened at the point of contact with the wall of the tympanum it was found wrinkled up, and presenting the appearance of an old ulcer of the intestines.
- 2155. Left ear. Membrana tympani greatly thinned by disease; it is fallen in, and is in contact with the inner wall of the tympanum in nearly the whole of its extent. Carotid canal contracted.
- 2156. From a woman æt. 64. Died from pneumonia. Right ear. Membrana tympani very concave externally; it is thick, white, and cartilaginous, and firmly adherent to the inner wall of the tympanum. The mucous membrane of the tympanum is very thick, with small patches of yellow scrofulous matter adhering firmly to its surface. The incus, the crura of the stapes, and the greater part of the malleus have disappeared, and the membranous labyrinth is very much atrophied.
- 2157. Left ear. The upper half of the membrana tympani has been

destroyed ; the remaining portion is very thick and opaque, and firmly adherent to the inner wall of the tympanum. The mucous membrane of the tympanum is but slightly thicker than natural. The malleus and incus have both disappeared, and the stapes is adherent at its cervix to the remnant of the membrana tympani. In the bands of adhesion which connect the membrana tympani with the inner wall of the tympanum, small yellow masses of scrofulous matter, of a caseous consistence, are interspersed. The membranous labyrinth is atrophied.

2158. Right ear. The membrana tympani has been partially destroyed ; some cellular tissue and a few fibres only remain. These fibres were attached to the malleus externally, and to the promontory internally ; the lower part of the tympanic cavity has thus been obliterated. The upper part of the tympanum and the mastoid cells contain a dark, thick matter, like coagulated blood, which was visible through the upper osseous wall of the tympanum, which is translucent. The mucous membrane of the tympanum is thick and of a dark colour. The vestibular cavity is in a diseased state, the membranous labyrinth atrophied. The dark matter in the tympanum was visible through the base of the stapes. *History*.—Male æt. 40. Died from smallpox. Deaf ; he could hear when spoken to in an ordinary tone near to his bed. He had had scarlet fever when a child, since which time he had been somewhat dull of hearing, but he was considerably worse during the attack of smallpox ; he died on the eleventh day after the appearance of the eruption.
2159. Left ear. Membrana tympani very concave and thick, adherent to inner wall of tympanum. Mucous membrane of tympanum very thick, covered with mucus. The fluid of the labyrinth and cochlea opaque ; otoconie very abundant.
2161. Membrana tympani partially destroyed by ulceration, fallen in and adherent to the inner wall of the tympanum. The membrane of the fenestra rotunda greatly thickened and of dark colour. On the right side the stapes partially ankylosed. (See "Transactions of the Pathological Society," 1852-3, vol. iv, p. 251.)
2162. Membrana tympani very concave. Inner surface in contact with promontory.
2163. Membrana tympani adherent to inner wall of tympanum, containing a thick white deposit at upper and posterior part.
2164. Membrana tympani and malleus in contact with stapes.
2165. From a man æt. 71. Right ear. Membrana tympani fallen in and adherent to the promontory. Left ear healthy.
2166. From a man æt. 72. Left ear. The meatus was full of cerumen. The lower part of the membrana tympani is destroyed ; the

surface of the promontory is seen covered only by a delicate membrane. The inferior extremities of the malleus and incus are nearly in contact with, and are attached to, the promontory. The lower extremity of the incus is detached from the stapes, and the neck of the latter projects towards the external meatus. The tympanic cavity is filled by thick mucous membrane. The lower osseous wall of the tympanum is imperfect.

2167. Membrana tympani anterior half destroyed; posterior half adherent to promontory.

2168. Membrana tympani absent, excepting a part of the mucous layer, which is in contact with the promontory.

M.—PERFORATED.

2169. Membrana tympani nearly destroyed; portions of its mucous layer adherent to stapes and promontory.

2170. From a female æt. 16. Died from fever after seven weeks' illness. She was in a certain degree deaf from the commencement of the attack. Right ear. The meatus externus contained a large quantity of purulent secretion, and the lining membrane was soft and ulcerated. The membrana tympani is destroyed, except a small portion at posterior and inferior borders. The mucous membrane of the tympanum is thick, soft, and ulcerated, the long process of the malleus has been partly absorbed. The tympanic cavity contains a thick, white matter; the mastoid cells are filled with a dense mucus. The dura mater is very loosely connected to the upper wall of the tympanum, and the periosteum of the fossa parotidea is very easily separable from the bone. The mucous membrane of the Eustachian tube was healthy.

2171. Right ear. Membrana tympani entirely destroyed, except a small thick white strip, about half a line in width, remaining at its circumference. The inner surface of the remnant at the point to which the malleus is attached is bound to the inner wall of the tympanum by firm bands of adhesion, which entirely conceal the stapes. The long process of the malleus has partially disappeared, but the processus brevis is firmly adherent to the remnant of the membrana tympani. The internal part of the head of the malleus presents an exostosis of nearly equal size with the head of that bone. The surface of the malleus and incus is rough, and they are surrounded by caseous matter. The upper wall of the tympanum is dark and infiltrated with fluid. The tensor tympani muscle is atrophied to half its natural size. *History.*—Male æt. 53. Died of pneumonia. He had become deaf after a scrofulous disease when young, and continued so during the rest of his life.

2172. Membrana tympani; orifice in centre, the margin of which is adherent to the stapes. The outer part of the membrane is white and thick.
2173. Membrana tympani, larger part absent; the remnant, much thickened, is adherent to the promontory. *History*.—Female æt. 50. Had been deaf for many years.
2174. The membrana tympani of a child æt. 18 months, who died of measles. It was thick and red, the red appearance being due to the congested mucous layer. There are two small perforations at the lower part. The tympanum contained yellow tenacious muco-purulent fluid, its mucous membrane thick and red.
2175. Right membrana tympani of a boy æt. 21 months, who died from fever. Inner surface thick; in the central part was an orifice in the mucous and fibrous coats, which was covered by thick epidermis. This epidermis having been removed, mucus escaped from the tympanic cavity. The tympanum was nearly filled by thick white mucus, and its lining membrane was very thick, red, and soft.
2176. From a man æt. 61. Right ear. The fibrous layers of the membrana tympani, at its posterior half, have been entirely destroyed. The mucous layer has fallen inwards, and is attached to the stapes and long process of the incus. The canalis caroticus is slightly contracted.
2177. Membrana tympani, perforated at lower and anterior part. The upper portion, with the long process of the malleus, is adherent to the promontory. The tympanum and mastoid cells contain numerous bands of adhesion.
2178. Left ear. The central portion of the membrana tympani (about the extent of a pea) was very thin and concave, and broke down on being touched. The circumference, to the depth of three quarters of a line above and half a line below, remained, and the upper part was adherent by a broad band to the inner wall of the tympanum. The long process of the malleus is absent.
2179. From a man deaf for a long time. Right ear. The meatus was full of cerumen; the surface of the bone, at the posterior part, is rough, and presents small depressions. Membrana tympani opaque, very concave; at the superior and posterior part is an orifice, which communicates with the tympanic cavity; the inner surface is adherent to the promontory by a broad band.
2180. Left ear. Meatus in same condition as that of right ear. Membrana tympani partly destroyed, and adherent to incus and stapes. The handle of the malleus is absorbed.
2181. From a man æt. 64. In each membrana tympani there is a

2182. circular orifice, three quarters of a line in diameter, between the malleus and the posterior part of its circumference. This orifice was covered by the epidermoid layer, which was complete.
2183. From a man æt. 72. Membrana tympani not much thicker than natural, but at its anterior part there is an orifice about a line and a half long by three quarters of a line broad. Near the posterior border are two very small deposits of calcareous matter.
2184. From a man æt. 80. Deafness for many years, first occasioned
2185. by a cannonade. The membrana tympani in each ear is thick and white at superior part; lower part destroyed.
2186. From a man æt. 70. Very hard of hearing. Left ear. The inferior and posterior portions of the membrana tympani destroyed; the superior part to which the malleus is still adherent is thick, fallen inwards, and adherent to the promontory. Mucous membrane of tympanum thick. Stapes disconnected from the incus.
2187. From a man æt. 70. Left ear. The posterior third of the membrana tympani is destroyed, exposing the incus, stapes, and chorda tympani nerve. The anterior two thirds of the membrane is thick and white. Right ear healthy.
2188. Membrana tympani perforated at superior and posterior part; margins not thickened.
2189. Membrana tympani thick and opaque; it presents an orifice a line in diameter at the anterior part; the mucous membrane of the tympanum is thick and red.
2190. The greater part of the membrana tympani destroyed; the margins of the orifice connected to the stapes.
2191. Membrana tympani partially destroyed, adherent to promontory.
2192. Membrana tympani partially destroyed; adhesions in the tympanum.
2193. The membrana tympani presents two orifices at the posterior part.
2194. Membrana tympani presenting an orifice at the central part; the mucous layer thick.
2195. Membrana tympani presenting an orifice in the lower part; the end of the long process of the malleus has disappeared.
2196. Membrana tympani adherent to promontory; mucous membrane of tympanum very thick.
2197. Membrana tympani thick and adherent to stapes.
2198. Membrana tympani adherent to promontory.
2199. From a woman æt. 60. Died from bronchitis. She had been
2200. deaf for several years; the deafness had come on gradually. There were repeated accumulations of wax in the ears, the removal of which afforded partial relief. Each meatus contained a large quantity of cerumen. Membrana tympani white, concave, the short process of malleus very prominent. The mucous membrane of the tympanum is thickened, and

numerous bands of adhesion connect the membrana tympani with the inner wall of the tympanum and the ossicular with each other.

2201. From a woman æt. 40. Died from uterine disease. Right ear. Membrana tympani white, thick, and more concave than natural. Mucous membrane of tympanum very thick, and also white. The tympanum and mastoid cells contained a white, glairy fluid.
2202. Membrana tympani adherent to the promontory; mucous
2203. membrane of tympanum thick.
2204. From a man æt. 60. The membrana tympani in each ear
2205. presents an orifice.

SERIES IV.—CAVITAS TYMPANI.

A.—ABNORMAL CONTENTS.

MUCUS AND EPITHELIUM.

2206. Mucus removed from the tympanum of a woman æt. 22, who was deaf.
2207. Mucus that escaped from the tympanum through an orifice in the membrana tympani.
2208. Another specimen of tympanic mucus from the same cause.
2209. Thick, dark-coloured mucus from the tympanum.
2210. Mucus from the tympanum.
2211. } Cavitas tympani distended with mucus.
2212. }
2213. The tympanum contains a mass of epithelium cells, which occupies the larger part of it.
2214. The tympanum contains an accumulation of epithelium.

LYMPH AND BLOOD.

2215. The tympanum nearly full of firm lymph.
2216. Right ear. The tympanum contains a mass of soft, pale substance, which surrounds the stapes, and partly conceals the other ossicles. *History*.—Male æt. 79. Deaf for four or five years; the deafness came on slowly from cold. The right ear was the worst. He could hear the click of the nail. He suffered from a feeling as of stopping up on the right side of the head, and from noise like the ticking of a clock; was worse during the cold. The membrana tympani, on examination, was seen to be white, concave, and thick. The act of blowing the nose was accompanied with a feeling of cracking and bursting in the ears.
2217. Right ear. The meatus contained purulent fluid and thickened epidermis. The membrana tympani is fallen in to the promontory, of a dark colour, and thick. The anterior part

of the tympanum is filled with a firm mass, resembling a partially decolourised clot: the posterior part is filled with a clot of comparatively recent blood, which appears to extend into the mastoid cells. The malleus and incus are freely moveable; the base of the stapes is somewhat less moveable than natural. *History.*—Male æt. 79. At times, when a boy, was hard of hearing, which he attributed to bathing; for fifty years had been decidedly deaf; it varied much, being worse during a cold. He could only hear a loud voice; had a beating noise in his head. Died from cancer of the liver.

SCROFULOUS MATTER.

2218. From a girl æt. $2\frac{1}{2}$, who died from phthisis. Right ear.

2219. Membrana tympani entirely destroyed by ulceration; the tympanum contained some scrofulous matter, although the lining membrane is so swollen as nearly to fill the cavity. Left ear. Membrana tympani thick, white, and soft; the mucous membrane of the tympanum very thick and red. The tympanum is nearly filled with a mucus so dense as to be almost solid. Examined by the microscope, this substance was found to be mucus in combination with scrofulous matter.

2220. From a girl æt. 9, who died from diseased hip and phthisis.

Left ear. The mucous membrane of the tympanum is thick, soft, and ulcerated. The tympanum contains scrofulous matter. The stapes is entirely concealed. Right ear healthy.

2221. The tympanum of each ear is distended with scrofulous

2222. matter.

CALCAREOUS MATTER.

2223. The tympanum contains calcareous matter, deposited chiefly upon its inferior and posterior walls.

2224. The incus dislocated and impacted in the mastoid cells, and surrounded by calcareous matter.

2225. Meatus dilated by cerumen; tympanum nearly full of coagulated blood and cholesterine; Eustachian tube occluded. From a man æt. 33, partly hemiplegic four years. Two small, hard, semi-transparent masses were found in the cerebrum. (See "Trans. Path. Soc.," vol. xi, p. 222, 1860.)

2226. Cholesterine from the tympanum of the above.

B.—MUCOUS MEMBRANE THICK.

2227. Mucous membrane of tympanum very thick.

2228. From a child æt. 7, who died with tubercles in nearly all the

2229. organs of the body. Right ear. Strong bands of adhesion between the membrana tympani and incus. In both ears the mucous membrane of the tympanum is thick, soft and

vascular, so as to conceal the stapes, and filling the greater part of the cavity, which latter also contained mucus and serofulous matter.

2230. Mucous membrane of the tympanum very thick; incus and stapes partially concealed.
2231. From a woman æt 62. Died of gangrene. Deaf in the left ear. Right ear. The membrana tympani is unusually concave; its internal surface about the centre is not more than a quarter of a line from the promontory. The membrane is also, in parts, rather opaque, especially at the circumference, and its internal layer is white and slightly thickened. The mucous membrane of the tympanum is rather thicker and more vascular than natural, and is also very tough. A firm band of adhesion connects the cervix of the malleus with the long process of the incus, and another membranous band connects the anterior surface of the long process of the incus with the promontory and with the stapes, which latter bone it completely envelops. The tensor tympani muscle is of diminished size.
2232. From a child æt. 6 months, who died of pneumonia. The membrana tympani of each ear is white, and contains red vessels of twice or thrice their natural dimensions. The mucous membrane of the tympanum is so thick as nearly to fill the tympanic cavity. The stapes and incus are almost concealed. The tympanum contains a white, muco-purulent matter, which is thick and tenacious, and distends the mastoid cells. (Note.—This thick condition of the mucous membrane illustrates one possible mode of formation of bands of adhesion, for the mucous membrane of the promontory is here in contact with the membrana tympani and malleus.)
2234. From a boy æt. 3, who died from scarlatina. In each ear the membrana tympani is thick, and of a reddish-white hue.
2235. The mucous membrane of the tympanum is so much thickened as nearly to fill the cavity, but is not ulcerated.
2236. Mucous membrane of tympanum thick; ossicula partly concealed.
2237. Female æt. 25. Died of pleuritis. Right ear. Membrana tympani more concave than natural. The mucous membrane of tympanum very red, thick, and soft. The dark colour of the mucous membrane of the tympanum is distinctly observable through the membrana tympani.
2238. At the inferior and anterior part of the membrana tympani is an orifice about half a line in diameter, with thick margins. The mucous membrane of the tympanum is thick; the tympanic cavity contains a considerable quantity of mucus.
2239. Mucous membrane of tympanum very thick, the stapes concealed.

2240. Membrana tympani and mucous membrane of tympanum thick, the stapes surrounded by thickened membrane.
2241. Membrana tympani and mucous membrane of tympanum thick.
2242. Mucous membrane of tympanum thick around the stapes.
2243. Membrana tympani and mucous membrane of tympanum thick. Adhesions between the membrana tympani and incus.
2244. Mucous membrane of tympanum very thick.
2245. A portion of thickened mucous membrane of the tympanum; from a boy æt. $3\frac{1}{2}$, who died of dysentery.
2246. A portion of thickened mucous membrane of the tympanum; from a woman æt. 20, who died from typhus fever; deaf five days before her death.
2247. A portion of the mucous membrane of the tympanum rather thicker than natural.

*C.—MUCOUS MEMBRANE—EFFECTS OF
SCROFULOUS INFLAMMATION.*

2248. From a child who died of enteritis. A degree of deafness had been perceived. Right ear. Membrana tympani white. The tympanum was quite full of a white purulent mass, consisting of oleaginous globules and scrofulous granular matter. The mucous membrane is thick and very vascular. The head of the malleus is rough and disjoined from the incus; the tendon of the tensor tympani muscle is ulcerated and reduced to a fine thread. The incus and stapes are concealed by the thickness of the membrane. The mastoid cells are filled with pus.
2249. Left ear. In the same general state as the right. The vascularity of the mucous membrane was imparted to the osseous wall of the tympanum and to the membrana tympani, which is crowded with vessels.
2250. Mucous membrane of the tympanum thick, from scrofula.
2251. Mucous membrane of the tympanum thick, from scrofula.
2252. Mucous membrane of the tympanum thick, from scrofula; bands of adhesion uniting the ossicula.

D.—EFFECTS OF MEASLES.

2253. From a male infant æt. 9 months, who died from measles. Left ear. The membrana tympani presents a large orifice at the posterior part. There is ulceration of the mucous membrane of the tympanum, and the incus is disconnected from its attachments, and lies free in the tympanic cavity, which contains pus. The stapes is completely concealed by the thick mucous membrane.

2254. From a male child æt. 2 years, who died from measles. Right ear. Membrana tympani thick and white. The mucous membrane of the tympanum is inflamed and thickened. The tympanum contained mucus.
2255. Left ear. The tympanum is in the same condition as that of the right ear.

E.—EFFECTS OF SCARLATINA.

2256. From a boy æt. 5, who died from scarlatina. The tympanum was completely filled with mucus; the mucous membrane thick and vascular.
2257. A portion of greatly thickened mucous membrane from the tympanum of a man, deaf since scarlatina in early life.
2258. Portion of thickened mucous membrane of the tympanum from a boy æt. 21 months, who died from fever.
2259. Mucous membrane of the tympanum, thick from smallpox.

F.—MUCOUS MEMBRANE—EFFECTS OF ACUTE INFLAMMATION.

2260. Dermoid meatus, membrana tympani, and mucous membrane of tympanum of a red colour, and containing numerous vessels distended with blood. Bands of adhesion in tympanum and mastoid cells. *History.*—Male æt. 22. Three weeks before death complained of pains in right ear, as if a foreign body were there. The pain became very severe. Died of fever after a week's illness. Ulceration of ileum.
2261. Mucous membrane of tympanum in a state of acute inflammation.
2262. Mucous membrane of tympanum (acutely) inflamed, of a deep red colour, and thick.
2263. Mucous membrane of the tympanum and mastoid cells, of red colour and thick.
2264. Mucous membrane of the tympanum, of a pale red colour.
2265. Mucous membrane of tympanum, inflamed. The tympanum contains numerous bands of adhesion of a deep red colour. Membrana tympani perforated at anterior and lower part.
2266. Membrana tympani and lower two thirds of malleus destroyed. Mucous membrane of tympanum ulcerated. Cavity filled with soft membranous bands and offensive purulent matter. Upper wall of the tympanum of a green colour.
2267. From a woman æt. 38, who died of dropsy. Deaf. Right ear. The membrana tympani is rather dull towards the posterior and superior part, and a round, fleshy-looking substance is visible beyond it. The membrane is also much more concave than natural, and at its central region there is a round portion, about a line in diameter, which is white. The surface is smooth

and shining, and the white appearance evidently arises from the presence of some substance near its internal surface. The tympanum is nearly filled by a firm gelatinous-looking substance of a red hue, and which is the mucous membrane of the tympanum in a highly tumefied condition. This is the substance which was seen through the membrana tympani, the inner surface of which being in contact with the mucous membrane covering the promontory explains the peculiar appearance of its central region. The handle of the malleus is also in contact with the mucous membrane of the promontory; a small quantity of mucus existed in the tympanic cavity. The membrana tympani appears to be drawn inwards, at its upper and posterior part, by adhesions, which connect it firmly with the inner wall of the tympanum.

2268. From a child æt. $2\frac{1}{2}$, who died from consumption. In each

2269. ear the membrana tympani is thick and soft and of a white colour. The mucous membrane of the tympanum is thick and soft, and the tympanic cavity full of muco-purulent matter.

2270. From a child æt. 1, who died from hydrocephalus; it was

2271. scrofulous. The mucous membrane of the tympanum in each ear is red, and swollen to four or five times its natural thickness. The cavity is full of yellowish-white mucus, which to the naked eye wears the appearance of pus, except that it is more tenacious. The osseous walls of the tympanum are red, and the lower wall which separates it from the jugular vein is dark-coloured. The mastoid cells are nearly filled by the thickened lining membrane. The membrana tympani of the left ear presents a large ulcerated orifice about its centre.

2272. Right ear. From an infant æt. 9 months, who died from measles. The mucous membrane of the tympanum is red, soft, and pulpy.

2273. From a woman æt. 22, deaf. Died from diseased heart. Right ear. Membrana tympani much more concave than natural; its circumference, for the extent of half a line, is white and thick. It is adherent to the inner wall of the tympanum by firm membranous bands. The mucous membrane of the tympanum and mastoid cells is much thicker and softer than natural.

2274. From a child who died from scrofula. The mucous membrane

2275. of the tympanum in each ear is very thick.

H.—CONTAINING MEMBRANOUS BANDS OF ADHESION.

2276. From a man æt. 67, who died of gangrena senilis. Left ear.

The meatus externus contained a collection of cerumen lying in contact with the membrana tympani, which is more con-

cave than natural. The whole of the inner surface of the long process of the malleus is connected by a strong band of adhesion to the stapes and the inner wall of the tympanum. The stapes is entirely hidden, and the mucous membrane covering the ossicula and lining the mastoid cells is very much thickened.

2277. From a man æt. 44, who died of a diseased bladder. He had been growing gradually deaf during many years. The Eustachian tube was pervious. Right ear. The meatus contained a large quantity of cerumen. Membrana tympani white, shining, and concave. The mucous membrane of the tympanum is thick, and bands of adhesion connect the stapes, malleus, and incus to the membrana tympani.

2278. From a man æt. 70. Died of disease of the heart. Hard of hearing. Right ear. Membrana tympani dull like lead, but not much thicker than natural; the tympanum completely full of cellulo-fibrous tissue, which connects the ossicles and the membrana tympani to the promontory.

2279. Left ear. The meatus contained cerumen. Membrana tympani soft, flaccid, and as if sodden; it is of a leaden hue, the handle of the malleus being scarcely visible; at its circumference, for the breadth of a line, there is a band of a darker colour than the central part; this is produced by thickening of the mucous lamina. The mucous membrane of the tympanum is slightly thicker than natural; the posterior and superior part of the cavity is full of a firm, membranous, cellular tissue, apparently organised lymph, which surrounds the upper part of the malleus and incus, connecting them together and to the stapes.

2280. From a man æt. 76. Right ear. The membrana tympani is concave, and the inferior extremity of the malleus is detached from it and projects into the cavity of the tympanum. Numerous firm bands of adhesion connect the malleus and other ossicles to the inner wall of the tympanum. The canal for the superior petrosal nerve is as large as a crow's quill.

2281. Right ear. Membrana tympani thick and concave. Numerous

2282. bands of adhesion connect the ossicles to the tympanic walls and to the membrana tympani. Ossicles not so moveable as natural. Left ear. Membrana tympani destroyed, except a narrow portion posteriorly; the ossicula remain, and are connected to each other and to the tympanic walls by broad bands of adhesion. The tympanum contained secretion of black colour. *History*.—Male æt. 70. Had been deaf in the left ear since the battle of Trafalgar; for three weeks after the battle was almost entirely deaf, but afterwards became better. During the four years preceding his death became more deaf; subject to noises of a tinkling character in the left ear

- during a cold. Could hear a watch on pressure over the right ear; with the left could hear the click of the finger-nails.
2283. Right ear. Membrana tympani: lower two thirds destroyed;
2284. the lower margin of the upper third is connected to the thick mucous membrane of the tympanum, which shuts off the mastoid cells from the tympanic cavity. The mastoid cells were full of a dark-coloured serous fluid, epithelium, and cholesterine. Mucous membrane of tympanum very thick. Labyrinth healthy. Left ear. In the same state as the right ear, except that the fluid in the mastoid cells was transparent. The stapes was fixed. The mastoid cells were separated from the tympanic cavity by a distinct band between the inner wall of the tympanum and the upper part of the membrana tympani. *History*.—Male æt. 67. Had been deaf for thirty or forty years after a naval engagement; was subject to roaring noises in both ears, which sometimes ceased for a day or two. At times there had been discharge from both ears. Up to about two years before his death he could hear the click of the finger-nails with each ear, but before he died he became unable to hear the voice.
2285. A portion of some bands of adhesion removed from the tympanum of a man æt. 84.
2286. The same, treated with acetic acid.
2287. Bands of adhesion connecting the malleus to the incus and
2288. promontory. Superior wall of the tympanum partly deficient.
2289. Bands of adhesion connecting the malleus to the stapes and promontory.
2290. Bands of adhesion connecting the stapes to the inner wall of the
2291. tympanum.
2292. Bands of adhesion connecting the membrana tympani, malleus,
2293. and incus to the inner wall of the tympanum.
2294. A broad band of adhesion connecting the incus to the membrana tympani.
2295. Bands of adhesion connecting the incus to the membrana tympani, and also to the stapes and inner wall of the tympanum.
2296. All the ossicular connected to each other, and to the inner wall of the tympanum by numerous bands of adhesion.
2297. Base of the stapes entirely surrounded by delicate bands of adhesion.
2298. Bands of adhesion connecting the malleus and incus to the tendon of the tensor tympani muscle.
2299. A broad band of adhesion between the long processes of the malleus and incus, which are considerably approximated.
2300. Incus and stapes connected to each other and to the walls of the tympanum by bands of adhesion. The stapes entirely embedded in them.

2301. All the ossicula connected together, and to the walls of the tympanum by bands of adhesion.
2302. Malleus adherent by bands to the incus, and to the inner and upper wall of the tympanum; broad bands of adhesion in the mastoid cells.
2303. Membrana tympani connected by a band of adhesion to the incus; also the tendon of the stapedius muscle to the promontory.
2304. Bands of adhesion connecting the incus and stapes to the inner and superior wall of the tympanum.
2305. The membrana tympani and all the ossicula connected together, and to the inner and posterior walls of the tympanum by bands of adhesion.
2306. Bands of adhesion connecting the membrana tympani to the malleus, incus, and stapes; the stapes connected to the adjacent portions of the tympanic wall, especially to the promontory.
2307. Membrana tympani connected by bands of adhesion to the
2308. ossicula and promontory.
2309. Thick bands of adhesion enveloping all the ossicula and connecting the membrana tympani to the promontory.
2310. Bands of adhesion connecting the membrana tympani to the long
2311. process of the incus.
2312. Bands of adhesion connecting the membrana tympani to the incus, and the incus and stapes to the walls of the tympanum.
2313. Bands of adhesion connecting the membrana tympani and malleus
2314. to the long process of incus and promontory. The membrana tympani is more concave than natural.
2315. Bands of adhesion connecting the malleus to the superior and internal walls of the tympanum. Membrana tympani very concave, being almost in contact with the promontory.
2316. Malleus connected by bands of adhesion to the long process of the incus and to the tendon of the tensor tympani muscle.
2317. Broad bands of adhesion connecting the malleus to the superior and inner wall of the tympanum, and the long process of the incus to the posterior margin of the membrana tympani.
2318. Bands of adhesion connecting all the ossicula together, and to the inner wall of the tympanum.
2319. Bands of adhesion connecting the incus and stapes to the inner
2320. wall of the tympanum.
2321. Bands of adhesion surrounding the stapes, and attaching it to
2322. the inner wall of the tympanum.
2323. From a girl æt. 11, who died from phthisis. Right ear. Mem-
2324. brana tympani opaque and very concave. At its posterior part is an orifice of a line in diameter, through which the fenestra ovalis is seen. The margins of this orifice are smooth and defined; the upper one is attached to the neck of the stapes.

