Newborn infants may suffer from some form of congenital stenosis or atresia of the alimentary tract, with consequent constipation. The commonest of these is congenital pyloric stenosis, in which the constipation is a cardinal symptom of the condition. Congenital duodenal stenosis or atresia is a much rarer condition. Stenosis of the rectum or sigmoid portion of the bowel, known as Hirschsprung's disease, is also uncommon. In the two former conditions operative intervention is demanded, but in the latter the careful dieting and management of the child yields excellent results.

Some children who have reached the school age and acquired the utmost regularity of bowel movement then seem to develop obstinate constipation. This is much rarer in the school boy than in the school girl. Sometimes these irregular habits may be traced to the child neglecting the opportunity she is given to empty the bowel. Occasionally it is because there is no opportunity given at school—either there is no time allotted for such purpose or there is insufficient lavatory accommodation. She misses the maternal care and urge to good bowel habits. Such cases can only be set right by the school authorities themselves.

Medicinal Treatment.

Beyond a very few preparations, and on few occasions, no drugs or medicines should have to be used. If they do have to be given it should be for a short time only. The following will be found to aid the regaining of good habits. In the infant one of the liquid paraffin preparations, such as plain liquid paraffin or senprolin emulsion, Angier's emulsion, petrolagar, or virolax, may be given in teaspoon doses night and morning. In older infants, if this is not enough, and especially during the teething period, an occasional grey powder given at bedtime (one grain at 6 months, two grains at 18 months, and three grains at 3 years); in the morning one or two teaspoonfuls of milk of magnesia should be given. For those elder children, in whom liquid paraffin will not control constipation, the rhubarb and soda mixture will be found a great help.

To take a long or general view of constipation in children is the only view which, in my opinion, leads to success.

A HISTORICAL SURVEY OF PERORAL ENDOSCOPY

FROM ITS ORIGIN TO THE PRESENT DAY.*

BY

IRWIN MOORE, M.B., C.M. EDIN.

The first successful attempts to obtain direct vision of the oesophagus and bronchi were made by laryngologists, thus establishing their claim to include these regions in the domain of their specialty. Little of favour and encouragement was bestowed on early endoscopic attempts, hence progress was but slow, and the interest taken in it was only of an academic nature. The present proud position occupied by the method is largely due to such pioneers as Gustav Killian, who has been styled the "Father of Bronchoscopy," Chevalier Jackson, and others. It is no exaggeration to assert that there has been no greater development in the history of medicine and surgery than that of peroral bronchoscopy, for it has opened to view the whole length of the oesophagus, the cavity of the stomach, and the bronchial ramifications.

As recently as 1903 Jonathan Wright of New York spoke of the removal of foreign bodies from the bronchi as a species of legerdemain, when he learned of two cases at Freiburg in which foreign bodies in the bronchi had been successfully removed by the mouth. One of the patients was a child aged 6; the procedure was carried out under chloroform, and Wright says that it seemed to the inexperienced laryngologist little short of miraculous. A comparison of this with the present position of peroral endoscopy shows what enormous strides have been made.

The statistics of foreign bodies accidentally aspirated into the respiratory passages, and the consequent mortality at different periods, are very instructive. The mortality in the pre-laryngoscopic period was 52 per cent.; the laryngoscopic period reduced the mortality to 30 per cent. In the early days of bronchoscopy—1897 to 1908—the death rate was down to 13.1 per cent., while in the period 1909-10 this was further reduced to 9.5 per cent. By 1913 the death rate from this cause had fallen, according to Killian, to 8 to 9 per cent., while Chevalier Jackson gave, for various surgeons in the United States, a mortality of between 5.3 and 1.7 per cent., the latter figure having been achieved by himself in 182 consecutive cases of bronchoscopy for foreign bodies. In many cases recorded the foreign body has been either vomited or evacuated per rectum. In the large clinics, of 210 cases of foreign bodies in the oesophagus, 12 were evacuated, and all the remainder were removed by oesophagoscopy. Of 206 cases of oesophagoscopy for foreign bodies, in Jackson's hands, only 8 defied his efforts, and 4 of these died, one from advanced nephritis, while the oesophagus of the other three had been severely lacerated before he saw them.

The mortality in these cases in this country is considerably higher than the figures just given, since a number of cases are treated by such old methods as the bougie and probang before coming to the laryngologist. The profession has not yet fully appreciated the value of endoscopy in diagnosing diseased conditions of the gullet which have hitherto been unrecognized.

A large number of laryngologists have borne a share in bringing the method to its present efficiency, besides those outstanding men whose names are mentioned in this article.

It is nearly 120 years since Philip Bozzini of Frankfort designed an apparatus, the "light conductor," for looking into the dark cavities of the body. It was a convex vase-shaped stand, and its lamp-holder, of tin, was covered with leather, its upper third being uncovered brass. A candle inside one half of the lamp-holder gave the light, the other half having an opening in its posterior wall for the observer's eye. The candle light was reflected into the examining tube. At a later stage a concave mirror was fixed inside the lamp-holder. It was specially designed to view the urethra and rectum. The Medical Faculty of Vienna, asked by the Government to report on this, condemned it, stigmatizing it as a toy.

Eighteen years later John D. Fisher of Boston devised and used an endoscope consisting of lens and mirror, again illuminated by a candle. It had a concave mirror, three tubes, and two looking-glasses, and there was a mechanism for keeping the flame opposite the lens. Cylindrical tubes were united at right angles, forming an elbow-joint. A lens magnified the object to be viewed. The designer himself suggested that his instrument was "easily susceptible of improvement."