The mucous membrane of the tympanum is slightly thickened; the cavity contains a small quantity of mucus, which the microscope shows to be composed of epithelial corpuscles. The posterior portion of the membrana tympani is attached by fine adhesions to the stapes and inner wall of the tympanum. The upper third of the long process of the incus has disappeared, and it is no longer attached to the stapes. Left ear. Membrana tympani opaque and thick, and more concave than natural. At its posterior part a defined portion of the membrane, to the extent of two lines in length and one in breadth, is much thicker, and quite white, probably in the first stage of calcareous degeneration. The surrounding portion of the membrane has an increased vascularity. The mucous membrane of the tympanum is thick and soft, and exhibits innumerable large vessels distended with blood. The tympanum contains muco-purulent fluid. The stapes is almost entirely concealed in the thick, soft, and vascular membrane. In this case the right ear presents traces of former disease, from which it had, to a certain extent, recovered. The left ear was in a state of active disease at the time of death. *History.*—The patient was in the hospital for six weeks previous to death, and was not supposed to be deaf until a few days preceding that event, when she complained of great pain in the left ear accompanied with deafness. No doubt, however, can exist that she was deaf in the right ear during a considerable period, though the deafness was not detected until the left ear became diseased.

2325. Bands of adhesion extending across the tympanum; stapes firmly fixed. 124
2326. A mass of membranous bands in the posterior part of the tympanic cavity, connecting the incus and stapes to the tympanic walls. From a man æt. 80, deaf.

I.—CANAL FOR THE PORTIO DURA NERVE IMPERFECT.

2327. The osseous wall of the canal for the portio dura nerve is deficient for a narrow space, about three-quarters of a line in length, in the upper part of its course around the tympanum, the neurilemma of the nerve being in contact with the tympanic mucous membrane.
2328. The osseous walls of the canal are entirely wanting throughout the greater part of its course around the tympanum.
2329. The canal is deficient at the superior and inferior thirds.
2330. The canal is deficient at the inferior two thirds.
2331. The osseous walls of the canal are deficient for a space of about a line and a half above the fenestra ovalis and at the inferior fourth.

2332. The osseous walls of the canal are wanting superiorly and inferiorly; in the central part of its course the nerve is separated from the tympanic mucous membrane by a very thin and translucent lamina of bone.
2333. The canal is deficient at the superior third.
2334. The canal is deficient at the superior and inferior portions.
2335. The canal is deficient at the middle third.

*K.—SUPERIOR OSSEOUS WALL
HYPERTROPHIED.*

2336. From a man æt. 85, who had been deaf for many years. Right ear. The meatus externus contained a large mass of hardened epidermis, pressing on the membrana tympani, which is opaque. The tympanum contained muco-purulent fluid. The superior wall of the tympanum is greatly hypertrophied, being more than half an inch in thickness. The canal for the carotid artery is greatly contracted. Left ear. The superior wall of the tympanum is similarly hypertrophied. The canal for the carotid artery is contracted to a less degree.

L.—SUPERIOR OSSEOUS WALL EXPANDED.

2338. The tympanic cavity is so expanded that its superior and posterior walls are so thin as to be translucent.

*M.—SUPERIOR WALL PARTLY DEFICIENT, THE
MUCOUS MEMBRANE OF THE TYMPANUM
BEING MORE OR LESS IN CONTACT WITH
THE DURA MATER.*

2339. Orifice in the roof of the tympanum, about three lines in length by one and a half in breadth, exposing the head of the malleus. The mucous membrane of the tympanum is nearly continuous across the orifice. The membrana tympani is partly destroyed, and adherent to the promontory. Bands of adhesion connect the malleus and stapes to the inner wall of the tympanum.
2340. A very small orifice in the roof of the tympanum, which is generally thin and translucent.
2341. Several small orifices in the roof of the tympanum; the mucous membrane of the tympanum continues across them.
2342. A large orifice in the roof of the tympanum above the attachment of the posterior crus of the incus, and a small one corresponding with the commencement of the Eustachian tube.
2343. The bone partially deficient over a large part of the roof of the tympanum; the mucous membrane continuous.
2344. Several small orifices in the roof of the tympanum; the bone, to
2345. a great extent, translucent.

2346. A large part of the roof of the tympanum deficient ; several small orifices in the plate of bone forming the roof of the mastoid cells.

2347. An orifice of square form, and about four lines in diameter, in the posterior portion of the roof of the tympanum ; it is traversed at right angles by narrow bands of bone. There are several small orifices in other portions of the bone.

2348. The larger portion of the upper wall of the tympanum is absent ; numerous small osseous laminæ, arranged perpendicularly, are observed, which project into the cerebral cavity slightly above the level of the surrounding bone. This orifice is three quarters of an inch long and half an inch broad ; a crescent-shaped band of bone, about half a line in diameter, divides it into an outer larger and an inner smaller portion. In this case the prominence of the vertical laminæ of bone affords evidence that the defective state of the tympanic wall is the result of arrest of development, and has not been produced by pressure of the brain, as supposed by some pathologists. The crescentic band of bone, which is so well marked in this specimen, may be less distinctly observed in many others, especially in Nos. , , and .

2349. A large irregular orifice, involving the larger part of the roof of the tympanum ; a crescentic band of bone, passing in a direction inwards and forwards, divides it into two nearly equal parts.

2350. The larger portion of the roof of the tympanum is deficient ; numerous vertical laminæ of bone occupy the posterior portion of the orifice.

2351. Roof of the tympanum very thin, and in parts deficient ; at the external and posterior part there is a large orifice, across which the mucous membrane is continuous.

2352. Roof of the tympanum deficient for a space nearly an inch in length, and about a line in breadth, extending from within outwards and backwards. Anteriorly to the tympanum, and near the junction of the squamous with the petrous portion of the temporal bone, there is a depression extending into the cancellous structure, about three lines in length by one in breadth.

2353. Roof of the tympanum deficient to a slight extent, the mucous
2354. membrane continuous.

2355. A small orifice in the posterior portion of the roof of the
2356. tympanum.

2357. Orifices of considerable size in the roof of the tympanum, which is
2358. generally thin and translucent.

2359. Upper wall of the tympanum defective.

*N.—THE INFERIOR OSSEOUS WALL DEFICIENT,
THE MUCOUS MEMBRANE OF THE TYM-
PANUM BEING MORE OR LESS IN
CONTACT WITH THE OUTER SURFACE OF
THE JUGULAR VEIN.*

2360. Right ear. Membrana tympani flatter and much thicker than natural; the lower half is white, like parchment; the mucous membrane lining the tympanum is thick, especially the portion surrounding the ossicula; the cavity contained mucus. The layer of bone between the jugular vein and the tympanum is incomplete. The stapes is fixed more firmly than natural in the fenestra ovalis. From a man æt. 54.
2361. From a man æt. 60. The lower wall of the tympanum is formed by a membrane, in which a small plate of bone is deposited. The membrana tympani was very concave.
2362. The lower wall of the tympanum is formed partly by a very thin and translucent plate of bone, and partly by a membrane. It presents an orifice of oval shape, and about a line in length.
2363. The lower wall of the tympanum is very thin, and presents an irregular triangular orifice, about a line and a half in diameter.
2364. The larger portion of the lower wall of the tympanum consists of membrane only.
2365. The lower wall of the tympanum is very thin and translucent, for a space, about the size of a small pea, it consists of a layer of membrane containing a little osseous deposit.
2366. The lower wall of the tympanum is very thin and translucent, and perforated by many minute orifices.
2367. Lower wall of the tympanum translucent, and presenting a small oval orifice.
2368. An orifice in the lower wall of the tympanum of the size of a small pea, with two or three minute orifices around it. The lower wall of the meatus externus also presents an orifice about the size of a mustard seed.
2369. The larger portion of the lower wall of the tympanum is deficient.
2370. The lower wall of the tympanum is entirely absent, except a very thin lamina of bone at the inner angle.
2371. Bony floor of tympanum imperfect. Minute apertures traverse it, into which bristles are inserted.
2372. The lower wall of the tympanum is perfect, but exceedingly
2373. thin and translucent.
2374. Lower wall of the tympanum imperfect in several places.
2375. Lower wall of the tympanum presenting several minute orifices.
2376. The lower wall of the tympanum consists, in part, of membrane
- 2377 only.
2378. { The lower wall of the tympanum is deficient in parts.
2379. }

2380. There is an orifice in the layer of bone between the lateral sinus and the mastoid cells, which allows of a communication between the two cavities.

SERIES V.—THE EUSTACHIAN TUBE.

A.—DILATED.

2381. Eustachian tube very large ; there is an orifice, the size of a small pea, between it and the canal for the internal carotid artery, so rendering that canal continuous with the cavity of the tympanum.

B.—STRICTURE.

2382. Stricture of the Eustachian tube ; the mucous membrane covered by dense fibrous tissue.
2383. Left ear. The central portion of the membrana tympani is white and thick ; the lateral portions are extremely soft and attenuated. The tympanum and mastoid cells were filled with white, thick mucus, and no air was discoverable in them. The mucous membrane of the tympanum was thicker than natural. The internal portion of the Eustachian tube, for the length of half an inch, is healthy ; but at about that distance from the tympanum there is a sudden constriction, and for the length of about a line and a half the tube is so contracted, that even when the anterior wall was removed it was with difficulty that a bristle could be introduced into the opening. The cause of the stricture appears to be an enlargement of the external and internal walls of the tube. The external osseous wall is at this part twice its natural thickness and somewhat rough ; the internal wall is forced outwards by dilation of the carotid canal. The mucous membrane of the tube was healthy. *History*.—Male æt. 45 ; died of phthisis ; had become gradually deaf in the left ear for six or seven years. (See "Monthly Journal of Medical Science," August, 1850.)
2384. Eustachian tube impervious at its entrance into the tympanic cavity. Membrana tympani very thick.
2385. Right ear. Eustachian tube obstructed by a bulging of the anterior bony wall. Membrana tympani concave, posterior part very thin, and composed of very delicate cellular tissue. The left ear was in a similar condition. *History*.—Male æt. 66. Had been deaf for forty-two years, having first become so from the firing of a piece of ordnance. He was at first rendered entirely deaf, but after some weeks he began to improve, and continued to improve for some twenty years. Since then he has become worse, and two years before his death he required to be spoken to in a loud voice. He suffered from "noises like a din,"

2386. Right ear. Eustachian tube contracted so much by extension upwards of its lower osseous wall that an ordinary pin could only just be made to pass through it. This constricted portion was about one third inch in length; on both sides the tube was as large as, or rather larger than usual. The tympanic cavity contained more mucus than natural, and it was very fluid. The mucous membrane was very vascular; membrana tympani more concave externally than natural, flaccid, of a leaden hue, and very shining. Meatus externus natural. From a man æt. 80, who died of serious apoplexy. He was so deaf on the right side as to require to be spoken to loud. The left ear was only slightly deaf. His deafness varied.
2387. Left temporal bone of the same patient. A slight bulging inwards of the anterior bony wall of the Eustachian tube. (See "Trans. Path. Soc.," vol. xi, p. 221 [1860]).

C.—OBSTRUCTED BY FIBRIN.

2388. Eustachian tube and tympanic cavity full of dense fibrin.

SERIES VI.—THE OSSICULA.

A.—ANKYLOSIS OF THE STAPES TO THE FENESTRA OVALIS.

2389. From a man æt. 64, who died from asthma. The stapes of each ear is ankylosed by bony union to the circumference of the fenestra ovalis. The ears are in other respects healthy.
- 2390.
2391. From a man æt. 52, who died from dropsy. He was deaf. Right ear. The membrana tympani is smooth externally, but opaque from thickening of its mucous layer. The mucous membrane of the tympanum is very thick, and the stapes is completely ankylosed to the margin of the fenestra ovalis.
2392. From a woman æt. 36, insane. Deaf, especially in the right ear; died from consumption. Right ear. Membrana tympani; posterior two thirds destroyed by ulceration; what remains is in a state of ossific degeneration, the seat of the bony deposit being in the fibrous laminæ of the membrane. The mucous membrane of the tympanum is so much thickened that the stapes scarcely projects from the fenestra ovalis, to the margin of which it is firmly ankylosed. The disease has extended from the tympanum to the carotid canal, the internal wall of which is much thickened, and its calibre reduced to a third less than the natural size. The external wall of the carotid canal is also deficient in more than one place, leaving at those points the mucous membrane of the tympanum in contact with the external surface of the internal carotid artery. The membranous labyrinth is much atrophied, and its peculiar fluids

deficient in quantity. The base of the stapes is seen projecting into the cavity of the vestibule, being three or four times its natural thickness and perfectly white.

2393. From a woman æt. 34, who died after an attack of fever, which lasted six weeks. She was insane; so deaf that she could not hear a shout. She had had several attacks of fever. Left ear. Mucous membrane of the tympanum thick. Only a small portion of the crura of the stapes was seen, the larger portion being hidden in the cavity of the vestibule. The base of the stapes is completely ankylosed to the fenestra ovalis. In both ears the labyrinthine humour were very deficient.

2394. From a man æt. 36, who died from phthisis. He was deaf

2395. in both ears, but especially in the right. The stapes in each ear is partially ankylosed to the fenestra ovalis. In the right ear the fluids in the vestibule are much diminished in quantity.

2396. From a man æt. 64, who died from pneumonia. He had been deaf in the left ear from childhood, having had a scrofulous affection of the ear. Left ear. The membrana tympani is almost entirely destroyed; a fragment remains posteriorly, which is fallen in and adherent to the promontory, and a small portion is still attached to the long process of the malleus. The tympanum contained a small quantity of pus; its mucous membrane is dark-coloured and much thickened. The stapes is fixed more firmly than natural in the fenestra ovalis. The carotid canal is slightly contracted. The right ear was healthy.

2397. From a woman æt. 48, who died from cancer. She was not very deaf. The stapes in each ear was almost completely concealed by the thickened mucous membrane of the tympanum, and by bands of adhesion.

2398. Stapes partially ankylosed.

2399. From a man æt. about 50. Deaf. Right ear. The meatus

2400. externus was white and deprived of cerumen. Membrana tympani and mucous membrane of the tympanum healthy. The base of the stapes is expanded, and projects into the cavity of the vestibule, so as to form within an oval protuberance, which is smooth, of an opaque white colour, and firmly adherent to the vestibular parietes. The walls of the vestibule are perfectly healthy, and may be distinguished from the base of the stapes by their difference of colour. The crura of the stapes are disconnected from the base. Left ear. Meatus externus dry and deprived of cerumen. Stapes completely and firmly ankylosed to the margin of the fenestra ovalis; it is entire. (See "Medico-Chirurgical Transactions," vol. xxiv.)

2401. From a woman æt. 79, who died from gangrena senilis. She

2402. had been deaf for several years; the disease commenced by a succession of attacks of earache. Right ear. The membrana

- tympani is white and thicker than ordinary parchment, to which it bears a great resemblance. The mucous membrane of the tympanum is thick; the base of the stapes is firmly ankylosed. Left ear. In the same state. (See "Monthly Journal of Medical Science," March, 1849, p. 569.)
2403. Stapes firmly ankylosed, a broad band of adhesion occupying the posterior part of the tympanum, and covering the fenestra rotunda.
2404. Base of the stapes expanded; bands of adhesion in the tympanum; mucous membrane thick.
2405. Stapes ankylosed. Tympanum containing numerous bands of adhesion.
2406. From a woman *æt.* 87. Deaf during a few years preceding death. Right ear. The meatus externus was dry and contained no cerumen. The membrana tympani was more concave and tense than natural, the fibrous laminæ white and slightly thickened. The stapes is fixed more firmly than natural to the margin of the fenestra ovalis. The tympanum contains numerous bands of adhesion, connecting the ossicula, and especially the stapes, firmly to the inner wall of the tympanum. The left ear was in a similar condition. (See "Monthly Journal of Medical Science," February, 1849, p. 523, Mrs. L—.)
2407. Right ear. Stapes completely ankylosed, the surface articulating with the os orbiculare more flat than natural. The malleus connected to the incus by bands of adhesion, tensor tympani muscle atrophied. The membrane of the fenestra rotunda is thickened. The cochlea had a deep red colour, the cochlearis muscle (Todd and Bowman) was larger than natural. In the left ear the stapes was also completely ankylosed, and the membranous vestibule thickened. *History.*—Male *æt.* 48. Deaf for about five years before death; could hear a shout on the right side, no sound at all on the left. The deafness commenced during a very severe ulceration of the throat after syphilis.
2408. From a man *æt.* 50, who died from hæmoptysis. Left ear. Membrana tympani whiter and thicker than natural, the thickening depending on hypertrophy of the mucous lamina. The stapes was surrounded by bands, and was adherent to the margin of the fenestra ovalis more firmly than natural.
2409. From a man *æt.* 80. Very deaf. In each ear the stapes is firmly
2410. attached to the margin of the fenestra ovalis by means of thickening and solidification of the connecting membrane. The crura of the stapes are much atrophied.
2411. Stapes firmly attached to the margin of the fenestra ovalis, so that some force was required to move it. Upon examining the cavity of the vestibule, the base of the stapes is observed to be thicker than natural, and the lower border projects into the

vestibule, the crura of the bone appearing to have been pressed down or drawn downwards by the bands of adhesion which connect it to the inner wall of the tympanum. Deaf.

2412. From a man æt. 65. Right ear. The meatus externus was

2413. distended by cotton wool; the lining membrane was more vascular than natural. The stapes adhered to the margin of the fenestra ovalis more firmly than natural, so that, upon being withdrawn, a small portion of it remained in contact with the margin of the fenestra. Left ear. The meatus externus was distended by cerumen. The stapes was much smaller than natural, the space between the crura being one third less than natural; the base also is diminished in size. The fenestra ovalis is smaller than that of the right side, being partially obliterated by a deposit of bone.

2414. The stapedes from the above case.

2415. Left ear. The external meatus was full of cerumen. Membrana tympani very concave, the epidermoid and fibrous laminae thick and opaque. The ossicula are less moveable than natural. The mucous membrane of the tympanum is thick, and bands of adhesion connect the ossicula. The base of the stapes is so firmly fixed in the fenestra ovalis, that when the malleus is pressed inwards it is scarcely moved. The membranous labyrinth is somewhat atrophied. The right ear was in a similar condition. *History*.—Male æt. 78. Deaf for thirty-eight years, after a fall upon his head from a height of ten feet, which produced insensibility for two hours. The right ear has been useless ever since the accident, the left ear has not varied much. He hears with the left ear the click of the finger-nails; suffers from noise in the head, and a cracking when he turns his head quickly.

2416. Stapes partially ankylosed.

2417. Stapes partially ankylosed, chiefly at the posterior and inferior border.

2418. Stapes partially ankylosed. In the right ear numerous bands of

2419. adhesion connect all the ossicula to the walls of tympanum. In the left ear a few delicate bands extend between the crura of the stapes and the superior wall of the tympanum. *History*.—Male æt. 85. Had been deaf for five or six years. The deafness commenced during a cold, and was worse when he had a cold: he required speaking to loudly near him. Cerumen was removed from the meatus.

2420. Stapes ankylosed to the fenestra ovalis. In the right ear the

2421. membrana tympani is perforated, and the posterior margin is adherent to the wall of the tympanum. The crura of the stapes are detached from the base. In the left ear the ossicula are connected together by bands of adhesion, which extend into the mastoid cells.

2422. From a man æt. 73. The base of the ankylosed to the fenestra ovalis ; the crura connected by delicate bands to the promontory.
2423. Right ear. Meatus externus very large, full of cerumen. Membrana tympani opaque, thick, and flat. The mucous membrane of the tympanum much thicker than natural, and a large part of the cavity filled by bands of adhesion, which connect the ossicula together and to the walls of the tympanum. The mucous membrane was red. The stapes was fixed to the fenestra ovalis more firmly than natural, and its base, as seen from the vestibule, is thicker and whiter than natural. The membranous vestibule contained a larger quantity of otoconie than natural ; it formed at the posterior and superior part an irregular patch nearly half a line in diameter. Left ear. The epidermoid and fibrous laminæ of the membrana tympani are somewhat thickened. The mucous membrane of the tympanum is hypertrophied, and the stapes is firmly fixed in the fenestra ovalis. *History*.—Male æt. 87. Ten or eleven years before death deafness came on without any assignable cause. It was not worse during a cold, but was so in thick weather. He suffered from occasional giddiness, and rumbling noises in both ears, especially at night. He was able to hear the click of the finger-nails with each ear.
2426. From a man æt. 63. Left ear. The stapes is much more firmly attached to the margin of the fenestra ovalis than natural. The membrana tympani and ossicles are more fixed than usual. The right ear was healthy.
2427. From a man æt. 67. Right ear. Meatus full of cerumen and epidermis. Membrana tympani more rigid than natural, scarcely moving when the tensor tympani is drawn. The stapes is fixed. Left ear. The stapes is more fixed than natural.
2428. From a man æt. 77. Right ear. Stapes ankylosed. Bands of adhesion between the malleus and incus.
2429. From a man æt. 80. Right ear. The meatus contained cerumen. Stapes completely fixed. In the left ear the stapes was firmly fixed by rigid membrane. The meatus also contained cerumen.
2430. From a man æt. 65. Left ear. Stapes completely ankylosed. The otoconie was more abundant than natural.
2431. From a man æt. 70. The base of the stapes is somewhat expanded and white ; it adhered to the fenestra ovalis more firmly than natural.
2432. Membrana tympani partly destroyed, fallen in to the promontory. Stapes completely ankylosed.
2433. Right ear. The membranous meatus was so thin that at the posterior part its presence could hardly be detected, and the bone at first sight appeared denuded. Membrana tympani quite transparent, more concave than natural ; the bright spot

is not triangular but elongated. There was a line of pigment-cells extending along the posterior part of the upper half of the handle of the malleus. The tensor tympani muscle was not more atrophied than is usual in extreme old age; and when it was drawn in the direction of its course, the membrana tympani moved nearer to the promontory than usual. The mucous membrane of the tympanum was not thicker than natural, but several bands of adhesion connected the posterior part of the stapes and the long process of the incus to the margin of the mastoid cells. The malleus and incus were in a normal state, except that the orbicular process was perhaps slightly expanded. The chief deviation from the normal state was observable in the stapes; the articular process, like that of the incus, was perhaps slightly flattened: the outer half of the anterior crus had its usual translucent appearance, but the inner half is white like enamel, the line of separation between the healthy and diseased parts being very defined. Near to the point which is usually attached to the base the anterior crus was observed to have a free extremity, which was separated from the base itself by a thick, soft, whitish tissue. The base projected slightly into the cavity of the vestibule, and was somewhat rounded. Left ear. The petrous bone is very light. The wall of the mastoid cells, to which the sterno-mastoid muscle was attached, is so thin as to be translucent; and upon tearing from its surface the fibres of the muscle portions of the bone as thin as paper were removed and the cavity of the cells was exposed. The membranous meatus was so atrophied that it could not, at the posterior part, be detected; the epidermis at that point covered the bone. Membrana tympani more concave than natural; instead of the usual triangular spot there was a narrow bright line around the anterior three-fourths of the membrane, which corresponds with the change of direction from the flat part near the circumference to the concave part at the centre. The malleus was rather more moveable than usual, and the membrana tympani perhaps rather more relaxed. The upper wall of the tympanum was very thin, and in parts the bone was absent: the tensor tympani muscle was large, strong, and natural. The mucous membrane of the tympanum was rather thicker than natural, the malleus and incus normal. The crura of the stapes were only connected to the base through the medium of a thick membrane. The free extremities of the crura were rounded, and had not the appearance of a recent fracture. The base of the stapes was larger and thicker than natural, and projected slightly into the cavity of the vestibule. It was white like enamel, and the bone forming the inner wall of the vestibule had, near to the base of the stapes, undergone a similar change.

There was a very faint line, which indicated the point of distinction between the two parts. *History*.—J. C.—, æt. 86. At the age of forty dulness of hearing gradually came on and increased until the age of sixty, when he was obliged to have recourse to a speaking-trumpet. By means of this trumpet he could hear a loud voice.

2436. Right ear. The meatus contained cerumen. The membrana

2437. tympani was less moveable than natural, and became more and more rigid as it was pressed inwards, until it felt like a piece of solid bone. The tensor tympani muscle was atrophied. The stapes was firmly fixed to the fenestra ovalis; the base, seen in the vestibule, was white like ivory; the posterior half of the base was expanded and projected into the vestibule; the anterior half was on a level with its walls. The membrane of the fenestra rotunda was much thickened; the membranous vestibule was atrophied. The fluid of the cochlea was more opaque than natural, and floating in it were observed rounded globules of the size of peas, and blood discs. In the cochlea was a large quantity of black pigment. The nerve was somewhat atrophied. Left ear. In the same state as the right ear, except that the base of the stapes did not bulge into the cavity of the vestibule, but the line around its circumference was perceptible. The cochlea did not contain so much black pigment; the membrane of the fenestra rotunda was not so thick. The membrana tympani was more concave than natural. *History*.—Male æt. 84. Was wounded in the head at Trafalgar in 1805. Two days afterwards he felt very deaf, and a permanent deafness gradually ensued. For twelve years preceding his death, in 1852, he had been so deaf that he could only hear a shout close to the left ear.

2438. From a man æt. 68. Right ear. The stapes is so firmly attached

2439. to the fenestra ovalis that it requires considerable pressure to move it. The base is somewhat expanded. Left ear. The stapes is less firmly fixed.

2440. From a man æt. 63. Entirely deaf in the right ear. Could only

2441. hear a shout with the left ear. Right ear. Membrana tympani destroyed, except a very narrow strip at the upper and posterior part, to which the body of the malleus is attached. The long process of the malleus is absent, the head articulates with the incus; the inferior extremity of the incus is absent so that it does not articulate with the stapes. Mucous membrane of the tympanum thick, concealing the ossicula. The base of the stapes projects slightly into the cavity of the vestibule. Left ear. The membrana tympani, with the exception of a small portion anteriorly, about a line in diameter, is of a yellowish-white colour, very thick and quite hard; the upper half is firmly adherent to the

- promontory. The tympanum is nearly full of the same calcareous matter into which the membrana tympani is converted. The malleus and incus are firmly pressed against and fixed to the promontory. The stapes is completely ankylosed.
2442. From a man æt. 71. Right ear.—The membrana tympani contains a crescentic deposit of calcareous matter near its inferior and anterior border. Stapes completely ankylosed.
2443. From a man æt. 71. Right ear. Stapes more fixed than natural.
2444. Left ear. Stapes fixed; lower wall of tympanum imperfect.
2445. From a man æt. 69. Right ear. The tympanum contains numerous bands of adhesion. The stapes was more fixed than natural.
2446. Left ear. Stapes partly fixed; base expanded. The cochlea contained an excess of pigment.
2447. From a man æt. 76, who had been becoming slowly dull of hearing for a long time. Right ear. Membrana tympani white like parchment, and more concave than natural. The stapes is so fixed that when the base is pressed upon it can only just be made to move. Bands of adhesion of considerable firmness connect the ossicula with various parts of the tympanum. Left ear. In the same state as the right, except that there are only two or three delicate threads of adhesion connecting the stapes to the canal for the portio dura nerve.
2448. From a man æt. 77. Deaf in the right ear. Right ear. Membrana tympani mottled; transparent in one or two parts, but white and leaden at others. Tympanum filled by mucus. Stapes ankylosed.
2449. From a man æt. 71. Right ear. The meatus contained pus.
2450. The anterior part of the membrana tympani is absent, the posterior part is disorganised, fallen in, and attached to the promontory. The upper part of the tympanum was full of thick membrane and dark purulent matter. The malleus is drawn inwards to the promontory; its lower part is absent. The incus is disarticulated from the stapes and pressed upwards. Stapes firmly fixed. Left ear. A dark-coloured matter resembling blood occupied the tympanum, and was also found on the floor of the fossa auditoria interna. The stapes is fixed. The tympanum contains bands of adhesion.
2451. From a man æt. 80, deaf. In each ear the fibrous layers of the membrana tympani are very thick and yellow; the membrana tympani is very concave. The tympanum is full of thick mucous membrane and mucus. In the left ear the stapes is ankylosed.
2452. From a man æt. 68. In each ear the base of the stapes is fixed much more firmly than natural; the tympanum contains bands of adhesion, and the membrana tympani and malleus, on being pressed, moved much less than usual.
2453. From a man æt. 71. The stapes is more fixed than natural. The malleus and incus are connected by a broad firm band of adhesion.
2454. From a man æt. 71. The stapes is more fixed than natural. The malleus and incus are connected by a broad firm band of adhesion.

2457. From a man æt. 63. The stapes is ankylosed in each ear ; other-
 2458. wise healthy.
2459. From a man æt. 80. Right ear. Stapes more fixed than natural.
 The lower wall of the meatus was partially absorbed.
2460. From a man æt. 74, deaf. In each ear the Eustachian tube was
 2461. much larger than natural, and the base of the stapes projected
 into the cavity of the vestibule.
2462. Right ear. The fibrous laminae of the membrana tympani are
 2463. much thickened. Bands of adhesion connect the membrana
 tympani, ossicles, and promontory. The base of the stapes is
 expanded, and more fixed than natural. Left ear. Membrana
 tympani thickened ; bands of adhesion in the tympanum.
 Base of the stapes white, expanded, and ankylosed. The
 meatus externus on each side is partly absorbed from the pres-
 ence of cerumen. *History*.—Male æt. 77. He first became deaf
 forty-two years before his death, when, being somewhat deaf
 from a cold, he was engaged in a naval action, after which the
 deafness was much increased. Since that time it had become
 worse, being increased by colds. He suffered from noises
 in both ears. He felt cracking in them when he blew his nose.
 Two years before his death he could hear the click of the
 finger-nails with each ear, but could hardly distinguish the voice
 with the left ear.
2464. Left ear. Membrana tympani much thicker, more opaque and
 rigid than natural ; the mucous membrane of the tympanum
 thick. The chain of bones is almost as fixed as if it consisted
 of but one, having two fixed extremities. The base of the
 stapes is firmly ankylosed. Upon looking at the base of the
 stapes from the cavity of the vestibule it is observed to have its
 natural colour, but the adjacent wall of the vestibule is white
 and thick, and projects, in the form of two curved lines, into
 the vestibule, one above and one below, the lower one being
 the larger. *History*.—Male æt. 74. Forty-five years ago he was
 rendered very deaf by the report of a cannon. He remained
 so for fourteen days ; the left ear then partially recovered,
 but he has never heard with the right ear since. He could
 only hear a loud voice close to the left ear. Had sometimes
 "terrible noises." Was worse during a cold.
2465. Right ear. The meatus contained cerumen. Membrana tympani
 2466. thick, white, concave, tense ; its inner surface is firmly adherent
 to the long process of the incus. The stapes is firmly fixed by
 membranous ankylosis. The mucous membrane of the
 tympanum is much thicker than natural ; bands of adhesion
 occupy the tympanic cavity. Left ear. In the same condition
 as the right ear, but the stapes is less firmly fixed. *History*.—
 Male æt. 71. Became deaf six or seven years before his death,
 after a cold. He requires speaking to in a loud voice ; can hear

the click of the finger-nails with each ear. After coughing or sneezing the left ear opens, and he hears better for ten minutes or a quarter of an hour, then it closes again; has sometimes singing in the ears.

2467. Right ear. The meatus contained cerumen. The membrana

2468. tympani is large, opaque, concave, and less tense than natural; the concavity is produced by the falling in of the central three-fourth of the membrane; the external fifth is flat, and on the usual plane. The stapes is rigid. Left ear. Membrana tympani very concave, the central part drawn in to the shape of a trumpet. Upon drawing the tensor tympani muscle the membrana tympani moves, but less than usual, and the stapes is not in the least affected. The base of the stapes is firmly fixed to the fenestra ovalis, so that upon making a section a portion of its base was removed with the wall of the vestibule.

History.—Male æt. 77. Deaf for twenty years; cause assigned, a cold; was worse during a cold. Could hear a loud voice with the right ear; on the left side required shouting into the ear.

2469. Right ear. The meatus contained hard cerumen. The stapes

2470. not so moveable as natural; the membrane around the base apparently rigid. Left ear. Meatus distended, and partially absorbed by the presence of hard cerumen. The stapes was not so moveable as natural, although the membrana tympani and incus moved as freely as usual, the orbicular process moving over the head of the stapes without that bone participating in the motion. The anterior two-thirds of the base of the stapes on its vestibular aspect is surrounded and partly concealed by a narrow ring of bone, which has an appearance like ivory. *History.*—Male æt. 80. Twenty years ago he became dull of hearing during a cold; had not become worse during the six years preceding his death. He required to be spoken to in a loud voice near him; heard about equally well with each ear.

2471. Right ear. The base of the stapes was so firmly fixed in the fenestra ovalis that it required considerable pressure to move it. The other parts of the organ were healthy. The left ear was in the same state. *History.*—Male æt. 71. Became deaf in the left ear forty years ago from cold. Can just hear the click of the finger-nails with it. Had been deaf in the right ear about fifteen years; could only just hear a shout. Was subject to a roaring noise in the head.

2472. Right ear. Membrana tympani opaque, especially in parts.

2473. The handle of the malleus was fixed, so that pressure upon it by means of a probe scarcely moved it. The stapes was firmly ankylosed by bone to the fenestra ovalis; the central part of the base is of the natural appearance and thickness,

but the portion at the circumference is as white as ivory, and projects into the vestibule further than natural. The inner surface of the vestibule, for the space of a quarter of a line around the base of the stapes, is also of an ivory whiteness. The membrane of the fenestra rotunda is rather thicker than natural. Left ear. Membrana tympani opaque, mottled; malleus nearly fixed. The base of the stapes is firmly ankylosed by bone to the fenestra ovalis. The surface of the bone looking towards the base is completely buried in a mass of ivory-like matter, which also extends a full line around it and projects into the vestibule. The tensor tympani muscle was atrophied. The membranous labyrinth was atrophied. The nerve filaments on the surface of the lamina spiralis were not distinct, and appeared to be undergoing fatty degeneration. *History*.—Male æt. 79. Had been deaf since being engaged in a naval action, thirty-two years before his death. He was entirely deaf for six weeks recovering partially after that time. Two years before his death he required shouting into the right ear, and could hear nothing with the left.

2474. From a man who was very deaf. Left ear. Stapes ankylosed.

2475. Right ear. The posterior half of the membrana tympani is absent; the remaining portion is thick, white, and tense; at the centre of it there is a portion about half a line in diameter, in which the epidermoid, dermoid, and mucous laminæ only remain: around the margin it is degenerated into earthy matter. The mucous membrane of the tympanum was not thicker than natural, nor was there any discharge. The long process of the incus is absent. The crura of the stapes are absent: the base is partially ankylosed and expanded. The membranous labyrinth was atrophied. The left ear was in a similar state. *History*.—Male æt. 80. Had been absolutely deaf for sixteen years before his death. The cause assigned was thunder on the coast of Guinea.

2476. Right ear. Membrana tympani, the fibrous layers are cartilaginous at the external part. Bands of adhesion connect the body of the incus to the mastoid cells, and the stapes to the surrounding bone. The base of the stapes is more fixed than natural, being ankylosed apparently by thickening, and increased tenseness of the capsular ligament. The perilymph of the labyrinth and cochlea was turbid and of a red colour. The mucous membrane of the faucial extremity of the Eustachian tube was thick and congested. *History*.—Male æt. 75. Became deaf during a cold about seven years before his death, and was always much worse when he had a cold. Two years before his death he required to be spoken to in a loud voice; he could hear the click of the finger-nails with each ear. He was not subject to noises in the ears or head.

2477. Left ear. Meatus distended by cotton wool. Membrana tympani tense. Malleus so fixed that upon being touched it felt quite rigid. The stapes firmly ankylosed. The otoconie is very abundant, and besides it there are crystals of carbonate of lime, which form almost a shell within the vestibule. The right ear was in a similar condition. *History*.—Male æt. 64. Had been more or less deaf for fifty years. For eighteen months at least before his death he had been quite unable to distinguish a single word.
2478. Right ear. Stapes not so movable as natural. Left ear. Stapes partially ankylosed; surrounded by membranous bands.
2479. Cochlea congested. *History*.—Male æt. 68. Two years before his death he was able to hear a watch only upon contact with the ear. He had suffered from noises in the head, which were relieved by the removal of cerumen from each meatus. The affection of the ears was attributed to his having fallen overboard, while at sea, many years previously.
2480. From a man who was deaf. In each ear the stapes is ankylosed;
2481. a band of adhesion connects the handle of the malleus to the long process of the incus.
2482. From a woman æt. 26, who died from acute tuberculosis: she
2483. was deaf. Right ear. The membrana tympani contains two patches of calcareous deposit. The stapes is firmly united to the fenestra ovalis by membranous ankylosis. Bands of adhesion connect the handle of the malleus to the head of the stapes, and the crura of the stapes to the promontory. Left ear. The base of the stapes is expanded, and firmly ankylosed. There is a deposit of a calcareous matter at the superior and anterior part of the membrana tympani. The long process of the incus is connected to the malleus and the membrana tympani by a broad band of adhesion.
2484. The stapes is partially ankylosed in each ear. In the right ear
2485. the crura have been broken from the base. *History*.—Male æt. 82. Had been deaf for six or seven years; had become so gradually after a cold; was worse during a cold. Had constant noises in the ears, and a rattling sound when he gawned or sneezed. Two years before his death, he required to be spoken to in a loud voice near him; he could hear the click of the nail with each ear; the right ear was the worse.
2486. Right ear. The membrana tympani is fallen in, so that the long process of the malleus is in contact with the promontory: it is also connected to the promontory by bands of adhesion. There appears to have been ulceration of the fibrous laminæ, and the remaining fibres have fallen inwards. The membrana tympani is thick and white, and contains a calcareous deposit anteriorly. The inferior extremity of the incus is in contact with it, and projects at the posterior part. The stapes is

firmly ankylosed. The membrane of the fenestra rotunda is very thick. In the left ear the stapes was partially ankylosed, and the chain of bones rigid. *History*.—Male æt. 67. Had been very deaf for fifteen years, since an attack of scarlatina. About a year before his death he could only distinguish the loudest voice close to either ear. Suffered from singing noise in the head.

2487. From a man æt. 68, who was very deaf. Right ear. Membrana

2488. tympani very concave at the central part; it is also very thin and transparent, except at the circumference, which is occupied by a narrow white band of great thickness. The lower third of the handle of the malleus is separated from the membrana tympani. The mucous membrane of the tympanum was thick and red, the mastoid cells full of mucus. Stapes firmly ankylosed. Left ear. The larger part of the membrana tympani destroyed; stapes ankylosed.

2489. Right ear. Membrana tympani large, concave, opaque, the

2490. incus and malleus partly ankylosed, drawn in, and pressing on the stapes, which is also partly ankylosed. Left ear. Membrana tympani thick and opaque; there is an orifice at the central part about the size of a pea. The incus and malleus are drawn in and connected by bands of adhesion. The stapes is completely ankylosed. *History*.—Male æt. 83. Had been deaf in the left ear since childhood; the deafness was at first accompanied with a discharge. For several years he had been deaf in the right ear also. About a year before his death he was only able to hear a loud voice close to either ear.

2491. Right ear. Membrana tympani large, white and thin. Chain of

2492. bones rigid; the stapes firmly ankylosed by membrane. Bands of adhesion surround the stapes. Tensor tympani muscle atrophied. Left ear. The fibres of the membrana tympani are separated in parts, as if there had been an orifice. In other respects it presents the same condition as the right ear. *History*.—Male æt. 78. He first became deaf after a cannonade at sea at the age of thirty-four. For six months he was quite unable to hear, but afterwards partly recovered. He was much worse during a cold. About three years before his death he was able to hear a click of the finger-nails with the right ear, but not with the left.

2493. In each ear the membrana tympani is concave and in parts

2494. opaque. The chain of bones is more rigid than natural, the stapes firmly fixed to the fenestra ovalis. In the right ear the ossicula are connected together by bands of adhesion. *History*.—Male æt. 75. Had been deaf for ten or twelve years, after a bad cold in the head. He was confined to his bed for some time, and never heard with the right ear since. At the same time he became as deaf in the left ear as he was two years before his death, when he could only hear a shout close to the ear. He suffered from a buzzing in the head.

2495. In each ear the membrana tympani is opaque, and the stapes is
 2496. firmly ankylosed to the fenestra ovalis, a result which seems to be caused by an expansion of the base. *History*.—Male æt. 89. Had been growing gradually deaf for twenty-five years. The deafness was worse during a cold, but did not commence from one. He never had pain in the ears, but had ringing noises in them at times. Four years before his death he was able to hear the click of the finger-nails well with the right ear, and, on pressure, with the left.
2497. Base of the stapes expanded. From the right ear of a man æt. 80, who had been slowly growing deaf for about twenty-two years. He had a rumbling noise in the head. There was an orifice in the membrana tympani. He required to be spoken to loudly, and could just hear the click of the finger-nails.
2498. Stapes surrounded by thickened membrane. It was more firmly fixed than natural, and there were bands of adhesion in the tympanum. From a man æt. 66.
2499. Stapes partially ankylosed to the fenestra ovalis by rigidity of the connecting membrane.
2500. Stapes fixed more firmly than natural. The mucous membrane of the tympanum very thick.
2501. A stapes, the base of which was adherent to the fenestra ovalis.
2502. Stapes ankylosed; base completely hidden by thick bands of adhesion.
2503. Stapes ankylosed.
2504. Deaf and dumb; stapes ankylosed.
2505. } Stapes ankylosed by rigid membrane.
 2506. }
2507. From a man æt. 30, who died from injury to the spine. Partially deaf as long as he could remember. Right ear. The mucous membrane of the tympanum and the membrana fenestræ rotundæ are thickened. The stapes is connected to the tympanic walls by bands of adhesion; it extends further than usual into the vestibule, so that but small portions of its crura are visible. Its base is expanded and adherent to the margin of the fenestra ovalis, with which there is a partial interossification. The membrane lining the vestibule was much thickened. The superior semicircular canal was unusually prolonged and ovate in form. The left ear was in a similar condition.
2508. Stapes completely ankylosed. A large deposit of calcareous matter occupies the anterior portion of the membrana tympani.
2509. Stapes attached to fenestra ovalis more firmly than natural;
 2510. the crura have separated from the base.
2511. Ankylosis of the lower margin of the base of the stapes to the fenestra ovalis. The lower wall of the tympanum is translucent and perforated.

2512. Stapes adherent by bands to the fossa fenestra ovalis.
2513. Stapes partially ankylosed to the fenestra ovalis; base denser
2514. than natural.
2515. Stapes ankylosed. Membrana tympani thick, and containing
2516. calcareous deposit. *History*.—Male æt. 78. Had been becoming gradually deaf for six or seven years, and had been very deaf so as to require shouting to for two or three years. Worse during a cold.
2517. From a man æt. 68. Left ear. Stapes fixed more firmly than natural. In the right ear the stapes was completely ankylosed.
2518. From a man æt. 67. Deaf, but only to a moderate degree. Right ear. Stapes partially ankylosed; the cartilage surrounding the base seemed to be expanded. Numerous bands of adhesion connected together various points of the tympanum. The malleus was very firmly fixed, the membrana tympani more concave than natural. The left ear was in a similar state.
2519. From a woman who died of acute tuberculosis. Right ear. Stapes ankylosed. Membrana tympani slightly opaque and concave.
2520. From a woman æt. 68, who died from pericarditis. Left ear. Stapes partially ankylosed. In the vestibule the quantity of otoconie was much larger than natural. A band of adhesion connects the long process of the malleus to the incus. In the right ear the stapes was firmly ankylosed. The tympanum contained mucus.
2521. From a man æt. 44, deaf. The base of the stapes in each ear is
2522. expanded. The mucous membrane of the tympanum thick.
2523. Stapes ankylosed.

B.—DISEASES OF THE MALLEUS.

2524. A small exostosis grows from the inner surface of the neck of the malleus, which is adherent to the internal wall of the tympanum. The fenestra rotunda is covered by bands of adhesion, which also almost entirely conceal the stapes.
2525. Malleus and incus ankylosed together.
2526. Exostosis in the tympanum, surrounding the neck of the stapes, apparently a morbid development of the malleus and incus, which were not to be distinguished. From a man æt. 80, requiring a loud voice.
2527. From a man æt. 76. Right ear. The handle of the malleus more curved than natural. Sulcus lateralis rough.
2528. From a man æt. 72. The membrana tympani is very concave. Broad bands of adhesion, which completely cover the incus, connect all the ossicula to the inner wall of the tympanum. The inferior extremity of the malleus has been fractured, and is partially separated from the long process.

2529. The handle of the malleus carious. From a youth æt. 10. Effect of scarlatina.
2530. Caries of malleus and incus from scarlatina.

C.—DISEASES OF THE INCUS.

2531. The short process of the incus and a portion of the mastoid cells carious.
2532. Membrana tympani very thick, almost resembling bone. Incus partly absorbed; os orbiculare absent.
2533. From a woman æt. 50, blind and insane; deaf in the left ear. Right ear. The incus disconnected from the os orbiculare, the latter being attached to the stapes.
2534. From a man æt. 19, who died of apoplexy. He was deaf in the left ear. Left ear. The membrana tympani contains calcareous deposit. Both processes of the incus are partially absorbed. The mucous membrane of the tympanum was very thick. The right ear was healthy.
2535. From a man æt. 67. Right ear. Incus and stapes.
2536. Portion of the incus removed six months after an attack of scarlatina.
2537. From a boy æt. 5, who died from scarlatina. Left ear. The os orbiculare is separated from the incus and attached to the stapes, which is fixed to the fenestra ovalis more firmly than natural. The tympanum contained mucus; lymph was also effused, and bands of adhesion between the membrana tympani and the inner wall of the tympanum were in process of formation.
2538. From a boy æt. $3\frac{1}{2}$, who died from dysentery. The incus extended more posteriorly towards the mastoid cells than usual, and was disconnected from the stapes. The os orbiculare was absent.
2539. The neck of the stapes was covered by thick mucous membrane, and there was no appearance of an articular surface for the incus. The membrana tympani was of a dark leaden hue, and much flatter than natural.
2540. The incus from the left ear of the preceding case.
2541. The incus and stapes from the left ear of a man æt. 79, who died from disease of the brain; he was dull of hearing. The stapes was firmly ankylosed to the incus.
2542. Three specimens of the incus affected with caries; in one the larger part of the body of the bone is destroyed; in the other two the surface roughened.
2543. An incus with the long process absent. No history.

D.—DISEASES OF THE STAPES.

2544. The incus and stapes from the right ear of a man æt. 65. The os orbiculare was disconnected from the incus and firmly ankylosed to the stapes.

2545. From a man æt. 60, who died from apoplexy; he was partially deaf in both ears. Left ear. The base of the stapes is expanded. The fibrous and mucous laminae of the membrana tympani are thickened and opaque. The mucous membrane of the tympanum was thick; the tympanum contained bands of adhesion and caseous matter.
2546. The stapes from the right ear of a woman æt. 26, who died from pneumonia; slightly deaf at times. It is larger than natural.
2547. From a man æt. 66. The base of the stapes in each ear is slightly-
2548. expanded, so that it could not be easily withdrawn from the fenestra ovalis. The membrana tympani in each ear was thickened; the mucous membrane of the tympanum was healthy.
2549. The stapes from each ear of a man æt. 80, who had been deaf for twenty years, since a severe cold. He could hear the watch on contact with each ear; was worse during a cold. The base of each stapes is thicker than natural. Right ear. Bands of adhesion surrounded the stapes and incus, and the former was more fixed than natural to the fenestra ovalis; its crura were atrophied. Left ear. Stapes partially ankylosed; one of the crura was separated from the base in the attempt to detach it, which was not effected till the vestibule was laid open. Each meatus contained cerumen.
2550. In each ear the base of the stapes is expanded, thick and dense, and adhered to the fenestra ovalis with considerable firmness. The fluid in each vestibule was deficient in quantity, and in the right ear large blood-vessels were observed to ramify in the periosteum. *History.*—Male æt. 78. Had been deaf for about twelve years, occasioned by hammering in an iron foundry. He could hear the click of the finger-nails; required to be spoken to in a loud voice; was worse during a cold. Had a ringing noise in the ears, especially the left when he shook his head.
2551. Base of stapes hypertrophied.
2552. Neck of stapes covered with thick mucous membrane, with no articulating surface for the incus.
2553. The stapes of the right ear in the same case as the preceding, in a similar condition.
2554. The crura of the stapes detached from the base, which was left adhering to the fenestra ovalis.
2555. Stapes from a tympanic cavity having carious walls. Crura hypertrophied.
2556. A stapes surrounded by thickened mucous membrane and by bands of adhesion.
2557. Stapes; investing membrane thickened.
2558. Mucous membrane of the tympanum thick and attached to the stapes.

2559. }
 2560. } Stapes resting upon and adherent to the promontory.
2561. Stapes entirely surrounded by firm bands of adhesion.
2562. Stapes ankylosed; the posterior extremity of the base projects more than natural into the vestibule.
2563. A stapes greatly hypertrophied, the space between the crura being very much diminished.
2564. A stapes smaller than natural. The base and crura are disproportionately thick, the neck partly carious.
2565. A stapes, the crura connected by false membrane.

SERIES VII.—MASTOID CELLS.

A.—*HYPERTROPHIED.*

2566. }
 2567. } Specimens of the mastoid cells, remarkably large.
2568. Mastoid cells very large, the external plate of the mastoid process so thin as to be translucent.

B.—*ATROPHIED.*

2569. Mastoid process small and dense, presenting very little cellular
 2570. structure.

C.—*CONTAINING CHOLESTERINE.*

2571. From a man æt. 50. Left ear. The mastoid cells are separated from the tympanum by a broad false membrane, and the anterior portion is lined by a thick membrane of dark colour, the surface of which is covered by a shining metallic-looking substance, which under the microscope was found to consist of crystals of cholesterine. The membrana tympani is destroyed except a small semicircular portion at the upper and posterior part. Bands of adhesion connect the malleus and stapes to the inner wall of the tympanum.
2572. Cholesterine from the foregoing case.
2573. From a man æt. 64. Right ear. Membrana tympani very concave, white like parchment, and thick. The tympanum contained some muco-serous fluid, with numerous bands of adhesion; the mucous membrane was thick. The mastoid cells were hollowed out, and contained muco-serous fluid of a dark greenish colour, and containing crystals of cholesterine. Blood was effused around the auditory nerve at the floor of the internal meatus. The cochlea was also full of a dark coloured fluid. Left ear. In the same state, but the stapes was also ankylosed.
2574. Cholesterine from the foregoing case.

D.—MUCOUS MEMBRANE THICK.

2575. From a woman æt. 60, who died from fever. Not deaf. Left ear.
A portion of very thick mucous membrane from the mastoid cells. The membrana tympani was perforated.

E.—CONTAINING BANDS OF ADHESION.

2576. } Firm bands of adhesion occupying the mastoid cells.
2577. }

F.—CARIOUS.

2578. Two portions of carious bone from the mastoid cells.
2579. Two large portions of carious bone from the mastoid process.
2580. A small necrosed portion of the mastoid process syringed from the ear of a boy æt. 6, twelve months after scarlatina.

SERIES VIII.—CAROTID CANAL.*A.—CONTINUOUS WITH THE EUSTACHIAN TUBE.*

2581. Showing the relations of the carotid canal to the tympanum.
2582. The layer of bone between the carotid canal and the Eustachian tube deficient for a space of a line and a half horizontally by a third of a line vertically.

B.—CONTRACTED.

2583. Right ear. Osseous meatus dilated by cerumen, the lower wall
2584. partly absorbed. Membrana tympani very opaque, thick, and more concave than natural. Superior wall of tympanum partly deficient. The tympanum contained a little thin mucus and several bands of adhesion. Stapes much more firmly fixed than natural, though not entirely immovable; the entire chain of bones unnaturally rigid. The membranous vestibule was rather thick and opaque. Left ear. Osseous meatus also dilated by cerumen. Membrana tympani concave, covered with exceedingly thick epidermis; the fibrous laminae are also thick. The roof of the tympanum was so thin as to be translucent; it was deficient in parts. Numerous bands of adhesion in the mastoid cells. The stapes was almost immovable from rigidity of its connecting membrane. In each ear the carotid canal is contracted.
2585. The internal carotid arteries from the preceding case. Each artery contains a calcareous deposit in its inner coat, and presents a puckered appearance about the middle of its course through the petrous bone. *History.*—Male æt. 76. Had been

- dull of hearing for thirty years. For twenty years he could only hear a loud voice close to the right ear.
2586. The internal carotid artery. It was less than half the size of that of the opposite ear.
2587. A large, sharp, bony growth in the lateral sinus, and smaller growths of a similar character in the carotid canal.
2588. From a man æt. 26, who died from a syphilitic disease of the cranial bones, pericranium, and dura mater. He was deaf, especially in the right ear. The deafness was much increased during an attack of erysipelas. The whole surface of the cranium was rough. The carotid canal in each ear is greatly contracted at the lower part, so as to present a shape nearly resembling that of a balloon. The contraction is caused by projection of the lateral walls, and occupies the angle and part of the horizontal portion of the canal. Right ear. Membrana tympani very soft and opaque. Mucous membrane of tympanum thicker and more vascular than natural. A band of false membrane, nearly half an inch in length and half a line in breadth, extends from the mastoid cells to the neck of the stapes. This band is soft and very vascular. Bands of adhesion also connect the stapes with the walls of the tympanum. The entire petrous portion partakes of the disease with which the skull generally was affected. Left ear. Membrana tympani very thin and soft. The mucous membrane of the tympanum is very vascular and rather thick. Large vascular and soft bands of adhesion connected the membrana tympani and ossicula with the internal walls of the tympanum and with the stapes. The mastoid cells contained a quantity of mucus, and also some smooth portions of bone lying in the cavity and attached to the mucous membrane.
2589. Left ear. There is a small bony growth, about the size of a mustard seed, on the internal wall of the carotid canal, in the situation of the angle. The membrana tympani is fallen in, and adherent to the internal wall of the tympanum throughout nearly its entire extent; the handle of the malleus and the neck of the stapes are seen as projections at the bottom of the meatus. The mucous membrane of the tympanum is much thickened around the heads of the malleus and incus, which are movable. The base of the stapes is fixed.
2590. Carotid canal contracted by bulging of the lateral walls. Membrana tympani containing a deposit of osseous matter.
2591. From a man æt. 40. The carotid canal slightly contracted.
2592. The horizontal portion of the carotid canal is much contracted, the contraction being produced by the presence of a rounded protuberance of the bone at the inner and outer surface of the lower half of the canal. The membrana tympani thick, opaque, and more concave than natural.

2594. Specimens showing contraction of the carotid canal. In each
 2595. case the contraction is produced by more or less protuberance
 of the lower portion of the lateral walls in the angular and
 horizontal portions of the canal.

SERIES IX.—INTERNAL EAR.

A.—VESTIBULE AND SEMICIRCULAR CANALS.

2596. From a man who was very deaf. Right ear. The tympanum and
 vestibule were full of blood.
2597. From a man æt. 20. Subject to epilepsy. Exostoses of small
 2598. size grow from the posterior surface of each petrous bone, and
 from the upper surface of each meatus internus. The meatus
 internus of the left ear is reduced to one half its natural size.
2599. The fenestra ovalis is surrounded by an exostosis or additional
 deposit of bony matter, the margin being thickened and of a
 pearly white colour. The lower wall of the tympanum is
 deficient in nearly half its extent.
2600. An exostosis in each tympanic cavity, partially filling up the
 2601. fenestra ovalis, so that it is no longer oval, but of a triangular
 shape, and its size is reduced by a full third.
2602. An exostosis in each tympanic cavity, partially filling up the
 603. fenestra ovalis.
2604. Exostosis in the tympanic cavity, slightly diminishing the fenestra
 ovalis; the floor of the tympanum partly deficient.
2605. Exostosis in the tympanic cavity surrounding and diminishing the
 fenestra ovalis. Floor of the tympanum deficient to a small
 extent.
2606. Exostosis in the tympanic cavity diminishing the fenestra
 ovalis; the floor of the tympanum imperfect; the external
 meatus very large.
2607. Exostosis in the tympanic cavity around the anterior part of the
 fenestra ovalis. The anterior wall of the external meatus
 diseased.
2608. Fenestra ovalis diminished and rendered irregular in form by an
 exostosis in the tympanic cavity.
2609. Otoconie more abundant than natural.
2610. Left ear. A portion of the membranous vestibule thickened.
 The stapes was ankylosed, the mucous membrane of the
 tympanum thick, and the cochlearis muscle hypertrophied.
 Deaf.
2611. The osseous superior semicircular canal deficient at its upper
 2612. part, the cavity of the canal being open for an extent of about
 three lines.
2613. From a man æt. 64. Right ear. The upper wall of the tym-
 panum and of the superior semicircular canal imperfect. The
 left ear was well formed and healthy.

2614. From a man æt. 65. Right ear. The upper wall of the superior semicircular canal is deficient for the extent of about a line.
2615. From a man æt. 92. Right ear. The posterior semicircular
2616. canal is incomplete, its posterior wall being deficient for extent of about three lines. Stapes ankylosed. Left ear. Stapes ankylosed. The membranous labyrinth and cochlea contained black pigment.
2617. Left ear. Membranous semicircular canal atrophied. The membrana tympani was white and collapsed; the tensor tympani muscle atrophied.
2618. Membranous semicircular canals from a man æt. 74, who had been deaf some years.
2619. The cochlea from the same case, containing pigment cells.
2620. Semicircular canal distended with otoconie. Deaf and dumb.
2621. Portion of a semicircular canal with its ampulla hypertrophied.
2622. Otoconie in excess in the semicircular canals. From a young woman deaf and dumb.
2623. The same. From the same case.

B.—COCHLEA.

2624. Cochlea containing coagulated blood.
2625. } Left ear. Portions of the cochlea containing pigment-cells.
2626. }
2627. Cochlea containing pigment.
2628. Two specimens of the cochlea containing an excess of pigment-cells.
2629. Cochlea containing black pigment.
2630. Cochlea containing black pigment.
2631. A portion of the cochlearis muscle enlarged. From a man æt. 48, deaf.
2632. A portion of the cochlearis muscle enlarged. From the same case as the preceding.
2633. Cochlearis muscle enlarged. From the same case.
2634. The scala vestibuli at and near its entrance into the cavity of the vestibule is much smaller than natural. The stapes is surrounded by bands of adhesion.
2635. A large portion of the cochlea necrosed. It was discharged during life from the ear of a man æt. about 55. The disease of the ear appeared to originate in an attack of erysipelas of the head. There were no symptoms of affection of the brain.
2636. In each ear the cochlea was in a state of degeneration, the lamina
2637. spiralis presenting dark patches under the microscope as if from old effusion of blood. No deviation from the healthy state was observed in the vestibule. The membrana tympani thin, white, relaxed, concave at the central part, the margin for the width of three-quarters of a line having its normal outline. The ossicula rather less mobile than natural. Numerous bands

of adhesion occupy the mastoid cells. *History*.—Male æt. 65. Thirty-three years before death he fell on his head (he was a sailor), and has been deaf ever since. His hearing power varied somewhat, being worse during a cold. He could never distinguish words, but could sometimes hear the sound of a loud voice. He suffered from headache and giddiness.

C.—FENESTRA ROTUNDA.

2638. The membrane of the fenestra rotunda thickened. From a woman æt. 30, who died from fever, having been very deaf for five days previous to death. There was a considerable quantity of mucus in the tympanum; it was white, and consisted of circular cells covered by fine granules. The mucous membrane of the tympanum was so thick that the stapes and incus were entirely concealed. It was red and pulpy, and so firmly adherent to the membrane of the fenestra rotunda that they could not be separated.
2639. The membrane of the fenestra rotunda thick and dark-coloured. The stapes was ankylosed.
2640. In each ear the membrana fenestræ rotundæ is thick and opaque.
2641. The ossicles are connected by bands of adhesion. *History*.—Male æt. 73. Had been growing deaf for six or seven years; sometimes, as during a cold, had a humming noise in the ears, not in the head; also at times a pain running up in the left ear. He could hear the watch with pressure.
2642. Right ear. The membrane of the fenestra rotunda is ossified,
2643. and covered in its cochlear aspect by a deposit of osseous matter. The vestibule and cochlea contained a sanguineous fluid, and their blood-vessels were greatly distended with blood. The base of the stapes is ankylosed to the fenestra ovalis, and projects farther into the vestibule than natural; a bony growth from the wall of the vestibule is attached to and fixes the base of the stapes. Mucous membrane of the tympanum thicker than natural. Membrana tympani opaque and concave. In the meatus externus, midway between the membrana tympani and the orifice, there is a bulging of the posterior osseous wall. Left ear. Vestibule and cochlea full of bloody serum. Membrane of the fenestra rotunda ossified, and covered with a deposit of osseous matter occupying the termination of the cochlea and extending into the vestibule. The bone forming the floor of the internal auditory meatus atrophied. Portio mollis nerve not seen. Stapes ankylosed. The membrana tympani and mucous membrane of the tympanum thick and vascular. The posterior wall of the meatus externus presents an osseous bulging. *History*.—Male æt. 56. Insane; so deaf that it was impossible to make him hear. Deafness hereditary, and also insanity on both father's and

- mother's side. It is not known whether he was born deaf; indeed, it is said that he was able to read, but a sister was born deaf.
2644. From a man æt. 67, who died from gangrena senilis. Right ear. The fenestra rotunda is entirely concealed by a false membrane, which is firmly attached to the entire circumference of the fossa fenestræ rotundæ.
2645. Left ear. At the lower part of the tympanic cavity there is a false membrane, in length about a line and a half, which completely conceals the fenestra rotunda. The false membrane is firm, and of a white colour. Bands of adhesion connect the stapes to the tympanic walls. *History*.—From a woman æt. 26, who died fourteen days after childbirth. She was very deaf in the right ear, and slightly so in the left. She had scarlatina when a child, and from that time had always a discharge from the right ear. The osseous walls of the right tympanum were diseased, and that portion which corresponds with the carotid canal was carious and perforated with small holes.
2646. Left ear. A false membrane covering the fenestra rotunda. Stapes ankylosed. Deaf.
2647. A false membrane completely covering the fenestra rotunda, being attached to the margin of its fossa. The stapes connected by bands of adhesion to the tympanic walls.
2648. Mucous membrane of the tympanum, thick, nearly burying the stapes. Fenestra rotunda entirely concealed.
2649. Membrana fenestræ rotundæ adherent by bands to the fossa fenestræ rotundæ.
2650. Membrana fenestræ rotundæ partially covered by a false membrane.
2651. Membrana fenestræ rotundæ completely covered by a false membrane, which also connects the stapes to the walls of the tympanum.
2652. Membrana fenestræ rotundæ entirely concealed by bands of adhesion.
2653. A smooth, transparent false membrane covering the fossa fenestræ ovalis.
2654. Membrane of fenestra rotunda thickened, stapes ankylosed. From a man æt. 83, deaf.

D.—AUDITORY NERVE AND MEMBRANOUS LABYRINTH.

2655. (See "Transactions of Pathological Society," 1850-51, p. 49.) Left ear. From a man æt. 60, partially deaf. A tumour of white colour and about the size of a small bean occupies the internal auditory meatus, and projects about a line beyond its

posterior border. It is of conical shape, the small end being at the anterior part of the meatus; its texture was firm posteriorly, and upon being cut into presented little but cellular tissue; anteriorly it was softer. It is attached to a portion of the nerve supplying the vestibule, the fibres of which pass through its anterior half. Under the microscope the tumour presented nerve tubes, parallel fibres, and nucleated cells. The right ear was healthy.

2656. From a woman who died from serous apoplexy, with aneurism of

2657. the basilar artery. She was quite deaf. Each auditory nerve atrophied. Dr. Van der Byl, under whose care the patient was, states "there was no pressure on the root of the nerve, but it seems probable that one of the small branches of the basilar artery to supply the internal ear was pressed upon, and in this way the nutrition of the organ may have been interfered with."

2658. From a woman æt. 70: had been hard of hearing during many

2659. years. Latterly it was with the greatest difficulty that the voice could be heard through a speaking-trumpet. Each petrous bone was of a dark plum-colour and somewhat expanded. Upon making a section, each portion, instead of possessing the usual hard and rock-like properties of this bone, was so soft that its exterior could be cut with a strong knife. The only part that retained the aspect and density of the healthy petrous bone was that portion which directly surrounds the vestibule, cochlea, and semicircular canals. Right ear. Membrana tympani thicker and whiter than natural; the surface of the incus is rough, parts of its outer layer having been absorbed; the stapes partly ankylosed. The auditory nerve atrophied, and less white than natural; the membranous labyrinth atrophied.

2660. From a man æt. 73, deaf for fourteen years. Right ear entirely

2661. useless. Left ear required shouting into the ear. Suffered from noises in the head. In each ear the membranous labyrinth was atrophied. Stapes partially ankylosed. Membrana tympani thickened and opaque.

2662. From a man æt. 74, who had been deaf for twenty years, occasioned

2663. by falling into the sea. For fourteen years he had only been able to hear a shout. In each ear the vestibule was full of aqueous fluid, but the membranous labyrinth was atrophied. Membrana tympani rather opaque; mucous membrane of tympanum rather thicker than natural; bands of adhesion surround the ossicula.

2664. From a man æt. 97, who had become gradually deaf many years

2665. ago. He was entirely deaf on the left side; could hear a loud voice close to the right ear. In each ear the membranous labyrinth appeared to be atrophied. Right ear. Pus was

effused among the muscles surrounding the styloid process, and some was contained in the meatus externus, the tissues of which, however, were themselves healthy. Membrana tympani thickened and opaque. Stapes more rigid than natural. Bands of adhesion in mastoid cells. Left ear. Meatus externus large. Bands in mastoid cells.

2666. From a man æt. 62, who had been deaf for twenty years. He

2667. required speaking to in a loud voice close to the head. Was worse during a cold. Right ear. Membrana tympani healthy, except a slight thickening at the point to which the extremity of the long process of the malleus is attached. Stapes ankylosed by thickening of the connecting membrane. Membranous vestibule much atrophied; there was no vestige of otoconie. Left ear. Membrana tympani quite red, arising from the effusion of serum of a dark red colour in the tympanum; it is very concave, the handle of the malleus being almost in contact with the promontory. Stapes partially ankylosed. The membranous labyrinth was so much atrophied that its presence was scarcely to be detected, it having become one with the periosteal lamina. The otoconie was absent. On the tympanic surface of the lamina spiralis of the cochlea external to the denticulate processes are dark granules, which are aggregated into a thick band beyond them. Beyond this thick band are transparent cells. The nerves distributed over the lamina spiralis appeared to be diseased, as they did not present any traces of the fine tubercles, but in their place were granules of various sizes.

E.—MEATUS INTERNUS.

2668. The basilar process of the occipital bone and the inner surface of the petrous bone present numerous depressions, with sharp margins, as if the bone had been ulcerated. The roof of the tympanum is imperfect, the meatus internus larger than natural.

2669. The meatus internus very large.

2670. The meatus internus very large.

2671. A large exostosis, with a rough protuberance, surrounding the upper part of the orifice of the meatus internus. Also a rough triangular exostosis on the upper part of the petrous bone near its junction with the squamous portion.

2672. An exostosis surrounding and diminishing the size of the meatus internus.

2673. The inner and posterior portion of each petrous bone, especially

2674. of the right, absorbed by the pressure of a tumour arising from the cerebellum. Each meatus externus rough.

SERIES X.—DISEASE EXTENDING FROM THE EAR TO THE BRAIN.

A.—EXTERNAL MEATUS.

2675. Caries of the external meatus extending to the middle cerebral cavity and lateral sinus ; upper wall of the tympanum healthy.
2676. From a woman æt. 16, who had had pain and discharge in the left ear for seven months, and died three days after the accession of acute cerebral symptoms. Left ear. The dura mater forming the posterior wall of the lateral sinus, where it is situated in the temporal bone, was of a dark colour and soft ; the sinus contained at its upper part a firm coagulum of dark-coloured fibrin ; at its lower part it was filled by dark pus. The anterior wall of the sinus was but loosely attached to the sulcus lateralis. The tympanic cavity contained a considerable quantity of serofulous matter, which, by its pressure on the posterior wall of the meatus, had produced a carious orifice in the bone. The membrana tympani was thick and soft, and on its outer surface were two dark-coloured polypi. (See "Pathological Society's Transactions," vol. v, 1853-4, p. 273.)
2677. There is a small orifice, about half a line in diameter, between the anterior wall of the meatus externus, near its outlet, and the cranial cavity. On the internal surface the bone, about the junction of the anterior wall of the petrous portion with the squamous portion of the temporal bone, is deeply excavated over a space the size of a horse-bean ; for half this extent there remains only the thin and translucent external plate.
2678. The meatus externus is rough, and the cancellous texture partially exposed, especially at the posterior and inferior walls. The lateral sinus is also rough, and presents, in a portion of its extent, a deep branching fissure.
2679. The external surface of the temporal bone has been destroyed, apparently by malignant disease, over a space extending from the root of the zygoma to the articulations of the parietal and occipital bones ; the cranial cavity is exposed in nearly the entire course of the lateral sinus. The ulceration extends deeply into the petrous bone, forming a large cavity, bounded internally at the lower part by the internal wall of the tympanum ; the promontory, stapes, and fossa of the fenestra rotunda remaining unaffected by the disease.
2680. From a girl æt. 3½. *History.*—From the age of five months an offensive creamy discharge had issued from the left ear. The child complained of itching, but not of pain. About six weeks before death the discharge ceased, violent pain came on in the ear, and an abscess formed behind the ear, at the bottom of which the surface of the squamous and mastoid bone was felt to be carious. She was delirious and very restless. Left ear.

The lateral ventricles contained about half an ounce of perfectly clear serum ; the cerebrum was otherwise healthy, as was also the dura mater covering the upper part of the petrous bone. Upon the removal of the tentorium the left hemisphere of the cerebellum was observed to be much softer than natural, and the portion in contact with the posterior surface of the pars petrosa was dark-coloured and very soft, and upon gently drawing it backwards it was found to be applied against two orifices in the posterior part of the lateral sinus, and it was separated from the cavity of the sinus by the thickened arachnoid and pia mater. A considerable vessel in the pia mater opposite the orifice was distended by a firm and dark coagulum, half an inch in length. The anterior membranous wall of the lateral sinus was absent ; the bone forming the sulcus lateralis in the mastoid process was carious, and the sinus full of a dark-coloured coagulum and purulent matter ; pus was also found in the jugular vein. The ear. The dermis lining the whole of the external meatus was soft, tumefied, and of a dark colour ; its surface was denuded of epidermis ; beneath it posteriorly was purulent matter which separated it from the carious bone. The membrana tympani was absent, but there was no more appearance of disease in the tympanic cavity than might have been produced by the affection of the meatus. The bone was carious anteriorly as far as the root of the zygoma ; posteriorly and superiorly the caries extended nearly to the margin of the parietal bone. In some parts the external table only was affected ; in others it extended to the diploe, and thence to the external table. Upon holding the bone up to the light small orifices may be observed through the bone, so that its external surface, viz., that part which was covered by the membranous meatus, was directly continuous with the lateral sinus.

2681. Necrosis of meatus and tympanum. Membrana tympani thickened, not perforated. Ossicula all *in situ*. A small carious orifice from tympanum into the external semicircular canal. Labyrinth full of purulent matter. Pus at the base of the brain. Pons Varolii soft and ulcerated. *History*.—A healthy man æt. 26 ; had discharge from ear for four or five years ; severe symptoms twelve days before death. Membranous meatus not ulcerated ; two small polypi attached to it. (See "Med. Times and Gazette," 1855, vol. i, p. 510.)

B.—TYMPANIC CAVITY.

2682. From a youth æt. 19, who died from scarlet fever after an illness of five weeks. In each ear the membrana tympani had lost all its central portion by ulceration. The mucous membrane of the tympanum was thick and ulcerated ; a sero-purulent

matter pervaded both it and the mastoid cells. The ossicula were rough. The dura mater was not adherent to the upper and posterior parts of the petrous bone, the coats of the internal carotid artery were very much thickened and dark-coloured, and the walls of the jugular vein corresponding to the floor of the tympanum are thin, soft, and easily detached from the bone.

2684. Superior wall of the tympanum absorbed. Mucous membrane of the tympanum thick.
2685. Left ear. From a woman *æt.* 62, who died from gangrene; deaf in the left ear. *Membrana tympani* white and very concave; around the point of attachment of the malleus the blood-vessels are enlarged and distended with blood. The tympanum is three parts filled with a thick, tenacious white mucus, which was partly the cause of the white appearance of the *membrana tympani*. The mucous membrane of the tympanum was thick and very vascular, and that portion of it which covers the body of the incus was red, the vessels being greatly distended with blood. The upper wall of the tympanum is very thin and almost transparent; the blood-vessels contained in it are distended with blood, and are continuous with the vascular mucous lining of the tympanum and the dura mater, which latter was also more vascular than natural. The tensor *tympani* muscle was atrophied, and no effect was produced on the *membrana tympani* by pulling it.
2686. Left ear. *Membrana tympani* destroyed by ulceration, except a small band at its posterior and superior region, to which the malleus is attached. Mucous membrane of tympanum very thick and diseased, and the bone forming the upper wall of the tympanum is also diseased in its entire thickness, the cranial surface of the bone being rough and very vascular. The dura mater which covers this part is in some places very thin, and in others presents large orifices. *History.*—Male *æt.* 22, died from phthisis: he was deaf in the left ear, and when a child had a scrofulous affection of that ear with discharge. In the right ear there was incipient calcareous degeneration of the *membrana tympani*, thickened mucous membrane of the tympanum, with bands of adhesion and partial ankylosis of the stapes.
2687. Left ear. The dura mater covering the upper surface of the petrous bone was more vascular than natural, and on its free surface was a patch of blood. The upper wall of the tympanum was of a dark colour, and the thick mucous membrane was seen beneath it. The tympanic mucous membrane was very thick and of a dark purple colour, its vessels being distended. The upper part of the tympanum was filled by this thick membrane, so that scrofulous matter and pus were retained in the tympanic cavity by it. The stapes was disarticulated

from the incus ; the ossicles were concealed by the thick mucous membrane. The lower osseous wall is also thin and of a red colour : it presented an orifice which allowed a communication between the tympanum and the jugular fossa. Membrana tympani destroyed. *History*.—Boy æt. 4. Had suffered from discharge in the left ear since his first year ; the ear was tender, but pain had not been complained of. Convulsions and hemiplegia occurred two months before death. There was a large deposit of tubercles surrounded by pulpy matter in the left cerebral hemisphere. (See "Medical Times and Gazette," 1855, vol. xxi, p. 107.)

2688. Right ear. The lower half of the membrana tympani is destroyed,

2689. and the inferior half of the upper part is attached to the promontory, so that the upper portion of the cavity of the tympanum and that of the mastoid cells was closed, and the matter there secreted had no exit. The tympanic mucous membrane was thick and ulcerated in parts. The mastoid cells presented a large cavity full of pus. On this side the dura mater was much congested. In the sulcus lateralis was a portion of necrosed bone about three-quarters of an inch long and half an inch broad. Between this and the dura mater was a considerable quantity of pus, which communicated with superficial abscesses behind the ear. An abscess was found in the substance of the middle lobe of the cerebrum. In the left ear the lower two-thirds of the membrana tympani were absent, but the upper part was not adherent to the promontory, so that there was ample room for the egress of discharge from the tympanum. The tympanic mucous membrane was thick, but not otherwise diseased ; the bone was healthy. *History*.—From a youth æt. 12, who had an attack of scarlatina two years before death, since which he had a discharge from each ear. Acute symptoms, affecting the left ear, supervened on February 13th, 1854, and he died on March 16th. (See "Medical Times and Gazette," 1855, p. 306.)

2690. From a girl æt. 10 years, who died with acute cerebral symptoms of short duration. She had formerly had a discharge from the right ear, but that had ceased, though deafness remained. Right ear. The whole of the petrous bone, and of the dura mater covering it, was of a deep red colour from the distension of the vessels. The upper wall of the tympanum was of a black colour and very thin ; the tympanic cavity was full of scrofulous matter, dark in parts and in others white. The malleus was drawn inwards so as to touch the promontory, and shut off the upper part of the tympanum from the lower, and to confine the matter. (See "Medical Times and Gazette," 1855, p. 52.)

2691. Right ear. The whole of the upper wall of the tympanum destroyed by caries, the tympanic cavity communicating with

that of the cerebrum by an aperture measuring three-quarters of an inch in length, and a third of an inch in breadth. The mastoid cells contain scrofulous matter. The periosteum was detached from the exterior, and the dura mater from the interior of the squamous bone, and separated by dark-coloured pus. The dura mater on the right side was gangrenous over a large surface; the middle lobe of the cerebrum was in a state of suppuration. *History*.—Female æt. 18, of scrofulous diathesis. She had been deaf in the right ear for two years; the deafness was preceded by discharge. She died after nine days' illness, death being preceded by epileptic fits. There was a very fœtid odour about the ear, but no discharge. (See "Medical Times and Gazette," 1855, p. 106.)

2692. Right ear. External meatus. Dermis extremely congested, and of a light pink colour. Membrana tympani of a dark red colour and thick; it presents two perforations of small size, one at the anterior and upper part, and a second smaller, not larger than a pin's head, at the anterior and lower part. The tympanum contained pus and blood, the pus being chiefly at the upper part, the blood at the lower. There is an ulcerated orifice, about a line and a half in length by a line in breadth, in the plate of bone that separates the tympanum from the fossa jugularis. There is an irregular oval orifice, about two lines in length, in the posterior osseous wall of the fossa jugularis, by which it communicates with the cavity of the cranium. The walls of the jugular fossa are stained with blood. *History*.—From a soldier who returned from the Crimea after fever in November, 1855. At that time he had an abscess in the right side of the neck, with discharge from the ear; both became well, but he then became slightly jaundiced, vomited, and had a sharp attack of fever. He died on 12th December, 1855, having been delirious for some hours. The day before and night just preceding his death there was a good deal of bleeding from the ear, amounting to about three or four ounces. He was deaf after the fever in the Crimea. All the viscera, except the spleen, which was large, were normal.

2693. The upper part of the membranous meatus externus, near the point of attachment of the membrana tympani, was thick, red, and soft; the membrana tympani was absent, the whole of it having been destroyed by ulceration, with the exception of a small portion of the upper part to which the ossicula are attached. The tympanum contained a considerable quantity of thick caseous matter, consisting of granules, epithelium, and oil globules. The mucous membrane of the tympanum is very thick, soft, and of a deep red colour; the lower wall of the tympanum is rough and carious, and there are several small orifices in this wall, which allow of a communication between this cavity and that of the jugular fossa. The handle

of the malleus has been destroyed by caries, the long process of the incus is rough and carious, and part of its substance has been destroyed; the portion which remains is adherent to the stapes. The dura mater was disconnected from that part of the surface of the petrous bone which forms the upper wall of the tympanum; the superior surface of this portion of the dura mater was adherent to the arachnoid membrane. Serum was effused beneath the arachnoid and in the lateral ventricles. *History.*—From a boy æt. 3, who died during whooping-cough. There was discharge from the left ear for eighteen months previously; it came on slowly without pain, but now and then it ceased, when there was great pain in the ear, which disappeared on the return of the discharge. The discharge was usually thick and white.

2694. There is a large aperture in the squamous bone, and the petrous and mastoid bones are converted into a white cheesy-looking mass. The basilar process of the occipital and sphenoid, and the whole of the malar bone, were in a similar condition. A cavity was found in front of the ear, and another beneath the temporal muscles; both contained a soft cheesy substance. The ventricles contained three ounces of bloody serum; the arachnoid was much injected, and between it and the pia mater was a layer of yellow pus extending along the base of the brain. In the middle lobe of the brain was an abscess, containing upwards of an ounce of very fœtid greenish pus, and a second abscess existed in the middle of the posterior lobe. The softened bone consisted of cells of various forms, some few only having distinct nuclei; there was also interspersed among the cells granular matter. *History.*—Male æt. 25. Subject for five years to a discharge from the ear right with occasional pain. A year before his death an abscess broke behind the ear, and discharged at times. About a fortnight before his death he suffered from severe pain in the head and vomiting, and had paralysis of the right portio dura nerve. (See "Medical Times and Gazette," 1855, p. 589.)

2695. From a youth æt. 19, strumous. About nineteen months before his death he was knocked down and struck on the right side of his head. Deafness and pain soon supervened, followed by swelling, with sloughing and ulceration, to such an extent that a large chasm formed around the ear, leaving that organ completely isolated. No brain symptoms occurred. The brain appeared perfectly healthy, except at the lower part of the right hemisphere, which was pulpy and very soft. The softening was caused by the upward pressure of a soft scrofulous-looking mass, springing from the dura mater covering the petrous bone. This mass pressed upon the bone below, and appeared as though inclined to force its way downwards through the temporal bone.

at the junction of the squamous with the petrous portion, a great part of the latter being completely absorbed. Some new bone had formed at the inner side, and the whole of the exterior was occupied by a sloughy mass and carious bone, the surrounding parts being very hypertrophied. No vestige of meatus or mastoid cells could be discovered; the lateral sinus was filled by a coagulum. (See "Medical Times and Gazette," 1855, p. 588.)

2696. From a woman æt. 35. *History*.—After a severe cold a year previously pain began in the right ear accompanied by tumefaction of the right side of the face. Six months ago a red growth (supposed to be a polypus) was removed from the meatus. Since then there has been at times considerable bleeding from the ear. After this the pain in the ear increased, a red tumour occupied the meatus, and the parts surrounding the ear were swollen. The left portio dura nerve was paralysed. She died in about three months with symptoms of cerebral congestion. A large mass of reddish-white colour extended from the posterior part of the mastoid process to the body of the malar bone. It was of different degrees of consistence; anteriorly it was hard and firm like the pancreas, posteriorly it was softer and deeper towards the styloid process; it contained a white creamy fluid; it contained also spiculæ of bone. The mastoid process was involved in the disease, and consisted of some detached masses of bone in the middle of a portion of the tumour. The osseous meatus had wholly disappeared; the remains of the membranous meatus could scarcely be distinguished. The only remains of the tympanic cavity were some portions of the mucous membrane having a dark livid hue; its blood-vessels were distended, and small red growths were attached to parts of it. There was no remnant of the bony tympanic cavity. The whole of the squamous bone, from an inch below the squamous suture, and the whole of the outer part of the petrous bone had been destroyed, so that the apex of the petrous bone had no connection with the squamous. The tumour had advanced inwards to the cavities of the cerebrum and cerebellum, through the aperture formed by the destruction of the squamous and petrous bones. In the middle cerebral fossa was a reddish-white tumour, about the size of a small pear; it consisted of two portions, one of which was continuous with the external tumour, while the upper portion seemed to be an independent growth from the free surface of the dura mater. It was adherent to the lower surface of the posterior cerebral lobe, which was softened to the extent of half an inch. The harder portions of the tumour consisted of very delicate fibres and nucleated cells, while the softer parts and the creamy fluid were almost wholly com-

posed of nucleated cells, some being circular, others fusiform, and others angular. (See "Medical Times and Gazette," 1855, p. 587.)

2697. Upper wall of the tympanum diseased ; orifice.

2698. Caries of the upper and inner walls of the tympanum.

2699. Necrosis of superior wall of tympanum. The specimen shows the necrosed mass with new bone formed around. The ossicula are all wanting except the base of the stapes. From a female æt. 20, who had had discharge from the ear from infancy, with formation of polypi. Death from abscess in the cerebellum.

2700. The central part of the petrous bone destroyed by necrosis. Abscess in cerebellum. From a man æt. 25, who had had discharge from the ears for nine years. (See "Trans. Path. Soc.," vol. xii, p. 13 [1861].)

C.—MASTOID CELLS.

2701. From a girl æt. 10 months, subject to scrofulous glands. *History.*

2702. ¶ —When first seen there was a considerable abscess behind the left ear, and discharge from the meatus. The membrana tympani was absent, the mucous membrane of the tympanum thick and red. At the bottom of the abscess dead bone could be felt. There had been a discharge from the right ear at the age of three months ; this lasted six or seven weeks and then disappeared. At five months of age discharge took place from the left ear, and after it had continued for a month an abscess formed behind the ear. She had frequently suffered from great pain in the left side of the head. The symptoms of cerebral irritation increased, and she died in a few days. Left ear. The bone above and posterior to the meatus externus over the space of a sixpence was denuded ; it was rough, black, and soft ; the external table had been removed. Upon making a vertical section of the bone through the horizontal portion of the cells the walls of the latter were observed in a state of disease, and the cavity contained purulent matter. The outer wall of this portion of the cells was carious throughout. The membrana tympani had been wholly removed by ulceration, as also were parts of the tympanic mucous membrane ; the small portions remaining were thick, soft, and of a livid colour. The long process of the malleus had disappeared ; the remnant was partially disconnected from the incus, as was the incus from the stapes. The inner surface of the carious bone is of a dark colour, and is itself carious ; it presents numerous small depressions. The dura mater, thick, soft, and red, was separated from the carious bone by a transparent fluid. Right ear. Affected by the same disease, but in an incipient state ; the meatus was soft and red, the membrana tympani thick, white, and concave. The mucous membrane lining the tympanum

and mastoid cells was thick and red, and there was a collection of mucus. (See "Medical Times and Gazette," 1855, p. 154.)

2703. From a man who died in St. George's Hospital in 1847. Disease of the mucous membrane of the tympanum and mastoid cells; caries of its inner wall; suppuration in the lateral sinus produced by the inflammation of the mastoid cells. Secondary abscess. The case is recorded in the Register of St. George's Hospital for 1847, No. 289. (Post-mortem Book, No. 42.)

2704. From a man *æt.* 50, deaf in the left ear. When young he had scrofulous disease of the left mastoid process, followed by caries. Left ear. A fossa exists at the upper and anterior part of the mastoid process, near to the external meatus; it is nearly large enough to admit a horse-bean. This fossa was lined by the integuments which adhered firmly to it. The lower half of the membrana tympani was absent, having apparently been destroyed by ulceration; the upper half is directed very obliquely inwards, and is adherent to the promontory. The ossicles remain, but the incus and stapes are disconnected. Attached to the anterior part of the long process of the malleus, near its inferior extremity, is an exostosis, measuring three-quarters of a line in length, which passes outwards and somewhat backwards and downwards. The lamina of bone which forms the sulcus lateralis is much thickened. The right ear was healthy.

2705. From a girl *æt.* 12, who died twenty-two days after receiving a violent blow on the head. An abscess formed beneath the temporal muscle, discharge took place from the left ear, and coma supervened upon symptoms of cerebral irritation. Left ear. The pericranium was separated from the squamous bone by purulent matter; the dura mater lining the squamous bone and covering the upper wall of the tympanum was thicker than natural, and but slightly adherent to the bone; the arachnoid and a portion of the cerebral matter were attached to this part of the dura mater. In the middle cerebral lobe was an abscess containing four ounces of pus. The petrous bone was diseased. The membranous meatus was thicker than natural; its free surface was smooth and presented no signs of ulceration. The superior and posterior walls of the osseous meatus were rough; this rough appearance was produced by a deposit of new bone, which was also found to extend on the outer surface of the squamous bone above the meatus for a space measuring half an inch in its vertical and an inch in its antero-posterior diameter. The posterior two-thirds of the membrana tympani were absent; the mucous membrane of the tympanum was healthy, but in the passage to the mastoid cells there was a collection of pus and scrofulous matter which had not been freely discharged on account of the

small size of the aperture leading into the tympanum, contracted as it was by the thick mucous membrane. The upper wall of the tympanum was in a diseased state; the surface next to the dura mater was composed of a very fine scale of dead bone, about six lines long and four broad; this was perforated by small orifices, and posteriorly it was eaten away in parts. Beneath this portion of dead bone was a layer of new bone, which formed the upper wall of the tympanum, and it was continued upwards and outwards on the inner surface of the squamous bone to its upper margin; the old bone underneath and adjacent to this new bone was worm-eaten, and had been the seat of the disease, being about half an inch in breadth. In this case there can be no doubt that disease in the horizontal portion of the mastoid cells commenced in early childhood. the squamous bone and dura mater being affected, but not to such an extent as to endanger life. As the bone was developed new bone was deposited on each side of the diseased squamous bone, and it is probable the patient might have lived many years if the disease had not been re-excited by the blow. (See "Medical Times and Gazette," 1855, p. 155.)

2706. Portion of brain and dura mater from the inner surface of the squamous bone, from the preceding case.

2707. From a boy æt. 13, who died, after six weeks' illness, with symptoms of cerebral disease, pain in the right temporal region, with discharge and impaired hearing in the right ear. *Autopsy.*—The ventricles of the brain were enormously distended with transparent serous fluid, amounting to at least half a pint. The venæ Galeni were flattened, and contained no blood, having been obstructed by the pressure of the underlying disease. A few transparent and very minute granulations were scattered over the arachnoid at the base of the brain. The inferior surface of the right lobe of the cerebellum was attached to the dura mater by slight adhesions. This lobe was the seat of three distinct abscesses, and the central part of it was almost entirely converted into pus. The left lobe and other parts of the cerebellum were free from disease. On examining the interior of the skull a yellow spot about the size of a pea was discovered over the petrous portion of the right temporal bone. The dura mater was here separated from the bone by a thin layer of pus lying upon the carious bone, but there was no trace of inflammation or other disease in the cerebral aspect of the membrane. Over this space the bone was destroyed in its whole thickness, so that on lightly scraping it with a scalpel the cavity of the tympanum was brought into view. This cavity was filled with opaque lymph of a reddish-yellow colour, but on removing this the bones and muscular apparatus of the ear were seen to be still in place. The membrana tympani was slightly thickened and opaque. (See "Medical Times and Gazette," 1855, p. 405.)

2708. From a child æt. 13 months. *History*.—At the age of six weeks a discharge was observed to flow from the right ear, which continued with short intermissions. About two months before her death an abscess formed at the back of the ear, which discharged into the meatus. She died in convulsions after febrile symptoms of a fortnight's duration. *Autopsy*.—The part of the sterno-mastoid muscle attached to the mastoid process was discoloured. The membranous meatus was much thickened, and of a dark purple colour. The posterior part of the osseous meatus was carious, and the bone continuous with and above it for a space the size of a fourpenny piece was also carious, this being the portion of bone which bounds externally the horizontal mastoid space. The periosteum covering this carious bone was thick and soft in parts and ulcerated in others; internally there is also a portion of necrosed bone about one half the size of that externally; and upon a section the inner surface is found to be part of the necrosed portion of bone which is seen externally, where it covers the tympanic cavity and extends above it. The outer surface of the dura mater, which was in contact with the dead bone, was soft, spongy, and of a dark colour, and partly filled the superficial cavity formed by the necrosed bone. In immediate contact with the bone, however, was a soft, pulpy tissue. The membrana tympani was absent, the mucous membrane of the tympanum ulcerated, and the ossicles carious.
2709. From a man æt. 73, who had been deaf some years. Could only hear a loud voice near to the left ear. Right ear. Membrana tympani in parts transparent, in parts thick and white like cartilage. The chain of bones fixed, the head of the malleus being ankylosed to the upper wall of the tympanum; when it was freed the ossicles moved freely. Left ear. Membrana tympani: all the laminae perforated except the epidermis; adherent to stapes and incus. In each ear the cancellous bone entering into the formation of the mastoid process was soft and dark-coloured.
2711. Osseous wall of the lateral sinus carious and perforated by numerous orifices, which communicated with the mastoid cells. The surrounding bone was thick, rough, and vascular. The mucous membrane of the tympanum was very thick, and in contact with the membrana tympani, which was white and thick.
2712. From a man æt. 29. *History*.—Had been subject to diabetes. The fatal illness commenced with a pain in the head, chiefly referred to the right mastoid process. The pain increased, and was attended with a purulent discharge from the ear. Drowsiness, giddiness, and stupor supervened. Six weeks previous to death an abscess was opened behind the right ear, from which a large quantity of pus was discharged. Right ear.

The external meatus contained muco-purulent discharge; it was inflamed and tumefied. The membrana tympani was entire, but of a dull leaden hue, and much softer than natural. The tympanum contained much purulent matter, and its lining membrane was vascular, thick, and flocculent. The incus had disappeared; the stapes was *in situ*, but was surrounded by bands of adhesion. The osseous walls of the tympanum were healthy. The mastoid cells were full of purulent matter; the bony laminae dividing the cells were externally carious, large portions of them having been destroyed. The whole of the posterior wall of the mastoid cells, usually forming the sulcus lateralis, is destroyed, and in its place is an orifice measuring an inch and a quarter from above downwards, and more than half an inch in breadth. This orifice in reality corresponds exactly with the sulcus lateralis as situated in the temporal bone, with the exception of half an inch before it reaches the fossa jugularis. A circular orifice about the size of a pea existed at the posterior part of the mastoid process, which communicated with the aperture just mentioned on one hand, and with the abscess behind the ear on the other. The membranous lateral sinus was much attenuated, and beneath it was a large quantity of pus.

2713. From a woman æt. 31, who died comatose four weeks after an attack of scarlatina, since which there had been a discharge from the left ear. *Autopsy*.—An abscess was found in the left lobe of the cerebellum of the size of a walnut. It reached to the surface, and thus came in contact with a large quantity of pus, bounded by the diseased and distended walls of the lateral sinus; the latter contained pus and blood. There was an opening through the membrana tympani, which had a regular shape and its size was one third of the whole diameter of the membrane. The upper wall of the tympanum was healthy, and not even discoloured. The portion of the mastoid cells posterior to the incus contained some pus and blood mixed together; this extended down as far as the mastoid process. The portion of the lateral sulcus, about an inch long and half an inch broad, which forms the posterior boundary of this part of the mastoid cells, was of a dark leaden colour. The canals in this portion of the bone were also distended with black matter. The blood-vessels between the lateral sinus and the mastoid cells were distended with dark pus and blood.

2714. The right petrous bone of a child who died with discharge from the ear after scarlatina. The mastoid cells are inflamed, and the plate of bone forming their external boundary is carious.

2715. A portion of carious bone, about the size of a hazel-nut, from the mastoid cells.

2716. Mastoid cells distended with scrofulous matter ; upper wall of tympanum diseased ; dura mater greatly thickened.
2717. Scrofulous matter from the preceding case.
- 2718 From a woman æt. 20, who was deaf in the left ear, and had long been subject to intense earache, with occasional foetid discharge from the meatus. About a month before death an abscess formed just above the left collar-bone, which continued to discharge large quantities of matter. She suffered from great disturbance of the heart's action, delirium, erysipelas, and coma. *Autopsy*.—A large abscess existed at the root of the neck on the left side, communicating with and extending through the whole of the carotid sheath ; the internal jugular vein was full of matter, and a clot containing pus globules extended into the vena cava. The lungs contained purulent infiltration. The cerebrum was healthy ; the arachnoid near the tentorium was smeared over with pus. The tentorium, covering the left lobe of the cerebellum, was much inflamed, thickened, and had matter between it and the arachnoid covering that lobe of the cerebellum ; and immediately beneath this, on cutting into the cerebellum, a circumscribed abscess, about the size of a walnut, was discovered. The part of the cerebellum in contact with the cranial bones was healthy. Petrous bone. The external meatus contained pus. The glandular and periosteal portions of the membranous meatus were much softer than natural, and they adhered but slightly to the surface of the bone. The bone forming the upper and outer half of the tube was found to present numerous foramina for the transmission of blood-vessels ; they were much larger than natural, and some of them were surrounded by delicate layers of new bone. The lateral sinus was of a dark brown colour ; the dura mater forming its posterior wall was entire. The sinus was full of coagulated blood, mixed with purulent matter. The dura matter constituting its anterior wall, and which was in contact with the surface of bone forming the sulcus lateralis, was very thick and soft ; portions of it were destroyed by ulceration, and the bone was exposed. The bone forming the sulcus lateralis was of a dark colour, and covered by masses of lymph and pus ; its surface was rough, presenting throughout numerous orifices and tortuous grooves, this appearance being produced by the almost complete disappearance of the internal table of the skull, which, excepting two scales, each measuring about two lines in diameter, had been destroyed by caries. A carious orifice exists between the cavity of the cerebellum and the mastoid cells. The bone forming the jugular fossa is also carious. There is an orifice in the posterior part of the membrana tympani. The tympanic mucous membrane was much thicker than natural, and in the

upper osseous wall was a carious orifice that would allow the passage of a small pin. The mastoid cells at their upper part formed a cavity about the size of a horse-bean ; it contained pus. This cavity communicated posteriorly with the lateral sulcus by means of an orifice three lines in diameter ; anteriorly the orifice into the tympanic cavity was not more than two lines in diameter, and it was placed above the level of the floor of the cavity containing the pus. (See "Medical Times and Gazette," 1885, p. 228.)

2719. Bony wall of the lateral sinus, rough and covered with a thin irregular deposit of new bone.

2720. Lateral sinus distended with dark coagulum, the dura mater around it inflamed and thickened.

2721. From a child æt. 11 months, subject to much privation and very weakly. *History*.—There had been a discharge from the right ear since birth. At the age of three months there were redness and swelling of the ear, with purulent discharge and tenderness over the mastoid process. At the age of seven months paralysis occurred on the left side of the face, the soft parts around the ear became sloughy, and the mastoid process offered no resistance on pressure. *Autopsy*.—The dura mater was very thin ; the convex surface of the brain was greatly congested, patches of dark-coloured blood were scattered over its hemispheres, especially on its right side, where in one or two places they extended to the depth of three or four lines into the substance of the brain. The cerebral veins were distended by coagula. At the surface of the posterior part of the middle lobe on the right side was a small abscess, the size of a pea. The dura mater covering the petrous portion of the right temporal bone was separated from it by pus, and it was very much thickened. Temporal bone. The part of the squamous portion between the root of the zygomatic process and the mastoid process has been entirely destroyed, and the larger part of the mastoid process has also disappeared ; an aperture, an inch in length and three quarters of an inch in depth, had thus been formed. The petrous portion is detached, and it is carious both on its superior and posterior surfaces. The small remaining part of the mastoid cells contained scrofulous matter. (See "Medical Times and Gazette," 1855, p. 154.)

2722. Necrosis of mastoid cells producing meningitis.

D.—THE LABYRINTH.]

2723. A portion of necrosed bone from the vestibule in the preceding

SERIES XI.—DISEASE EXTENDING FROM THE EAR TO THE CAROTID CANAL.

2724. From a woman *æt.* 26, who died fourteen days after childbirth. She was very deaf in the right ear, and slightly so in the left. She had scarlatina when a child, and from that time had always a discharge from the right ear. Right ear. Membrana tympani destroyed; the tendon of the tensor tympani muscle had disappeared. The malleus and incus were in contact, and the connecting ligaments were soft, and so relaxed as scarcely to hold the bones together. The incus and the stapes were disconnected. The mucous membrane of the tympanum was thick, white, and soft, and in several places ulcerated; a thick discharge was diffused over it. The stapes was nearly concealed. The osseous walls of the tympanum were diseased, and that portion which corresponded with the carotid canal was carious and perforated with small holes, through which the external surface of the carotid artery was covered with purulent matter from the tympanum. The coat of the artery was thick and red, and there was a slight contraction of the carotid canal.
2725. Acute caries of the left temporal bone, preceded by a severe blow on the left side of the head two years before. Ulceration of the internal carotid artery; hæmorrhage. (See "*Med.-Chir. Trans.*," vol. xliii, p. 217 [1860].)

VARIOUS SPECIMENS.

2726. From a man *æt.* 46, who died from a malignant disease of the central region of the left middle lobe of the brain. A tumour attached to the dura mater pressed upon the brain at the point indicated. Left ear. The upper surface of the petrous portion of the temporal bone is dark-coloured and roughened, presenting slight elevations. The mastoid cells are diseased, and the mucous membrane of the tympanic cavity was thickened, partaking of the disease of the bone.
2727. Partial absorption of the upper surface of the petrous bone from the pressure of the tumour of the cerebrum.
2728. Part of a petrous bone showing absorption in consequence of the presence of sebaceous tumour in the meatus externus. From a patient *æt.* 67. (See "*Med.-Chir. Trans.*," vol. xliv, p. 63 [1861].)
2729. From a woman *æt.* 26, of scrofulous diathesis, who had been subject to a discharge from the right ear since an attack of measles when a child. For twelve or sixteen months she had suffered from headaches and attacks of giddiness. Twenty-three days before death acute pain came on in the ear, and she died comatose. *Autopsy.*—An abscess occupied the whole

ulceration ; the bone beneath it was found to be carious, and to form part of the posterior wall of the inner extremity of the mastoid cells. (See "Transactions of the Pathological Society," 1850-51, vol. iii, p. 179.)

2733. From a woman æt. 33, who died after an illness of several years'

2734. duration, of which the symptoms were violent pain in the head, followed by delirium and loss of power in the limbs, chiefly of the right side, but varying very greatly in amount. She was able at times to rise from her bed until within a few days of her death. There was discharge from the left ear, which was sometimes very profuse, as much as a tablespoonful escaping in the course of a few minutes, sometimes very slight or absent. The discharge generally relieved the severity of the symptoms. *Autopsy.*—Dura mater healthy. Vessels of pia mater, especially the veins, very full of blood. The brain seemed firmly compressed by the dura mater. On removing it from the skull, pus exuded from the external portion of left middle lobe ; and, on a careful examination, it was found that the substance of the brain was adherent, together with the dura mater and other membranes, to the bone, over a space about the size of a sixpence, constituting the roof of the mastoid cells on the left side. The bone was carious at this part, and allowed a communication between the mastoid cells and the cavity of the cranium ; but the substance of the brain having given way during its removal, owing to its adhesion to this portion of the bone, it is not possible to say whether there was an actual communication between the ear and the abscess within the brain. A large part of the middle and posterior lobes of the cerebrum, on the left side, were occupied by an abscess, containing about two ounces of green-coloured pus, contained in a firm membranous sac, which was easily torn out from the surrounding cerebral tissue. The brain substance around the abscess was softened and broken down for the extent of two or three lines in all directions ; but internally the softening extended farther, and involved the whole of the left corpus striatum, which was entirely disintegrated. The left lateral ventricle contained no excessive amount of fluid, but the right lateral ventricle was distended with about three ounces of clear pale serum. The substance of the brain on both sides was firmer than natural, and presented many bloody points, most numerous on the right side. The anterior boundary of the abscess was situated about two inches behind the fissure of Sylvius, and the posterior boundary about one inch and a half in front of the termination of the posterior lobes. The cerebellum and pons Varolii were healthy. Left ear. The superior bony wall of the tympanum is much thickened ; and internally, opposite the horizontal portion of the mastoid cells, is an orifice

of the upper part of the right cerebral hemisphere. The substance of the surrounding brain was healthy. Lymph was effused on the dura mater covering the petrous bone, and a portion of it was detached from the bone. The membrana tympani was absent; the tympanic mucous membrane and that of the mastoid cells was thick and soft, and it was covered by a large quantity of caseous scrofulous matter. The upper tympanic wall was of a dark colour, extremely thin, and perforated by numerous blood-vessels. The dura mater covering the upper part of the petrous bone and lining the squamous bone was very thick and detached from the bone, and a large quantity of purulent matter was deposited between the dura mater and the arachnoid. The arachnoid was highly congested. In some parts the pus had passed through the dura mater, and was in contact with the bone. The outer surface of the dura mater forming the lateral sinus is rough where it is in contact with the inflamed bone; the internal surface of the sinus had portions of fibrin adhering to it.

2731. The surface of the bone forming the wall of the lateral sinus is rough, and as if slightly worm-eaten. The membrana tympani is fallen inwards, and is in contact with the promontory. The mastoid cells contain scrofulous matter.

2732. From a man æt. 35, subject to severe pain in the right ear for many years. Five weeks before his death a large polypus was removed from the external meatus. He died comatose, having suffered from great pain in the back of the head and neck, and loss of control over the limbs. *Autopsy*.—There was an abscess in the right lobe of the cerebellum large enough to hold a pigeon's egg. The contents were very foetid, the walls were firm and lined with false membrane, but were very thin where the cerebellum rested on the aquæductus vestibuli of the temporal bone. At this spot there was a small ulcerated opening in the dura mater communicating with a carious portion of the temporal bone. Temporal bone. The membrana tympani was very much thickened; it presented an orifice at its anterior part, and had two small polypi attached to its superior and inner part. Upon separating the membranous from the osseous meatus, the latter, near to the membrana tympani, was darker and rougher than natural, and had evidently been subject to inflammation, which had penetrated into the mastoid cells and thence to the sulcus lateralis which bounds them internally. The upper part of the sulcus lateralis is carious over a space about three lines in diameter, and there are orifices which were filled by coagulated fibrin. The dura mater in this locality was softened, but the disease had not penetrated to the cavity of the lateral sinus. The dura mater adjacent to the fossa jugularis was soft and partially destroyed by

about one third of an inch in diameter. This orifice allowed of a communication between the middle cerebral cavity and that of the tympanum. There is a large aperture in the membrana tympani. From the large quantity of matter which sometimes escaped from the external meatus, it may be supposed that the contents of an abscess in the cerebrum situated above the aperture in the bone passed through the tympanic cavity. Right ear healthy, with the exception of an excess of pigment in the cochlea.

2735. From a man æt. 77, deaf. Right ear. The meatus contained a

2736. : small quantity of cerumen. Membrana tympani somewhat opaque, concave, its inner surface nearly touching the promontory; the mucous membrane of the tympanum is thick, and the cavity contains a quantity of fibro-cellular tissue, which occupies the whole of the upper part, and connects the body of the malleus to the inner wall of the tympanum, concealing the stapes. A membranous band connects the malleus to the promontory. The stapes is firmly ankylosed to the fenestra ovalis. The membranous vestibule is much atrophied, and the vestibular portion of the auditory nerve is shrivelled to half its usual size. The cochlear nerve is healthy. Left ear. Meatus externus full of hard cerumen; membrana tympani hazy. The tympanic cavity is of its natural size, but it contains fibrinous matter. The stapes is completely ankylosed.

XVII.—RADIOGRAPHY.

Hon. Curator - Dr. W. IRNSIDE BRUCE.

CALCULI (RENAL).

2737. Small oxalate calculus in the kidney.
Lent by Dr. Ironside Bruce.
2738. 284 stones in the kidney.
2739. Obvious stones in the kidney.
2740. Idem.
2741. Idem.
2742. Stone in the left kidney on right side.
2743. Calculus in the left kidney compensatory enlargement of right organ.
2744. Radiograph to illustrate the possibility of demonstrating the number and position of stones in the kidney.
2745. Calculi, various on a single plate.
Lent by Dr. W. F. Somerville.
2746. Some calculi seen through a saddle of mutton.
2747. Right renal calculus (uric acid). Patient is lying prone, number on patient's right.
2748. Left renal calculi; patient is lying prone, number on patient's left.
2749. Right renal calculi; patient is lying prone, number on patient's left.
2750. Stone in the right kidney (oxalate).
Lent by Dr. E. S. Worrall.
2751. 2 stones in left kidney (phosphate).
2752. Stone in left kidney (oxalate).
2753. Stone in right kidney.
2754. Stone in left kidney.
2755. 2 stones in right kidney.
2756. Stone in each kidney.
2757. 16 stones in left kidney.
2758. Stone in right kidney.
Lent by Dr. C. Thurston Holland.
2759. Very small stone in kidney.
2760. Stone in kidney, which moved up and down ureter (compare slide No. 2790.) Subject to alteration.
2761. Large calculus in which all symptoms pointed to opposite side.
2762. Large calculus in each kidney of a man, who had had no symptoms up to a few weeks before X rays examination.
2763. Idem.

CALCULI (VESICAL).

2798. Stone in bladder not discovered by sound.

Lent by Dr. Ironside Bruce.

2798A. Calculus encysted in the wall of the bladder.

2799. Collection of phosphatic calculi in the bladder.

2800. Phosphatic calculi.

2801. Vesical calculus (uric acid) in a boy aged 3 years. Size of stone, $\frac{3}{4}$ inch by $\frac{1}{2}$ inch by $\frac{3}{8}$ inch.

Lent by Dr. W. F. Somerville.

2802. Stone in bladder.

Lent by Dr. C. Thurstan Holland.

2803. Stone in bladder ; multiple phleboliths ; calcareous arteries.

2804. Stone in bladder and stone in lower end of ureter.

2805. Stone in the bladder.

Lent by Dr. C. Harrison Orton.

2806. Idem.

2807. VESICAL CALCULUS.

Lent by Dr. J. Taylor.

DISEASE OF THE KIDNEY.

2808. Tuberculous kidney (enlargement of the outline of the kidney).

Lent by Dr. Ironside Bruce.

2809. Multiple small shadows in left kidney (? cause).

Lent by Dr. C. Thurstan Holland.

2810. Probable calcareous tubercular kidney.

2810A. } Calcareous deposit in each kidney of a female, suffering from
2810B. } "fragilitas ossium."

2811. Large cystic kidney.

Lent by Dr. E. S. Worrall.

2812. Caseous kidney.

Lent by Dr. C. Harrison Orton.

2813. PYONEPHROSIS AND CALCULUS.

Outline of kidney quite distinct. The calculi surrounded by pus can be seen, but the shadow is indistinct.

Lent by Dr. J. Taylor.

2814. TUBERCLE OF KIDNEY SIMULATING CALCULUS.

GALL STONES.

2815. 2 gall stones on end (cholesterin surrounded by calcium phosphate).

Lent by Dr. C. Thurstan Holland.

2816. Radiographs of the gall stones removed from the same patient as slide No. 2804 depicts.

2817. Idem.

2818. SALIVARY CALCULUS IN SUB-LINGUAL DUCT.

Lent by Dr. Ironside Bruce.

CALCAREOUS LYMPHATIC GLANDS.

2819. Calcareous abdominal glands.

Lent by Dr. C. Thurstan Holland.

2820. Idem.

2821. Idem.

2822. Idem.

2823. Idem.

2824. Calcareous glands in neck.

2825. Calcified glands in region of right ureter; patient is lying prone; number on patient's right.

Lent by Dr. W. F. Somerville.

2826. Calcified tubercular glands in abdomen.

Lent by Dr. R. Hallam.

2827. Calcified tuberculous gland in pelvis.

2828. Tuberculous bronchial glands.

Lent by Dr. Ironside Bruce.

TUBERCULOSIS OF THE LUNG.

2829. Tuberculous infiltration of the lungs.

Lent by Dr. Ironside Bruce.

2830. Tubercular deposits in chest.

Lent by Dr. Somerville.

2831. Tubercular lungs.

Lent by Dr. C. S. Worrall.

2832. Tubercular lungs, showing vomica.

2833. Tubercular lungs, showing displaced heart.

2834. Early phthisis.

Lent by Dr. Rupert Hallam.

2835. Pulmonary tuberculosis.

Lent by Dr. C. Harrison Orton.

2836. PHTHISIS PULMONUM.

Tubercular deposit scattered over both lungs.

Lent by Dr. J. Taylor.

2837. OLD EMPYEMA.

The heart is pulled over to the right side.

DISLOCATIONS.

2838. Congenital dislocation of the hip joint.

Lent by Dr. Ironside Bruce.

2839. Congenital dislocation of the hip joint. Lorenz's position in plaster.

2840. Subastragaloid dislocation of the tarsus.

2841. Dislocation associated with slight fractures.

2842. Idem.

2843. Simple dislocation of the bones of the forearm.
 2844. Dislocation associated with fracture some distance from the joint.
 2845. Dislocation of the right radius.
 Lent by Dr. Somerville.
 2846. Congenital dislocation of the hip joint.
 Lent by Dr. E. S. Worrall.
 2847. Congenital dislocation of the hip joint, after an attempt at reduction. (In plaster case).
 2848. Dislocation of astragalus.
 2849. Dislocation and fracture of astragalus.
 2850. Same foot after amputation.
 2851. Luxation of the body of first lumbar vertebra.
 Lent by Dr. F. Bailey.
 2852. Double congenital dislocation of the hip joints after reduction.
 Lent by Dr. Thurstan Holland.
 2853. Idem.
 2854. Dislocated elbow joint (diagnosed and treated for six weeks as fracture).
 Lent by Dr. Rupert Hallam.

FRACTURES OF BONES.

2855. Fracture disease of head of the humerus.
 Lent by Dr. Ironside Bruce.
 2856. Simple transverse fracture of the tibia, not recognisable by screen.
 2857. } Fracture of the fibulæ. Two views ; fracture only recognisable
 2848. } in one.
 2859. } Two views of fracture of both bones of the forearm, to
 2860. } illustrate the position of the fragments.
 2861. Fractures about the elbow joint.
 2862. Idem.
 2863. Idem.
 2864. Idem.
 2865. Fractures about the shoulder joint.
 2866. Idem.
 2867. Idem.
 2868. Idem.
 2869. Fracture of the head of the radius.
 2870. Fracture of the olecranon process of the ulna.
 2871. Fracture of the humerus just above the elbow joint.
 2872. Fracture of the femur.
 2873. Idem.
 2874. Displaced epiphyses.
 2875. Idem.
 2876. Fracture dislocation of the fourth cervical vertebra.
 2877. Fracture of left olecranon.
 Lent by Dr. Somerville.

2878. Fracture of the head of the left ulna, from indirect violence.
 2879. Three metacarpal bones fractured by muscular effort in an acrobat.

Lent by Dr. Worrall.

2880. Colles' fracture, lateral view.
 2881. Idem, antero-posterior view.
 3883. Colles' fractures; only slight displacement.
 2884. Idem; styloid process of ulna torn off.
 2882. Fracture of fibula and tibia in plaster case.
 2885. Fracture at elbow.
 2886. Idem.
 2887. Idem.
 2888. Idem.
 2889. Idem.
 2890. Idem.
 2891. Idem.
 2892. Fracture dislocation at elbow; radius and ulna displaced forwards.
 2893. Fracture of olecranon.
 2894. Fracture of the head of the humerus.
 2895. Fracture of diseased tibia.
 2896. Fracture of lower end of the tibia.
 2897. Fracture of the phalangeal epiphysis of the great toe.
 2898. Fracture of one sesamoid bone of the great toe.
 2899. Fracture of the distal and proximal phalanx of the thumb, with impaction.

Lent by Dr. F. Bailey.

2900. Impacted fracture of the head of the metacarpal bone of the index finger.
 2901. Fracture of the transverse process of a lumbar vertebra.
 2902. Fracture of the olecranon.

Lent by Dr. C. Thurstan Holland.

2903. Fracture of the patella. (Broken in 5 pieces).
 2904. Unusual fracture of the scapula.

Lent by Dr. C. Harrison Orton.

2905. Idem.
 2906. Impacted fracture of neck of femur.
 2907. Old fracture of Elbow.
 Showing fracture displacement and non-union of external condyle.

Lent by Dr. J. Taylor.

2908. FRACTURE OF OS-CALCIS, BOTH FEET.

The man fell 60 feet, alighting on his feet.

2909. Fracture of every Metatarsal Bone.

DISEASES OF BONE.

2910. Early tubercular disease of the knee joint.
Lent by Ironside Bruce.
2911. Tubercular disease of the knee joint.
2912. Idem.
2913. Idem.
2914. Necrosis sequestrum of the head and neck of the femur, associated with tubercular disease of the hip.
2915. The same condition as No. 2914, showing collapse of the neck of the femur.
2916. Localised tuberculosis of the lower epiphysis of the femur.
2917. Early tubercular disease of the knee joint, showing only irregularity of outline.
2918. Extensive tuberculosis of the knee joint.
2919. Tubercular disease of the carpal bones, associated with advanced ossification.
2920. Tubercular disease of the scapho-astragaloid articulation.
2921. Tubercular osteitis of the fifth metacarpal bone.
2922. Localised tubercular osteitis of the tibia.
2923. Two views of a focal abscess of the lower end of the tibia with sequestrum,
2925. Tubercular disease of the medullary canal and shaft of a long bone, associated with periostitis.
2926. Tubercular disease of the atlas.
2927. Tubercular caries of the dorsal spine, with abscess.
2928. Tubercular caries of the body of the fifth lumbar vertebra.
2929. Tubercular dactylitis.
Lent by Dr. E. S. Worrall.
2930. Tubercular disease of the hip joint.
2931. Tubercular disease of the lower end of the femur, antero-posterior view.
2932. Idem, lateral view.
2933. Tubercular disease of the knee joint.
2934. Idem.
2935. Tubercular disease of the ankle joint.
2936. Idem.
2937. Idem. Left, showing changes in the tarsal bones.
2938. Idem. Right ankle of the same patient, bones and joint are normal.
2939. OLD TUBERCULAR DISEASE OF RADIUS.
Lent by Dr. J. Taylor.

2940. TUBERCULOUS OSTEITIS OF FEMUR.

The necrosed shaft is surrounded by new bone.

2941. Taken twelve months later, shows new formation of bone.

2942. TUBERCULAR FIFTH METACARPAL.

2943. TUBERCULAR DACTYLITIS IN INFANT.

4th and 5th terminal phalanges and 5th metacarpal affected.

2944. Polyarticular rheumatoid arthritis.

Lent by Dr. Ironside Bruce.

2945. Bony necrosis in rheumatoid arthritis.

2945A. Idem.

2946. Osteo-arthritis of the hip joint (actively progressing bony changes).

2947. Osteo-arthritis (not active).

2948. Normal hip joint for comparison.

2949. Charcot's joint (hip joint).

2950. Atrophic Charcot's joint.

2951. Rheumatoid arthritis (left hand).

Lent by Dr. Somerville.

2952. Idem (right hand).

2953. Idem (left foot).

All three from same patient.

2954. Rheumatoid arthritis affecting the hands of a girl aged 13 years.

Lent by Dr. Bailey.

2955. Gonorrhœal arthritis.

Lent by Dr. Ironside Bruce,

2956. Gouty nodes of the phalanges.

2957. Periostitis of the tibia.

2958. Acute localised osteo-myelitis.

2959. Central abscess of bone.

2960. Chronic osteo-periostitis.

2961. Idem.

2962. Endosteal sarcomata.

2963. Endosteal sarcomata.

2964. Periosteal sarcoma of the lower end of the femur.

2965. Periosteal sarcoma of the upper end of the femur.

2966. Secondary involvement of bone by carcinoma; upper end of femur showing spontaneous fracture.

2967. Idem.

2968. Sarcoma of the femur.

Lent by Dr. Thurstan Holland,

2969. Myeloid sarcoma of the fibula.
2970. Fibro-sarcoma of the tibia.
2971. Sarcoma of fibula.
Lent by Dr. C. Harrison Orton.
2972. Sarcoma of fibula.
2273. Sarcoma of Ilium.
2974. Sarcoma of femur.
2975. PERIOSTEAL SARCOMA OF FEMUR.
Lent by Dr. J. Taylor.
2976. MEDULLARY SARCOMA OF FEMUR.
2977. SARCOMA OF FIBULA.
The growth is invading the Tibia.
2978. PERIOSTEAL SARCOMA OF HUMERUS.
Note the eroded surface of the bone.
2979. OSTEO-SARCOMA HEAD OF HUMERUS.
2980. Rickets. Genu-valgum.
Lent by Dr. Ironside Bruce.
2981. Rachitic curvatures of long bones.
2982. Idem.
2983. Rickets affecting the tubercle of the tibia.
Lent by Dr. E. S. Worrall.
2984. Idem (after operation).
2985. Idem.
2986. Legs in plaster case after osteotomy for rickets (antero-posterior view).
2987. Idem, right leg (lateral view).
2988. Idem, left leg (lateral view).
2989. SCOLIOSIS.
The aorta, etc., is in midthorax away from the spine.
Lent by Dr. J. Taylor.
2990. EXOSTOSIS OF HUMERUS.
2991. EXOSTOSIS OF FEMUR.
2992. EXOSTOSIS OF HUMERUS.
2993. EXOSTOSIS OF HUMERUS.
2994. EXOSTOSIS OF LITTLE FINGER.
2995. Exostosis of the tibia with dislocation of the ankle joint.
Lent by Dr. Ironside Bruce.

2996. Pedunculated exostosis of the femur.
2997. Sessile exostosis of the femur.
2998. Exostosis of the femur.
Lent by Dr. E. S. Worrall.
2999. Idem.
3000. Exostosis of tibia.
Lent by Dr. C. Thurstan Holland
3001. Exostosis of the os calcis.
3002. Congenital syphilitic disease of bone.
Lent by Dr. Ironside Bruce.
3003. Idem.
3004. Double coxa vara.
3005. Coxa vara (adolescence).
3006. Flat foot with arthritis of scapho-astragaloid articulation.
3007. Spondylitis deformans of the lumbar vertebræ.
3008. Enchondroma of right hand, pronated (ordinary photograph).
Lent by Dr. Somerville.
3009. Idem, supinated (ordinary photograph).
3010. Skiagram of enchondroma of right hand, supinated (before operation).
3011. Idem, pronated (before operation).
3012. Idem, pronated (after operation).
3013. Idem, supinated (after operation).
3014. Ordinary photograph of the same, supinated (after operation).
3015. Idem, pronated (after operation).

3016. SYPHILITIC OSTEITIS OF HUMERUS.

Universal thickening of the bone.

Lent by Dr. J. Taylox.

3017. OLD NECROSIS OF TIBIA.

3018. FEET FROM A CASE OF TABES DORSALIS.

Note the bony absorption of the distal ends of the metatarsal bones.

3019. ABSCESS OF FIBULA.

Lent by Dr. C. Thurstan Holland.

OTHER PECULIARITIES AND AFFECTIONS OF BONES. 1103

3020. Osteophytic spur of os calcis (painful heel).
Lent by Dr. Ironside Bruce.
3021. Remarkable injury to the bone.
3022. Idem.
3023. Idem.
3024. Idem.
3025. Idem.
3026. Idem.
3027. Idem.

3028. Double cervical rib.
 3029. Congenital absence of the lower end of the sacrum.
 3030. Right foot after excision of the astragalus.
 Lent by Dr. W. F. Somerville.
 3031. Right knee, 11 years after arthrectomy.
 3032. Extra cervical ribs, patient is lying prone.
 3033. Idem, cervical rib.
 3033A. Cervical rib.
 Lent by Dr. E. S. Worrall.
 3034. Disease of ends of leg bone.
 3035. Achondroplasia, affecting leg.
 3036. Idem.
 3037. Congenital absence of fibula.
 3038. Congenital absence of arm ; showing rudimentary bones.
 Lent by Dr. Thurstan Holland.

NORMAL BONES AND BONES ALTERED BY DISEASE OF CONTIGUOUS PARTS.

3039. Lateral view of the normal sella turcica.
 Lent by Dr. Ironside Bruce.
 3040. Normal frontal sinus.
 3041. Normal skull antero-posterior view, showing frontal sinus, &c.
 Lent by Dr. Worrall.
 3042. Idem, lateral view, showing sella turcica, &c.
 3043. Head, lateral view, showing normal sella turcica.
 3044. Idem, showing pituitary tumour.
 3045. Idem.
 3046. Idem.
 3047. Idem.
 3048. Idem.
 3049. Head, lateral view, showing premature synostosis.
 3050. Head, lateral view, showing bullet and fragment of bone in brain.
 3051. Knee, lateral view, showing normal popliteal artery and muscles.
 Lent by Dr. E. S. Worrall.
 3052. Empyema of the frontal sinus, affecting one side.
 Lent by Dr. Ironside Bruce.

OESOPHAGUS : POUCHES, &c.

3053. Pouch of œsophagus, lateral view.
 Lent by Dr. Ironside Bruce.
 3054. Idem, antero-posterior view.
 3055. Simple dilation of the œsophagus, with bougie in situ.
 3056. Antero-lateral right view of the thorax, showing bismuth retained in lower part.
 3057. Bismuth food arrested by malignant stricture of the œsophagus.
 Lent by Dr. Thurstan Holland.
 3058. Idem, showing food passing the stricture.

GASTRIC DISEASE.

3059. Malignant disease of the stomach. Bismuth food in organ.
Lent by Dr. C. Thurstan Holland.
3060. Idem.
3061. Idem.
3062. Simple ulcer of the stomach. Bismuth food in organ.
3063. Hour glass contraction, due to ulcer of the stomach.

THORACIC AFFECTIONS.

3064. Pneumothorax.
Lent by Dr. Ironside Bruce.
3065. Suppurative Pericarditis.
3066. Normal clothed adult chest, instantaneous "Snook" exposure.
Lent by Dr. Thurstan Holland.
3067. Hydro-pneumothorax in a boy aged $4\frac{1}{2}$ years.
3068. Secondary growth in the lung in a case of sarcoma of the kidney in a child of 1 year, 1 month.
3069. Fibrosis of the lung, in a child aged $7\frac{1}{2}$ years.
3070. Drain tube lost in an empyæma cavity.
3071. Idem.
3072. Encysted empyæma.
3073. Empyæma, "Snook" instantaneous exposure.

ANEURYSM.

3074. Thoracic aneurysm.
Lent by Dr. Ironside Bruce.
3075. Aneurysm, showing the patient's spine. The number is on the left side of the patient.
Lent by Dr. Somerville.
3076. Aneurysm, showing the patient's spine. The number is on the right side of the patient.
3077. Idem.
3078. Idem.
3079. Idem.
3080. Aneurysm of the innominate artery. Revealed at the post-mortem examination.
2081. Thoracic aneurysm.
Lent by Dr. C. Thurstan Holland.
3082. Aneurysm of aorta.
Lent by Dr. Worrall.
3083. Aneurysm of the aortic arch, antero-posterior view.
Lent by Dr. C. Harrison Orton.
3084. Idem. Right anterior oblique view.

FOREIGN BODIES.

3085. Drawing pin in œsophagus.
Lent by Dr. Thurstan Holland.

3086. Penny in œsophagus.
 3087. Open safety pin in œsophagus.
 3088. "Devil" in œsophagus.
 3089. Tooth plate in œsophagus.
 3090. Idem.
 3091. Pin in the colon.
 3092. Hat pin in the stomach.
 3093. 62 pieces of needles in and around a knee joint.
 3094. A revolver bullet in the pericardium.
 3095. Foreign body (steel) in the orbit.
Lent by Dr. Rupert Hallam
 3096. Foreign body (air gun shot) in the orbit.
 3097. Lead pellets in the right side of the abdomen and the right hip joint.

Lent by Dr. Somerville

MYOSITIS OSSIFICANS.

3098. Traumatic myositis ossificans.
Lent by Dr. Ironside Bruce.
 3099. Myositis ossificans.
Lent by Dr. E. S. Worrall.
 3100. Myositis ossificans after dislocated elbow.
Lent by Dr. C. Thurstan Holland.
 Case of traumatic myositis ossificans :
 3101. Dislocated elbow, 4 days after the accident.
 3102. Ditto. 24 ditto ditto
 (note the band from olecranon to humerus)
 3103. Ditto 31 ditto ditto reduced.
 3104. Ditto 6½ months ditto
 3105. Sesamoid bone in the outer head of the gastrocnemius.
Lent by Dr. C. Harrison Orton.
 3106. Taken on May 6th, 1907.
 3106A. „ „ Oct. 14th, 1907.
 Showing bony deposit more transparent and smaller.
Lent by Dr. J. Taylor.

3106A. MAXILLARY ABCESS

Lent by Dr. Ironside Bruce.

3107. Unerupted teeth in maxilla.
 3108. Normal trachea (streak).
 3109. PHOTOGRAPH OF THE SO-CALLED "BRIGHTON UNITED TWINS."
Lent by Dr. F. Bailey.

3110. ECZEMA OF HAND, before X ray treatment in 1898

Lent by Dr. Thurstan Holland,

- 3110A. Idem, after treatment,

- 3111. Lupus of the face ; before X ray treatment in 1898.
- 3112. Idem, after treatment.
- 3113. Lupus of the face ; before treatment with X rays in 1900.
- 3114. Idem, after treatment.
- 3115. X ray dermatitis and epithelioma of hands.
- 3116. Ringworm ; X ray treatment (measured Sabouraud disc doses), permanent baldness.

3117. TELANGIECTASIS after X rays for Leukæmia.

- 3117A. Telangiectasis after X rays for goitre (coming on one year after the cessation of treatment ; at no time was there any burning of the skin).

3118. WEBBED FINGERS.

Lent by Dr. E. S. Worrall.

3119. A SIX MONTHS' FÆTUS.

Lent by Dr. C. Thurstan Holland.

18 SLIDES.

Lent by Dr. C. J. Morton.

- 3120. Osteo-Sarcoma of the upper part of tibia
- 3121. Idem of head of tibia.
- 3122. Idem of tibia.
- 3123. Idem of tibia (secondary growth).
- 3124. Carcinoma of tibia.
- 3125. Idem of fibula.
- 3126. Carcinomatous tumour.
- 3127. Epithelioma affecting tibia.
- 3128. Idem affecting mandible.
- 3129. Idem affecting heel.
- 3130. Idem affecting tibia.
- 3131. Exostosis.
- 3132. Hydatid of tibia.
- 3133. Syphilitic osteitis of tibia.
- 3134. Syphilitic epiphysitis of tibia.
- 3135. Recurrent new growth of shaft of tibia.
- 3136. Endosteal sarcoma of tibia.
- 3137. Multiple enchondromata.

XVIII.—ANÆSTHETIC APPARATUS.

Hon. Curator - Dr. ADA M. BROWNE.

Historic Apparatus

Lent by the Anæsthetic Section of the Royal Society of
Medicine, by Dr. F. Silk.

3138. PORTRAIT OF DR. CRAWFORD W. LONG, æt. 26.
Lent by Dr. F. Hewitt, M.V.O.
3139. LETTER FROM DR. C. W. LONG AND ROBERT H.
GOODMAN, ordering some ether, February, 1842.
*Lent by Mrs. Francis Long Taylor, Daughter of the late
Dr. C. W. Long, of Jefferson, Georgia, U.S.A.*
3140. COPY OF AN AFFIDAVIT BY Mr. J. M. VENABLES,
the first patient to be operated on, under the
influence of ether, by Dr. C. W. Long, early in 1842.
3141. CERTIFICATE OF Mr. E. S. RAWLS, witness of first
operation on Mr. Venables, 1842.
3142. CERTIFICATE OF Mr. W. H. THURMOND, a second
witness of first operation on Mr. Venables, 1842.
3143. CERTIFICATE RELATING TO FIRST OPERATION BY
DR. LONG ON MR. VENABLES, signed by the
mother, brothers and sisters of the latter, 1842.
3144. CERTIFIED COPY MADE FROM LEDGER of account
presented by Dr. Long to Mrs. James Venables for
administration of ether and removal of tumours,
1842.
3145. CERTIFICATE from witness of second operation by
Dr. Long on Mr. Venables, 1842.
3146. CERTIFICATE OF MARY VINSON as to an operation
performed on her under ether by Dr. Long, 1843.

3147. CERTIFICATE OF MRS. E. W. CARLTON, wife of Dr. Carlton, stating that on the advice of Dr. Long he produced ether anæsthesia on a patient for extraction of a tooth, 1844.
3148. LETTER TO MRS. F. LONG TAYLOR from Dr. Long's first student, Dr. G. F. Groves, who assisted him in removal of two fingers from a boy's hand, January 8th, 1845. One when he was under the influence of ether—one without anæsthetic.
3149. CERTIFICATE OF MR. MILTON BAILEY, witnessing Dr. Grove's letter.
3150. CERTIFICATE OF MR. G. L. THOMPSON, witnessing Dr. Grove's letter.
3151. CERTIFICATE OF MARY E. WARE, of having had a tooth extracted when under the influence of ether, by Dr. Long, 1846.
3152. CERTIFICATE OF ELIZABETH NAHERS, corroborating the statement of her sister (Mary E. Ware) as to the extraction of a tooth under ether by Dr. Long 1846.
3153. CERTIFICATE OF DR. A. DE LA PERIERE, a senior physician, as to Dr. Long's having used ether as an anæsthetic in 1842.
3154. CERTIFICATE OF JAMES CAWARK of Athens, Georgia, to the effect that in 1843 the physicians of Athens recognised the use of ether as an anæsthetic by Dr. Long.
3155. DR. C. W. LONG'S OWN ACCOUNT OF HIS DISCOVERY OF THE USES OF ETHER as an anæsthetic for surgical purposes.
Read before the first Convention of the Georgia State Medical Society, 1852.
3156. A DOCUMENT setting forth the decision of the Commission appointed to consider the matter to place Dr. Long's Statue in the Statuary Hall, Washington, as being the most distinguished man in Georgia.

3157. NEWSPAPER CUTTING, April 1910, describing the unveiling of the monument erected to the memory of Dr. Crawford W. Long at Jeffreson.
3158. NEWSPAPER CUTTING, being a letter from Mr. J. W. Glenn, one of Dr. Long's first patients, certifying that he had removed a tooth for him under ether, when a child.
3159. LEAVES FROM A CATALOGUE (1874) of Evans and Wormall, illustrating Snow's and some other old pattern Chloroform Inhalers.
Lent by Evans & Wormall.
3160. REPORT of the 61st Annual Session of the Medical Association of Georgia. Memorial to Dr. Crawford W. Long.
Lent by Dr. Foy, Dublin.
3161. PHOTOGRAPH OF DR. CRAWFORD W. LONG, of Jefferson, Georgia.
Lent by Dr. G. Foy.
3162. PORTRAIT OF DR. WATTS.
3163. PHOTOGRAPH OF DR. W. J. MORTON, of New York.
3164. A FACSIMILE OF DR. C. W. LONG'S HANDWRITING.

Books.

3165. A COPY OF BEDDOE'S WORKS.
Containing illustrations of machinery devised by Watts, used in preparing nitrous oxide gas by Humphrey Davy. Also a letter from Dr. Pearson to Dr. Beddoes on "The value of inhalations of ether to allay the irritation of cough in tuberculosis.
3166. A HANDBOOK ON CHLOROFORM, its action and administration, by A. E. Sansom, M.B.
Lent by Mr. F. Rowland Humphreys.
3167. ANÆSTHETICS, by Dr. Snow. 1858. Edited by Richardson. *Lent by Dr. Silk.*
3168. ON THE INHALATION OF ETHER, by Dr. Snow. 1847.

3169. MURPHY ON CHLOROFORM. 1855.
3170. CHLOROFORM AND CHLORIC ETHER, by J. C. Warren. 1849.
3171. ETHERISATION IN CHILDBIRTH, by Channing. 1848.
3172. MANUAL OF ANÆSTHETICS, by Dr. Kidd. 1859.
3173. BOUND PAMPHLETS; see No. 22, Simpson's account of the discovery of Chloroform. Original pamphlet, 1847.
3174. SANSOM ON CHLOROFORM.
Lent by Mr. F. Rowland Humphreys
3175. SNOW'S INHALER, invented 1847.

Consists of a double cylinder, the outer space for cold water, the inner for chloroform. Air is drawn in through holes in the upper part of the cylinder, over the chloroform, up through the tube to a Simpson's facepiece which has inspiratory and expiratory valves. "Snow on Anæsthetics," 1858, page 81.

3176. A SIMILAR SNOW'S INHALER without tube or facepiece.

3177. SANSOM'S INHALER, invented about 1860.

The chloroform receptacle contains blotting paper or lint, over which the air is drawn through holes in the metal cylindrical part, the joints of which allow of adaptation in any position, and the air supply can be regulated. "Sansom on Chloroform," 1865, page 129.

3178. MURPHY'S INHALER, invented about 1855.

Applied only to the mouth. The chloroform is contained on a sponge in a box. The air supply can be regulated and there is an expiratory valve. "Murphy on Chloroform," 1855, page 31.

3179. CLOVER'S INHALER, for the administration of a "definite dilution" of Chloroform.

Consists of a bellows of known capacity leading to a chamber containing a measured quantity of chloroform, introduced by means of a syringe. The mixture is conveyed to the large bag, which hangs from the shoulders of the anæsthetist, and when the latter is full the tube is detached from it and the facepiece substituted.

3180. AN OLD FORM OF REGULATING CHLOROFORM INHALER.

3181. A NOVEL FORM OF CHLOROFORM INHALER with perforated sides.

3182. ROBERT ELLIS'S INHALER.

An attempt to provide for the administration of mixed vapours.

3183. AN OLD PATTERN OF CLOVER'S (LARGE) GAS AND ETHER APPARATUS.

The ether is conveyed to the facepiece by a tube, which is contained within the nitrous-oxide bag.

Modern Apparatus.

3184. BARTH'S NITROUS OXIDE INHALER.

Has a composition face-piece and three-way valved stopcock with gas bag and tubing, connecting with supply cylinders which have a simplified, coupling worked by one screw. The sides of stopcock are transparent, and are of mica, together with the valve discs, which are controlled by springs.

Advantages.—(1) The face-piece and stopcock can be boiled. (2) The valves lifting vertically are wide-spanning. (3) Not being made of rubber, they do not perish or stick to the metal parts. (4) The simplified coupling saves much time in exchanging cylinders, and avoids the loss of loose parts.

Lent by George Barth & Co.

3185. HEWITT'S NITROUS OXIDE APPARATUS.

Has a rubber face-piece with three-way stopcock and gas bag with small tap connected to supply tube from cylinders. Gas is turned on or off by lower handle of stopcock, whilst top handle puts the breathing valves in or out of action. The small tap on bag permits detachment from supply tube when used with Clover's inhaler.

Advantages.—(1) The stopcock valves act whilst air is breathed as well as gas, and correct fit of face-piece can be judged by action of expiratory valve before turning on gas. (2) The valve opening being large, breathing is free and quiet. (3) By half a turn valve chamber can be at once taken out for sterilizing.

3186. FLUX'S OPEN STOPCOCK FOR THE "OPEN" ADMINISTRATION OF N_2O .

It is formed of a T-shaped tube, the upright portion of which is connected with the gas bag, and one end of the cross-piece

with the inhaler. An inner tube is telescoped into the cross-piece, and fits it closely at the end opposite the inhaler, but is flattened obliquely towards the face-piece. Being made of metal, and containing no valves, it cannot get out of order, and may be repeatedly sterilised by boiling. As air is constantly admitted, patients can never be cyanosed. Anæsthesia is induced with greater rapidity (often within fifteen seconds), and can be maintained with a very small additional expenditure of gas and independently of any inter-current mouth breathing.

Lent by Montague & Co.

3187. HEWITT'S NITROUS OXIDE AND OXYGEN INHALER.

Has a rubber face-piece and a valved regulating and mixing stopcock, with a rubber bag divided in its centre, and connected by metal Y mounts and rubber tubes, one within the other, to the supply cylinders. The stopcock has four valves, two acting as in expiratory ones, and two as check valves to prevent mixing of the gases in the double bag.

Advantages.—(1) There is a longer anæsthesia than with gas alone. (2) The mixture is suitable for weakly-constituted and debilitated patients. (3) Oxygen being admitted through separate openings which, coincide with divisions on the dial, there is less variation in the supply than when the O_2 passes through one continuous slot or opening.

3188. HEWITT'S SEPARATE BAGS.

Lent by George Barth & Co.

3189. HEWITT'S NITROUS OXIDE AND OXYGEN INHALER WITH ADDITIONAL OXYGEN SUPPLY TAP FOR LONG ADMINISTRATIONS.

Has a rubber or similar face-piece attached to the regulating stopcock by a short flexible tube. An increased supply of O_2 is got by turning a small tap under the dial indicator. The inhaler is fixed to the upright of a hollow frame, slid between the mattress and bed frame, so that the rubber bags hang free and are not pressed by any part of the apparatus. The supply tubes from cylinders are connected to the top mounts of bags and let in gas at the sides.

Advantages.—(1) The flexible tube allows the bags to hang free at the side of bed or operating tables. (2) There being no weight on the bags the proportions of N_2O and O_2 are more reliable. (3) The disadvantage of breathing through the flexible tube is got over by fixing the valves close to the

face-piece. (4) Anæsthesia of a very satisfactory type can be maintained by this means for upwards of one hour, and without after-sickness.

3190. DR. A. G. LEVY'S APPARATUS for the administration of N_2O and O_2 .

The reservoir bag containing the oxygen is within that containing the nitrous oxide. The advantage is that the pressure on the gases is thus equalised.

3191. MR. COLEMAN'S APPARATUS FOR ADMINISTERING NITROUS OXIDE THROUGH THE NOSE.

Consists of a metal nasal and mouth inhaler leading by separate tubing to a gas and air regulating stopcock, the latter being fed from a gas-bag enclosed in a spring compressor. The nosepiece, containing an expiratory valve, is retained in position by means of a sliding-clamp, and the mouthpiece, when employed, can be used as an expiratory chamber or as an additional supply for nitrous oxide by means of a controlling lever.

3192. MR. LOOSELEY'S APPARATUS FOR CONTINUOUS NASAL ADMINISTRATION OF NITROUS OXIDE GAS.

Consists of a nose and a mouthpiece, both made of metal, the former connected by two, the latter by one, flexible tube with the gas bag. The gas can be supplied to both nose and mouth during the induction, which is thus unembarrassed and quiet. By sliding the button on the nosepiece, a total distance of $\frac{1}{2}$ inch—(i.) The gas may be admitted at atmospheric pressure, the patient exhaling it through the valve; (ii.) The expiratory part may be cut out and a plus pressure obtained; or (iii.) Re-breathing may be allowed if desired. (iv.) The gas may be cut off and air admitted. The nose-piece, being made of malleable copper, will fit any nose, and both it and the mouthpiece may be sterilised by boiling.

Lent by George Barth & Co.

3193. PATERSON'S APPARATUS FOR ADMINISTRATION OF NITROUS OXIDE THROUGH THE NOSE.

The apparatus consists of a bag to contain the N_2O under slight pressure, and a nosepiece connected therewith to cover the nose withal. A separate mouthpiece is provided to cover the patient's mouth during induction in order to economise gas and to establish nasal inspiration.

Advantages.—Light and efficient, enabling anæsthesia to be prolonged to the requirement of the operator. An airway for allowing the patient to have air without the necessity of removing the face-piece.

Lent by Allen & Hanbury.

3194. MR. ROOD'S APPARATUS FOR ADMINISTERING
NITROUS OXIDE THROUGH THE NOSE.

The apparatus consists of a metal nosepiece with a single tube leading to the gas bag. At the junction of the nosepiece and the tube is placed a valve, by the rotation of which the nosepiece can be placed either in connection with the gas bag or air may be admitted from a side aperture as required. The apparatus can be operated entirely with the right hand, so leaving the left free. Air may be given without raising the nosepiece from the face, at the same time cutting off the gas, so avoiding waste. The apparatus can be fitted to any gas bag.

Lent by Mayer & Meltzer.

3195. MR. TRUSBY'S APPARATUS FOR ADMINISTERING
NITROUS OXIDE THROUGH NOSE.

A nasal apparatus to overcome the obstruction to respiration caused by the relaxation of the soft palate falling on the base of the tongue during an administration.

The points are :—i. A valve on the nose-piece.

ii. Connection of the nose-piece and mouth-cover during the induction period.

iii. A simple method of shutting off the gas and giving air, fixed on the nose-piece itself.

iv. Two metal bands connected by a spring fixed on the nasal bag in order to allow the gas to come off at the gentle pressure of the spring rather than the pressure of the expanding rubber, which is too great a pressure.

Lent by The Dental Manufacturing Company.

3196. CARTER BRAINE'S ETHYL CHLORIDE INHALER.

Ordinary N_2O face-piece, two-way stopcock, Clover's small respiratory bag, and a phial to contain the ethyl chloride. The ethyl chloride can be given gradually by raising the phial slowly from the dependant into the horizontal, and finally the vertical position. Air can be admitted as required through the stopcock.

Lent by J. H. Montague.

3197. PROBYN WILLIAMS' ETHYL CHLORIDE INHALER.

May be used in conjunction with the ether inhaler when giving ethyl chloride as a preliminary to ether administration. The angle piece contains a tube opening on to the surface by a hole covered by a shutter closed by a spring.

This can be pushed on one side by the nozzle of the ethyl chloride tube, and the ethyl chloride can be sprayed through the tube into the bag.

Advantage.—The dose of ethyl chloride can be administered with one hand, leaving the other free to hold the face-piece on to the patient's face.

Lent by Mayer & Meltzer.

3198. ETHYL CHLORIDE INHALER AND TUBE.

Inhaler consists of celluloid face-piece with removable rubber pad, a nickel-plated elbow joint with straight tube for insertion of stopcock of ethyl chloride tube, and a reversible wide mouth rubber bag.

Advantages—Inhaler. Simplicity. Rubber pad is removable so that facepiece can be sterilised. Rubber bag is wide-mouthed and reversible. Cleanliness. Convenience. Can be adapted to ordinary Clover, so that ethyl chloride ether sequence can be easily conducted. Ethyl chloride—Chemical purity, freedom from unpleasant odour, stability. Tube—Convenience of administration, accurate dosage ensured, stopcocks interchangeable.

Lent by Duncan, Flockhart & Co.

3199. HEDLEY'S ETHYL CHLORIDE BOTTLE.

3200. CLOVER'S PORTABLE REGULATING ETHER INHALER

3201. CLOVER'S GAS AND ETHER INHALER. With modifications by Ludley Buxton.

Commonly known as the Large Clover. The reservoir holds four ounces of ether, and therefore is less likely to need replenishing than the smaller apparatus.

The gas tap can be left open (after detaching the gas tube). This does away with the necessity of removing the face piece.

The patient is not aware of any smell of ether.

3202. DR. HEWITT'S INHALER FOR THE ADMINISTRATION OF ETHER.

A modification of Clover's Apparatus, with a wide box airway. The opening through which the ether is passed is always vertical.

Advantage.—Less possibility of any asphyxia. Ether can be added *after* anaesthesia is first induced with gas.

Lent by George Barth & Co.

3203. HEWITT'S LARGE-BORE ETHER INHALER.

Has a special form of facepiece attached by screwed mount to large-bore reservoir with vertical filling opening. A wide-necked ether bag is directly connected at distal end, and a large-bore stopcock with gas bag can also be attached when giving gas and ether.

Advantages—The large bore allows perfectly free respiration. (2) The smell of ether is avoided before giving gas or ethyl chloride, as the reservoir can be charged whilst on the patient's face. (3) The screwed face-piece prevents its slipping off when in use. (4) The weight of reservoir is not more than an ordinary Clover's inhaler.

Lent by George Barth & Co.

3204. ORMSBY'S ETHER INHALER.

Lent by Mayer & Meltzer.

3205. PROBYN WILLIAMS', WIDE - BORE, PORTABLE REGULATING ETHER INHALER.

A modification of the Clover respiration with a wide bore inhaler is less laboured than with a narrow bore apparatus.

3206. CARTER BRAINE'S MODIFICATION OF ORMSBY'S ETHER INHALER.

Large air-way. Non-compressible cage bearing the sponge. Large respiratory bag. Regulating air valve. Anæsthesia obtained approaches that of "open method" by permitting a free supply of air with the ether.

Lent by J. H. Montague.

3207. WIRE MASK FOR ETHER ADMINISTRATION BY THE OPEN SYSTEM.

White gauze is folded in twelve layers and stretched over the unhinged mask and then clamped down. A rolled strand of gauze is laid on the face beneath.

Lent by Allen & Hanbury.

3208. AN "OPEN INHALER" FOR THE ADMINISTRATION OF ETHER, CHLOROFORM, OR "MIXTURE."

In the apparatus shown an ordinary nitrous oxide inhaler face piece is used, and the patient breathes only through valves in such a way that the inspired air passes through gauge, on which any desired quantity of the anæsthetic may be dropped. The gases of expiration pass out freely through the expiratory valve being prevented passing again through

the gauze by the inspiratory valve which is inside the inhaler thus less than half the usual quantity of the anæsthetic is required.

For an adult it is necessary to use 8 to 16 layers of gauze stretched over the opening of the inhaler by means of the fixing ring. For a child less would be required. The gauze carrier is detachable, and is pierced half way round its collar by holes; by rotating the gauze carrier the holes are made to pass over a slot in the tube beneath them, and thus extra air can be admitted in a regular manner to mix with and dilute if necessary that passing through the gauze.

With this apparatus patients have been kept comfortably anæsthetised under ether for periods lasting two hours for Wertheim's hysterectomy in the Trendelenberg position and for the removal of the Gasserian Ganglion in the sitting posture. From an experience of several hundred cases in which this apparatus has been used, the inventor believes that unpleasant after-effects are much less likely to be met with owing to the greater precision of dosage its use makes possible.

3209. ETHER BOTTLE-STOPPER.

For use in administering ether by the open system. Fits ordinary medicine bottles. Can be removed from empty and inserted in full bottles during operations.

3210. DR. HAROLD LOW'S MASK for the "Open" System of Ether Administration.

Consists of a wire cage in the principle of Schimmelbusch's mask which is so shaped, however, that it fits into an ordinary "wide-bore" face piece. The cap is covered with layers of gauze. Being further from the patient's face, there is no chance of any fluid reaching the patient and freezing of the face is prevented. The wide bore prevents any asphyxiation.

Lent by George Barth & Co.

3211. MAYO'S MASK FOR ADMINISTERING ETHER BY THE OPEN METHOD.

A larger and stronger modification of Schimmelbusch's mask, allowing ample room for the requisite number of layers of gauze.

3212. RENDLE'S MASK FOR A.C.E., made in celluloid as suggested by Silk.

Lighter and more easily cleaned than the original mask of leather.

3213. DR. SILK'S MASK FOR A.C.E.

A modification of Rendle's, but being made of *metal* is stronger and can be *sterilised* by boiling.

The top is hinged so that more anæsthetic can be added without removing the face-piece. A sloping diaphragm prevents any fluid running into the face, whilst a wire guard keeps the sponge in position.

Lent by Down Brothers.

3214. DR. WARING'S MASK FOR A.C.E.

A modification of Rendle's, made of celluloid.

The sponge is kept in position by a wire spring and a deep gutter inside the apparatus prevents the anæsthetic running into the patient's face. The face-pad ensures the patient only getting air that is charged with the anæsthetic.

Lent by George Barth & Co.

3215. DR. HEWITT'S MASK AND BOTTLE FOR CE MIXTURE.

The mask is a modification of Skinner's, and is of certain dimensions. The bottle is graduated in drachms and is provided with a stop-cock (pierced by an airway) and a curved delivery tube. A curved metal tube is provided for the delivery of oxygen. Much facilitates accurate pouring of the mixture.

Lent by Allen & Hanbury.

3216. DR. BLUMFELD'S MASK.

A modification of Schimmelbusch's, with the addition of a wire handle resembling that on the Skinner, and an extra deep gutter. Strong, easy to hold, deep gutter forms a reservoir for any superfluous anæsthetic.

3217. AN OPEN ETHER INHALER.

The lint lining gives a large surface for evaporation. The apparatus may be used without valves if desired its dissipation into the surrounding air.

The patient receives a stronger vapour with the inspiratory valve at the mouth of the chamber in use than he does when the valve is interposed between the chamber and the face piece. The warmth of the hand holding the chamber promotes evaporation.

*Lent by Dr. G. A. H. Barton and supplied by Messrs.
Allen & Hanbury.*

3218. DUBOIS' APPARATUS FOR SUPPLYING CHLOROFORM MIXED WITH AIR IN FIXED PERCENTAGES, ON THE PLENUM PRINCIPLE. (Foot movement by Dr. Chapman). *Lent by Dr. Paul M. Chapman.*

Dubois' apparatus. When the piston moves, air is drawn into the interior of the apparatus through the glass phial, into which some drops of chloroform have been instilled prior to each movement. The drops are vaporized by the ingoing current of air. In this way, the chamber, whether above or below the piston, contains the required mixture; this is assured by a reversal of the intake.

By the same movement, the mixed vapour is continuously expelled through the outlet tube on to an open mask. It is thus a plenum apparatus, *i.e.*, the mixture is supplied independently of the vacuum created in a closed mask by the patient himself in the act of breathing.

N.B.—The foot movement has been adapted to the apparatus as a simple device for moving the piston by Dr. Chapman. The apparatus has been continuously in use for nearly six years, without repairs of any kind.

3219. A REGULATING CHLOROFORM INHALER, which can be used also for the "Open" administration of Ether.

The principle of the inhaler is that the inspired air is made to pass over the surface of the anæsthetic, and thus the same quantity is automatically absorbed with every breath. This quantity can be precisely regulated.

Lent by Dr. Harvey Hilliard.

3220. PROFESSOR VERNON HARCOURT'S CHLOROFORM REGULATOR.

Air is aspirated by the patient over CHCl_3 in a Wolff's bottle of a peculiar shape, so designed that as the level of the chloroform is lowered by evaporation, a larger and larger area of chloroform is provided to ensure the automatic 2% chloroform in air mixture being maintained. An index moving on a graduated arc opens up a supplementary airway, and so the strength of the chloroform per centage may be decreased to *nil* by fractions from 2%.

Lent by Messrs. Griffin.

3221. HARVEY HILLARD'S CHLOROFORM AND ETHER REGULATING INHALER.

Consists of a glass chamber on the principle of a Wolff's bottle. The ingress tube is provided with a sliding inner metal tube

whereby the entering column of air can be made to enter at different levels. The egress tube is guarded with an inspiratory valve.

Advantages—

- (i) Suitable for either chloroform or ether or mixtures.
- (ii) Fresh air with each inspiration, and no delimitation of oxygen.
- (iii) No rebreathing of vitiated air, and no cyanosis.
- (iv) No urgent respiration.
- (v) Little or no mucous secretion
- (vi) After-effects less likely.
- (vii) The constant steady vapour minimises lethallity and "anæsthetic shock."

Lent by Krohne & Sesemann.

3222. HEWITT'S IMPROVED CHLOROFORM INHALER.

Consists of an ordinary Junker, the supply and delivery tubes of which are contained one within the other.

Advantage. Absolutely does away with the chance of the bellows being connected with the delivery tube and consequently liquid chloroform cannot reach the patient.

3223. DR. HUGHES' MASK FOR CHLOROFORM.

A modification of Schimmelbusch's, made of small size suitable for children and to cover the nose during operations to the mouth.

Lent by Allen & Hanbury.

3224. JUNKER'S CHLOROFORM INHALER

With modifications by Dudley Buxton, fitted with safety bottle, with funnel for filling, and aseptic face-piece.

Lent by Mayer & Meltzer.

3225. DR. A. G. LEVY'S PERCENTAGE CHLOROFORM INHALER. TYPE, "SUCTION."

Special advantages.. (1.) The percentage of vapour delivered is unaffected by variations in the force of respiration. (2.) The chloroform container is fixed so that the percentage of vapour cannot be accidentally increased by ascillations of the chloroform. (3.) All the air passages are wide, so that breathing is unobstructed. (4.) Only one adjustment required, *i.e.*, the index hand.

3226. KROHNE & SESEMAN'S IMPROVED JUNKER'S CHLOROFORM INHALER.

An ordinary Junker with the addition of stopcocks on the supply and delivery tubes. The bellows are graduated in c.c. to enable more accurate dosage of chloroform vapour.

Advantage. No chance of contents of bottle being spilled. More accurate dosage.

3227. A MODIFIED "JUNKER."

Lent by Dr. Beresford Kingsford.

The bottle has been designed to overcome the difficulty of keeping patients under with chloroform given through an oral or nasal tube. It is of metal, with two glass windows, and contains a thermometer attached by a clip to the afferent tube of the ordinary Buxton fittings. By holding the lower end of the bottle in one hand and watching the thermometer (while pumping), the chloroform can be kept at any temperature desired between 40° and 65° F., and the strength of the vapour given can be regulated thereby. Pumping through chloroform at a temperature of 40° F. gives a vapour of nearly 6 per cent., but if the chloroform be warmed to 60° F. the strength of the vapour rises to about 12 per cent. For details of experimental determinations of vapour strengths see *Polyclinic Journal*, March and April, 1908. A foot bellows is used for pumping, so that one hand may be free for warming the chloroform as required. The mask is a combination of the Buxton and Schimmelbusch masks, and through the celluloid the colour of the lips (and when respiration is inaudible, the movements of a gauze flag hung in the air current) can be watched. This mask may be used with the bottle, or for giving chloroform by the drop method, as it has a larger surface of lint than the Buxton mask and presents that surface almost horizontally when the patient's face is turned to one side.

3228. AN INHALER FOR ADMINISTERING ETHER BY CRILE'S METHOD OF NASAL INTUBATION IN OPERATIONS UPON THE LIPS OR WITHIN THE MOUTH.

Lent by Mr. Harold Upcott.

3229. A MODIFIED CRILE'S INHALER.

For administration of anaesthetics through the nose during operations on the mouth, nose, jaws, lips, etc. Suggested by Mr. H. Upcott, F.R.C.S.

Lent by Mr. H. Upcott, F.R.C.S.

3230. THE ROTH DRÄGER ASEPTIC VALVED MASK, for Ether and Chloroform.

A metal face-piece shaped to fit over the molar bones and the nose. It is provided with in- and ex-spiratory valves and is suitable for the administration of ether by the open method, mixtures, or chloroform.

Lent by Mayer & Meltzer.

3231. SCHIMMELBUSCH'S ASEPTIC CHLOROFORM MASK.

3232. SKINNER'S CHLOROFORM MASK.

3233. VAJNA'S ASEPTIC GLASS CHLOROFORM MASK.

For use with Juuker or other chloroform apparatus on the plenum system.

3234. TUBE TERMINAL FOR JUNKER'S APPARATUS, for use with Bronchoscope.

Is dull blackened to prevent reflection of light. Curve of flattened end fits proximal end of speculum; slight lower lip holds in place. Continuous instead of intermittent CHCl_3 administration.

3235. BIER'S SYRINGE, FOR SPINAL ANALGESIA, with Barker's modification.

Consisting of a inner canula, projecting beyond the needle point.

3236. MR. CANNY RYALL'S SPINAL ANALGESIA APPARATUS.

It consists of:—

1. A needle attached to a short hollow tube containing a stopcock. The needle is very fine so that it readily perforates the dural sac, making a minute opening in it, and causing little pain. It is composed of platinum-iridium which does not rust. The point is bevelled vertically so that it may do as little damage as possible, and is sloped as near a right angle as is consistent with its perforative power.
2. The syringe is of 1 ccm. capacity and can be readily taken to pieces for sterilization. Its piston is supplied with a screw arrangement into which a catch supported by a spring fits, one may therefore make use of either a pushing or screw action, and so regulate the rapidity with which its contents are emptied.

3237. ACKLAND'S MODIFICATION OF MASON'S GAG, the shape of the jaws allowing of easy introduction.

The tooth plates lie almost in the same places, one behind the other, and so can be inserted more easily than the normal pattern.

3238. DUDLEY BUXTON'S MODIFICATION OF MASON'S GAG, with ratchet to allow of easy manipulation.

The ratchet is more easy to operate than the screw nut of the ordinary gag.

The large handles give more powerful leverage.

3239. DOYEN'S GAG.

The curved shanks fitting the face, allows the mask to be used while the gag is in position.

3240. PROBYN WILLIAM'S MODIFICATION OF DOYEN'S GAG, fitted with chloroform tubes, for attaching to Junker's Inhaler.

3241. O'DWYER'S GAG FOR CHILDREN.

Small tooth plates which do not project into the mouth. Flat handles, enabling the gag to lie flat against the cheek and so being out of the way whichever way the patients have to be turned.

3242. HEWITT'S MOUTH GAG, fitted with chloroform tubes, for attaching to Junker's Inhaler.

Consists of a metal prop pierced by a hollow tube. Takes up very little room and is easily sterilised.

3243. MASON'S MOUTH GAG.

Lent by Mayer & Meltzer.

3244. KNOWLES-MASON GAG.

A modification of the Mason, with larger and stronger handles, giving more powerful leverage for opening the jaws. Owing to the ratchet being towards the handles, it is easily and naturally released by pressing forward with the thumb. Having a second ratchet, the gag is easily closed lower when the main ratchet is in such a position as to be out of sight. Owing to the pitch of the ratchet a very slight pressure is all that is necessary to close the gag.

The shape of the jaws prevents slipping, and obviates the necessity of covering them with rubber.

Lent by The Dental Manufacturing Company.

3245. WINGRAVE'S AUTOMATIC SPRING MOUTH PROP.

As the mouth opens a spring, coiled round the central pillar, adjusts the tooth-plates to the new degree of separation of the teeth.

Lent by Mayer & Meltzer.

3246. MOUTH OPENERS. MAUNDERS'.

Boxwood Wedge or Mouth-Opener.

3247. SCREW MOUTH-OPENER.

Two metal blades, which are separated by turning a metal screw through the base piece to which they are hinged.

3248. HEISTER'S MOUTH-OPENER.

The portions introduced between the teeth are separated by the powerful leverage of long and strong handles.

3249. Vulcanite mouth prop, with rubber pads.

3250. HEWITT'S MOUTH PROPS.

Wedge-shaped to fit contour of teeth when jaws are separated.

3251. BRUNTON'S AUTOMATIC MOUTH PROP.

A modification of an original prop. The teeth plates can follow any increased separation of the teeth by the pull of an elastic band. Approximation of the teeth is prevented by the locking of the arms carrying the teeth-plates on the central pillar.

3252. BUCK'S SCREW ADJUSTABLE MOUTH PROP.

An ordinary mouth prop, the height of which can be increased or decreased to a certain extent by the screwing together of the parts.

3253. DR. G. A. H. BARTON'S COMBINED TONGUE CLIP AND JUNKER TERMINAL.

A new design. A flattened tube conveys the vapour of chlor-form into the patient's mouth. From its lower side a pin projects which perforates the tongue and is locked into the opposing arm of the tongue clip. It is released by an arm which can be pushed sideways.

ADVANTAGE.—No bruising of the tongue, the tube out of the operator's way, the tongue held forward by a thumb, leaving the remaining fingers free to hold up the jaw.

3254. BERGER'S TONGUE FORCEPS.

The tongue is pierced with two sharp points, causes no bruising, and gives a firm hold. Easily released.

3255. BRAINE'S TONGUE FORCEPS.

Shaped something like a pair of polypus forceps. Has no retaining catch. Can be used as a mouth-opener.

3256. TONGUE CLIP, for use in Anæsthesia, with thumb loop for holding.

The oral airway is rendered patent. No bruising of the tongue results, and the patient is unaware of its use.

3257. COHEN'S TONGUE FORCEPS.

Anatomically shaped to the tongue, with a bifurcation in the lower blade, allowing space for the frænum linguæ. Lighter and more springey than the ordinary type, they cause less bruising of the tongue.

Lent by The Dental Manufacturing Company.

3258. TONGUE FORCEPS, with fenestrated and serrated blades.

Lent by Mayer & Meltzer.

3259. CARTER'S ORAL SPOON, modified by Dr. Dudley Buxton.

The metal handle is carried on round the spoon, making it stronger and less liable to break off in the patient's mouth.

- 3259A. MR. PATERSON'S TONGUE FORCEPS.

Consists of a pair of forceps with a sharp pin impinging upon a small plate, for piercing and holding the tongue—the handles being secured with an ordinary but easily releasable catch.

Advantage. No bruising of tongue. Causes a negligible wound.

Lent by The Dental Manufacturing Company.

3260. HAHN'S SPONGE TAMPON CANULA AND CHLOROFORM INHALER FOR ORAL OPERATIONS.

The sponge tampon soaks up any blood, and prevents it gaining access to the lungs.

Lent by Mayer & Meltzer.

3261. DR. HEWITT'S AIR WAY.

Lent by George Barth & Co.

Consists of a round metal tube with a deep outer central groove to fit between the teeth, and a wide-bore indiarubber tube bevelled at its free end. Maintains a free air way—and so obviates asphyxia—in edentulous patients or in those when the air-way is impeded by valvular action of the lips or obstruction due to the tongue. The bevelled edge being away from the tongue cannot be obstructed.

3262. PAGE'S AIR WAY.

A short metal tube with flanged ends to fit between the gums or teeth. Prevents asphyxiation due to valvular action of lips, &c.

3263. DOYEN'S INTUBATION TUBE AND INHALER, for Oral and Nasal Operations. With modifications by Brook.

By means of the special introducer a small metal tube (with an indiarubber tube attached thereto) can be slipped through the larynx. The larynx is thus closed and no blood, etc., can pass into, whilst chloroform can be administered though

the tube by means of a junker or plenum chloroform apparatus or can be aspirated by the patient from any of the vacuum apparatus.

3264. MR. WOODHOUSE BRAINE'S EMERGENCY CASE.

Consists of a metal box containing as calpel, trachæotomy tube, and a dilator. Handy and sterilisable.

Lent by Claudius Ash, Son & Co.

3265. HEWITT'S EMERGENCY CASE.

A case containing (a) mouth-opener, gag, mouth-prop, tongue forceps; (b) scalpel, sharp hook, dilating forceps and two silver trachæotomy tubes; (c) hypodermic syringe and anyl nitrate capsules.

Advantage: Handy, compact, always ready.

Lent by Krohne & Sesemann.

3266. ANÆSTHETIST'S EMERGENCY CASE.

Containing trachæotomy knife, hook and tube. Hypodermic syringe with needles. Hypodermules of atropine, strychnine, anyl nitrate and breaker.

Lent by Allen & Hanbury.

3267. BUTLIN'S LARYNGOTOMY CANULA, with extension piece suggested by Bond.

Lent by Mayer & Meltzer.

3268. MACKENZIE'S TRACHEOTOMY EMERGENCY CANULA, having scalpel fitted in handle.

3269 THE BRITISH OXYGEN COMPANY'S PORTABLE OXYGEN OUTFIT.

Consists of (i.) a cylinder containing oxygen; (ii.) a regulator indicating pressure in bottle and delivering the gas at any pressure the administrator desires; (iii.) a wheeled stand; (iv.) a "warning box" consisting of an outer vessel to contain hot water and an inner coiled metal tube through which the gas is conducted. Can be easily wheeled about. The amount of oxygen available can be read off on the gauge. The gas can be delivered at any desirable pressure. Being warned, any chilling of the patient's respiratory track is avoided.

Lent by The British Oxygen Company.

3270. CARTER BRAINE'S ARM REST FOR KIDNEY OPERATIONS.

The large flat plate is pushed between the patient and the table, near the shoulders, the weight of the patient keeps it in position.

The arm piece not only relieves the chest of the weight of the upper arm, but also prevents the patient rolling away from the operator.

Lent by J. H. Montague.

3271. HEWITT'S ANÆSTHETIC HANDBAG FOR N_2O AND O_2 INHALER.

Is made for carrying this apparatus, and provides for the cylinders being worked by means of the long key without their being taken out of the bag each time. The upper part of the bag is available for a number of other instruments, whilst the saddle-shaped leather cover resting on the top cylinder is made to hold tongue forceps, mouth gag, sponge holders and props, &c.

Lent by George Barth & Co.

3272. HEWITT'S SURGICAL ANÆSTHETIC HANDBAG.

Is made so that when opened the contents of top and bottom are all visible and to hand. The lower part is divided to take one small cylinder of No. 2, worked by handkey in the bag, with the gas bag placed at the side. Space is available at either end for large supply of bottles of ether chloroform C.E., and ethyl. Chloride tube with drop bottles, whilst in the leather flap in front may be put mouth gag, tongue forceps, props, etc. In the top are compartments for numerous other appliances.

3273. SILK'S ANÆSTHETIC HANDBAG.

Has one side which lets down to enable the two cylinders to be used without taking them out every time. There is a central winged partition dividing off the cylinders and inhaler from the rest of the bag, which latter will hold a number of other anæsthetic appliances, together with bottles, etc.

3274. DR. G. W. BAMPFYLDE DANIELLS' BAG AND MOUNT.

By means of which nitrous oxide or ethyl chloride may, in a simple way, be used in connection with Hewitt's Ether Inhaler.

Lent by Dr. G. W. Bampfylde Daniell.

3275. DR. G. W. BAMPFYLDE DANIELLS' CHLORIDE OF ETHYL INHALER WITH ADAPTER.

To enable it to be used with face piece of Hewitt's Gas or Gas or Ether Inhaler. Without the Adapter it can be used with an ordinary Clover Inhaler or face piece.

METHODS OF INDUCING LUMBAR ANÆSTHESIA.

3276. LUMBAR ANÆSTHESIA (Professor Bier's method).

Injection of 1 c.cm. of a 5 per cent. solution of tropacocaine with the addition of adrenalin into the lumbar sac, for the purpose of anæsthetising the nerve roots issuing from the spinal cord. Anæsthesia of the lower half of the body including the region of the kidney behind, and of the lower laparotomy region in front, is obtained.

*Lent by Dr. Härtel, of the Königliche Chirurgische
Universitätsklinik, Berlin.*

[Sketches by Fräulein Wendland.]

3277. POSITION OF SURGEON AND OF PATIENT IN CARRYING OUT LUMBAR ANÆSTHESIA.

The patient sits on the operation table, with his back bent forward, an attendant holds him in that position. The surgeon inserts the needle, sucks out some cerebro-spinal fluid by means of the syringe which has been placed in a sterilizer to his left side, and then injects the solution. After the injection has been carried out, the patient is placed in a horizontal position and the pelvis is raised.

3278. LUMBAR PORTION OF THE SPINAL COLUMN FROM BEHIND.

The lower end of the spinal cord is recognised at the lower border of the first lumbar vertebræ, and the upper end of the lumbar sac at the second sacral vertebræ. A line drawn between the two crests of the iliac bones passes through the spinous process of the fourth lumbar vertebræ. The site of puncture is situated between the spinous processes of the third and fourth lumbar vertebræ.

3279. TRANSVERSE SECTION THROUGH THE SPINAL COLUMN ABOVE THE SECOND LUMBAR VERTEBRA, WITH CANULA IN SITU.

The point of the canula passes through skin, supraspinous ligament, interspinous ligament and *ligamentum flavum*, then through the epidural space, which contains fat and veins. It then pierces the *dura mater* and is arrested just in front of the posterior wall of the *cisterna terminalis*. The fluid is injected in this situation.

VENOUS ANÆSTHESIA (Professor Bier's Method).

3280. INJECTION of from 50 to 100 c.c.m. of a 0·5% novocain solution into a subcutaneous vein of an extremity, which has previously been rendered anæmic by compression and application of two Esmarch's elastic bandages. A perfect anæsthesia of the whole limb is induced in this way for any operation.

The three following sketches illustrate a venous anæsthesia of the leg for all operations involving the limb below the middle of the thigh (resection, amputation, etc.)

3281. Taking off the first elastic bandage as far as the sight of the injection; close above this the second Esmarch's bandage has been applied.
3282. The anæmizing bandage (No. 1) has been removed. Below the knee-joint a third Esmarch's bandage has been applied. The great saphena vein is exposed by means of a transverse incision below the second bandage.
3283. The exposed vein is ligatured centrally and incised. The canula, which is connected to the injection syringe by means of a piece of rubber tubing, is introduced into the vein, and tied in place. The fluid is then injected. The anæsthesia sets in immediately after the injection in the area between the two bandages, and a little later over the whole limb. After the anæsthesia has set in the third bandage is removed. The anæsthesia lasts as long as the second bandage is kept on.

LOCAL ANÆSTHESIA.

INJECTION OF NOVOCAINE SOLUTION (usually 0·5% with the addition of suprarenin) into the region of the field of operation.

The following varieties are to be distinguished:—(a) “conduction” anæsthesia; interruption of nerve conduction by injection in the neighbourhood of the nerve trunk; and (b) “terminal” anæsthesia; which is obtained by injection into the neighbourhood of the nerve endings. Increased duration of the anæsthesia, prevention of the absorption of the anæsthetic and at the same time anæmia of the field of operation are achieved by the addition of adrenalin (Braun).

3284. EXAMPLE OF A SCHLEICH'S INFILTRATION
ANÆSTHESIA, FOR AN ABDOMINAL OPERATION.

The introduction of larger canulæ is rendered painless by carrying out intra-cutaneous injections with very fine needles, at either end of the site of incision (Schleich's weals). The tissue is saturated with novocaine solution in all the layers in the direction of the arrows, starting from the weals; first subcutaneous, then subfascial, then intramuscular, and lastly down to the peritoneum. In this way a "terminal anæsthesia" of the whole incision is produced.

3285. DIAGRAM OF ANÆSTHETIZING A TUMOUR BY
HACKENBRUCH'S CIRCULAR METHOD.

(a) Seen from the surface; (b) seen in section. Starting from four Schleich's weals, the tissue around the tumour is infiltrated with novocaine solution subcutaneously in the form of a rhombus (a) and in the depth in the form of a . In this way all the nerve trunks leading to the tumour are rendered incapable of conducting.

3286. OBERST'S METHOD OF ANÆSTHETIZING A
FINGER.

An elastic bandage is applied at the base of the finger; circular, subcutaneous injections of 0.5 per cent. novocain solution (without adrenalin) are made from two lateral weals.

3287. CONDUCTION ANÆSTHESIA OF THE HAND
(Braun).

The sketch represents a transverse section of the forearm near the wrist. The median and ulnar nerves appear as thick trunks below the fascia, while the branches of the radial nerve are situated subcutaneously. The latter are rendered incapable of conduction by a subcutaneous injection encircling the wrist; the median and ulnar nerves are rendered incapable of conduction by deep injections of 2 per cent. novocaine solution in the directions indicated by the arrow.

3288. CONDUCTION ANÆSTHESIA OF THE INFERIOR
ALVEOLAR AND LINGUAL NERVES.

A deep injection of several c. cm. of a 1 per cent. to 2 per cent. novocaine solution is made 1 cm. to the side and behind the last molar tooth at the inner side of the ascending portion of the maxilla. This suffices to anæsthetize the nerve trunks of the of the lingual and inferior alveolar nerves, for all operations on lower teeth &c.

3289. ANÆSTHESIA OF THE UPPER JAW (Braun).

Shows the nerve distribution of the bone ; (a) the maxillary branch of the trigeminal ; (b) the naso-ciliary branch of the trigeminal. The trunk of the maxillary nerve is anæsthetized in the region of the fossa of the soft palate, by deep injections below the arch along the posterior wall of the maxilla (see next sketch at (a)).

3290. Idem.

The branches of the naso-ciliary are anæsthetized by injections in the inner and lower wall of the orbit.

The field of operation is injected subcutaneous as shown in the sketch. (Peukert)

3291. INNERVATION OF THE LOWER ABDOMINAL REGION, INGUINAL REGION AND FEMORAL REGION.

3292. ANÆSTHESIA FOR INGUINAL HERNIA (Braun).

Deep subfascial and intramuscular injections into the abdominal wall are made from point 1, which is situated three fingers' width internal to the anterior superior spine of the ilium, as far as the crest, and forked on each side of the inguinal canal. The spermatic cord is infiltrated from point 2, which situated below the external inguinal ring. The line of incision is also injected subcutaneous.

3293. ANÆSTHESIA OF A HYDROCELE (Braun.)

Deep injections into the spermatic cord, and into the scrotal septum. Subcutaneous injections into the base of the scrotum.

XIX.—COLLECTION OF PICTURES, BOOKS, AND OBJECTS OF MEDICAL INTEREST.

Hon. Curator - Dr. A. J. RICE-OXLEY.

3294. WATER COLOUR SKETCH, drawn from the tomb
of the earliest known physician. (Framed).
Lent by Dr. F. M. Sandwith,
3295. AN ENGRAVING OF REMBRANDT'S, "Anatomy
Lesson."
Lent by Dr. Randle Harper,
3296. AN ORIGINAL DRAWING BY GILLRAY, "The
Cowpock."
Lent by Dr. Renner,
3297. SET OF CARTOONS OF MEDICAL MEN.
Lent by "Vanity Fair,"
3298. PHOTOGRAPHS AND DRAWINGS OF PICTURES
AND WORKS OF ART IN BRITISH GALLERIES
AND MUSEUMS, INTERESTING FROM A MEDICAL
POINT OF VIEW.
Lent by Dr. Leonard Mark.
3299. SIX CARTOONS illustrating the original work of
the X-ray workers at the London Hospitals
carried to an extravagant extent.
Lent by Dr. Howard Pirie.
3300. THOMAS GUY, by Bartolozzi (in black).
3301. A MODERN REPEAT FROM THE OLD PLATE (in
red. Published by the "Guy's Gazette."
3302. FALSE CHARITY, a skit on Thomas Guy (in colours)
3303. THOMAS GUY, a portion of the above plate is
in black.
Lent by Dr. Cecil Hayward,

3304. AN ENGRAVING OF A PHYSICIAN who remained all through the Plague of London, and was very good to the poor.
3305. ORIGINAL SKETCH, by the late C. Keeley, Esq., F.R.C.S.
Lent by Dr. Clippingdale.
3306. ORIGINAL DRAWINGS FOR "PUNCH" AND "THE SKETCH."
Lent by Gunning King, Esq.
3307. ORIGINAL DRAWINGS FOR "PUNCH."
Lent by Claude Shepperson, Esq.
3308. ORIGINAL DRAWINGS FOR "PUNCH."
Lent by L. Ravenhill, Esq.
3309. COLOURED PRINT. "The Village Doctress," 1785.
By W. Humphrey.
Lent by Dr. Drury.
3310. PORTRAIT OF SIR THOMAS LAWRENCE
3311. PORTRAIT OF PROFESSOR HUXLEY.
Lent by Sir Lauder Brunton.
3312. DRAWINGS BY SIR CHARLES BELL.
3313. ETCHINGS BY SIR SEYMOUR HADEN.
Lent by Jonathan Hutchinson, Esq., F.R.C.S.
3314. OIL PAINTING—"The Sentence of Death," by The Hon. John Collier.
Lent by the Hon. John Collier.
3315. OIL PAINTING—"Chesham Street," by G. Lambert, Esq.
Lent by G. Lambert, Esq.
3316. CIRCUMCISION IN A SYNAGOGUE.
Lent by Dr. Walter H. Dodd.
3317. PICTURE—"Amputation," by Rowlandson.
Lent by Sidney Spokes, Esq.
3318. THE LADY SEDLEY, her receipt book, 1686. A rare old book of old prescriptions.
Lent by Dr. Leonard Guthrie.

15 RARE EARLY ENGLISH BOOKS ON MEDICINE.

Lent by Henry S. Wellcome, Esq.

- 3319. Here begyneth a goode booke of medicines, called
The Treasure of poore men. London. 1540.
- 3320. The Myrrour or glasse of helth, by Thos. Moulton.
London. circa 1550.
- 3321. The regiment of Lyfe, by Thos. Phayre. London.
1553.
- 3322. The Judycyall of Urine. London. circa 1555.
- 3323. The Enchiridon of Chirurgerie, by Thos. Gale.
London. 1563.
- 3324. The composition of that pretious oil called Oleum
Magistrale, by George Baker. London. 1574.
- 3325. The castell of Helth, by Thos. Elyot. London.
1580.
- 3326. The treasuri of Helth, by Petrus Hyspanus.
London. circa 1580.
- 3327. The Englishman's treasure, by Thos. Vicary.
London. 1587.
- 3328. The Surgeons Chest, by William Clowes. London.
1588.
- 3329. Orders for the Plague. London. 1592.
- 3330. The key to unknowne knowledge. London. 1599.
- 3331. Military and domestique surgery, by John Woodall.
London. 1639.
- 3332. The anatomical exercises of Dr. William Harvey.
London. 1653.
- 3333. Works of Dr. Thomas Sydenham. London. 1696.

8 SURGICAL ENGRAVINGS.

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- 3334. Surgeon operating on man's arm.
- 3335. El Charlatan.
- 3336. Operation—Cooling the brain (Guercino).
- 3337. Operation—Excising Tumour (Weydmans).

3338. L'opérateur Barri (Balechott).
 3339. Operation (after Tenier).
 3340. Operation (Cupping).
 3341. Operation ("The Surgeon").

25 MEDICAL PORTRAITS.

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3342. Linacre, Thomas, 1461-1524.
 3343. Caius, 1510.
 3344. Gilbert, William, 1540-1603 }
 Butts, 1540 } On one sheet.
 Borde, 1549 }
 3345. Bulleyn, 1576, died.
 3346. Harvey, W., 1578.
 3347. Glisson, Francis, 1597-1671.
 3348. Browne, Sir T., 1605.
 3349. Mayerne }
 Charlton, W., 1619 } On one sheet.
 Terne }
 3350. Willis, T., 1622.
 3351. Sydenham, 1624.
 3352. Woodhall, John, 1626.
 3353. Sloane, 1660.
 3354. Garth, 1660.
 3355. Mead, 1673.
 3356. Cheselden, 1688.
 3357. Fothergill, 1712.
 3358. Hunter, W., 1718.
 3359. Hunter, J., 1728.
 3360. Darwin, 1731.
 3361. Monro, 1733.
 3362. Jenner, 1749.
 3363. Hulse, E., 1757.
 3864. Gregory, Jas., 1758-1822.
 3365. Abernethy, 1764.
 3366. Cooper, Sir A. P., 1768.

MEZZO ENGRAVINGS.

3367. Sir William Gull.
3368. Sir Andrew Clark.
3369. Hippocoates.
3370. Galen.
3371. Sir Astley Cooper.
3372. John Hunter.
3373. SKETCH—"A Medical Night at the "Savage Club."
3374. A BLOODSTONE AND SILVER PHLEBOTOMY CASE, belonging to a Naval Surgeon of the 18th century.
Lent by Dr. Phineas Abraham.
3375. HUMOROUS OLD PRINT OF A COUNTRY DOCTOR GIVING A BOLUS.
3376. AN ENGRAVING OF SIR BENJAMIN BRODIE.
Lent by Dr. Walter Gripper.
3377. ETCHING OF SIR HENRY ACLAND. By W. Miller.
3378. "EVOLUTION," a Caricature. By Sir Carruthers Gould.
3379. ENGRAVING, "The Doctor's Boy." By Collins.
3380. BOOK, "Receipts in Physick and Chirurgery," by Sir Kenelm Digby, 1668.
Lent by Dr. A. J. Rice-Oxley.
3381. ENGRAVING, Harvey Demonstrating to Charles I. the Circulation of the Blood.
Lent by Dr. Geo. Tocher.
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3387. JOHN BANISTER demonstrating anatomy at the Barber-Surgeons' Hall, about 1570.
From a picture in the Hunterian Museum, Glasgow.
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3394. PHARMACOPEIA OF COLOGNE, 1627.
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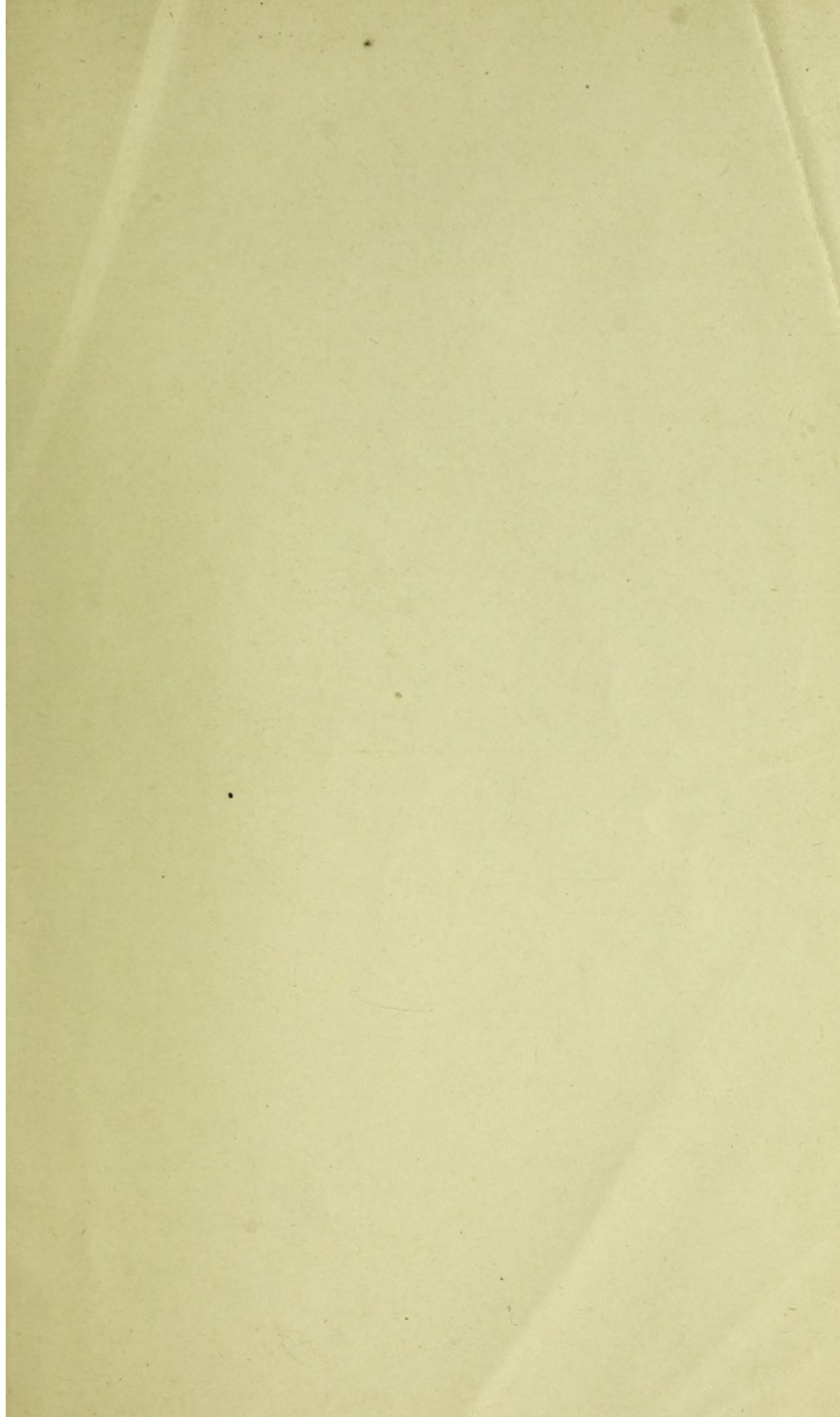
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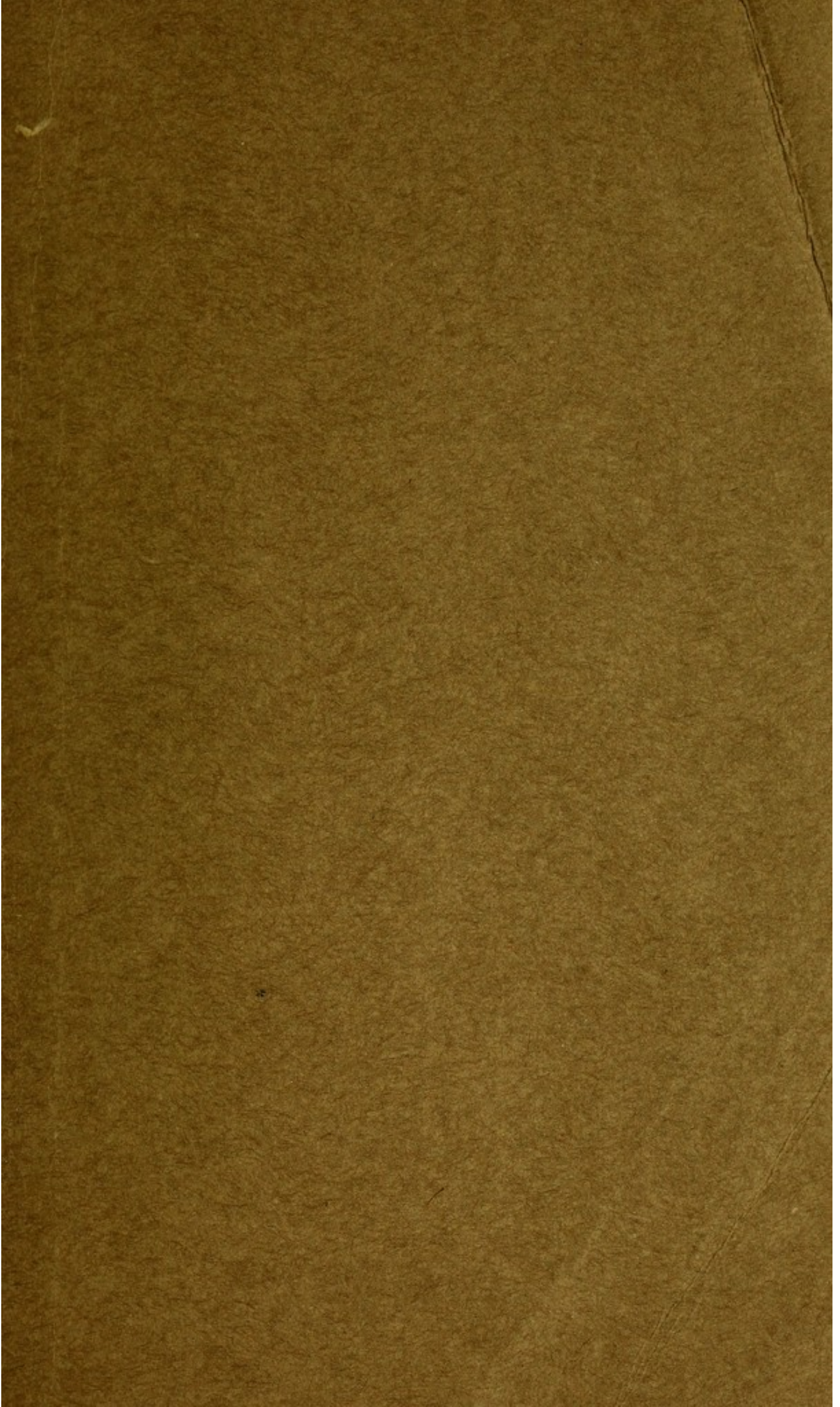
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