Ségalas (Paris, 1826) developed Bozzini's apparatus, constructing a urethro-cystic speculum for optical examination of the bladder and urethra. A polished cylindrical tube was open at its extremities for introduction into the urinary passages, and its length and size could be varied as required. Desormeaux, overlooking the work of Bozzini and Fisher, credited Ségalas with having originated the idea of an instrument for projecting light into deep cavities.

Bombolzi, an Italian, in 1827 devised a speculum for exploring the stomach, bladder, uterus, and rectum. Guillon spoke of this apparatus as a kind of camera obscura. There seems to be no record of any practical work having been done with this instrument.

John Avery, who was a surgeon at Charing Cross Hospital from 1843 to 1855, produced an apparatus with a frontal reflecting mirror to intensify the candle-light used, with a laryngeal mirror which was fixed to a speculum. He tried to view the vocal cords with it. At Avery's death the *Lancet* stated that he had been able by means of the apparatus to examine the ear, urethra, bladder, oesophagus, and larynx as probably no other surgeon had before him.

Desormeaux (Paris, 1853) produced an apparatus lighted by a gas-oxygen lamp, somewhat similar to Fisher's. In this the light was collected by a condenser, and fell upon

* Abstract of a paper communicated to the Section of Laryngology, Otology, and Rhinology of the Annual Meeting of the British Medical Association at Bath (July, 1925). The full text will be published, with illustrations, in the *Journal of Laryngology and Otology*.

a reflector which had an opening for the eye in the centre. Desormeaux was an indefatigable worker at endoscopy, and his work for thirteen years made it impossible for the profession to ignore what he did. He raised the use of the endoscope to a method; hence it is fair to regard him as the founder of endoscopy.

Horace Green (New York) in the following year proved the tolerance of the larynx to the passage of foreign bodies and instruments, and he passed a solution of silver nitrate through a gum-elastic catheter into tuberculous cavities via either bronchus. In his paper in 1860 on "The difficulty and advantage of catheterization of the air passages in diseases of the chest" he related 106 cases so treated, and he employed the method also in bronchitis and asthma. John Hughes Bennett (Edinburgh), in 1857, confirmed Green's work.

Sir Philip Crampton, a Dublin surgeon, who died in 1858, and was a great authority on lithotripsy, also assisted in the development of endoscopy, but published no account of his work in this domain.

After Desormeaux's work little practical progress seems to have been made until Richard Cruise of Dublin, realizing in 1865 that the illumination in Desormeaux's apparatus was not adequate, designed a brighter light which enabled him to get a view of the uterus, and in the year following he published a paper entitled "The endoscope as an aid in the diagnosis and treatment of disease"; in this he showed that the utility of the instrument was not confined to the diagnosis and treatment of diseases of the urethra, but was valuable in any part of the body into which a straight tube could be introduced, such as the bladder, the uterus, and the rectum, as well as the auditory meatus, nasal fossae, pharynx, larynx, and, he hoped, also the oesophagus and stomach. This contribution of Cruise was the first definite mention in the literature of the possibility of endoscopic examination of the air and food passages; and it is of interest to note that the present-day endoscope, as represented by the models of Kirstein and Brüning, were identical in principle with the designs of these earlier pioneers.

John Brunton described, in 1865, "A new otoscope or aural endoscope," which he had designed four years earlier. It is extensively used even at the present day.

Stoerk and Semeleder of Vienna made, in 1866, the first attempt to examine the gullet by an instrument; this consisted of a pair of forceps having spoon-shaped blades, and a laryngeal mirror attached. After introduction of the instrument the laryngeal mirror was placed in the ordinary position. Only negative results, however, emanated from this experiment.

Julius Brück, a dental surgeon of Breslau, was the first to take advantage of the introduction of the galvanocautery in 1756 by Middlethorp as a source of light for examining cavities of the body such as the bladder and intestine.

John Aylwin Bevan published, in 1868, a description of various instruments which he had designed for examining the pharynx, larynx, and posterior nares, which instruments could be fitted to a lamp, and he also devised a tube for inspecting the gullet. Morell Mackenzie said that Bevan's work was obviously the result of work in the laboratory rather than in hospital wards, and that the instruments were of no practical value.

Kussmaul (Freiburg) in 1868 reported to the scientific faculty of his city the successful examinations he had made of the oesophagus, both normal and diseased, and to him has been attributed the first oesophagoscopy worthy of the name. He passed a straight rigid tube into the oesophagus with the aid of a Desormeaux urethroscope for providing the illumination. Kussmaul, by this means, is reported to have diagnosed a carcinoma of the thoracic oesophagus, and to have approached the cardia. His pupil, Müller, continued these experiments, and showed that a rigid tube 13 mm. in diameter could be safely introduced into the oesophagus of the normal adult. As Kussmaul did not publish his work, and had it not been for Killian, that work might have passed into oblivion.

Waldenburg (Berlin) designed an oesophagoscope in 1868 consisting of a gum-elastic tube 8 cm. long to which a laryngeal mirror was attached. He employed this

apparatus in a case of pharyngeal pouch, and was able to observe its walls and contents. Later he had an instrument constructed of metal instead of gum-elastic. There were two tubes arranged telescopically, each of them being 6 cm. in length, one playing on the other by means of a slot.

Trouve (Paris) attempted, in 1873, to improve the illumination by means of a "polyscope," a tube with a window fitted with an optical arrangement of prisms and lenses. Ledentu and Raynaud also used this instrument for oesophagoscopy, and with it they were able to diagnose a cicatricial stricture of the oesophagus near the cardia, while at about the same date Collin demonstrated endoscopically the function of a bull's stomach.

Edison of New Jersey, U.S.A., by inventing the incandescent lamp in 1878, advanced endoscopy still further, enabling Mikulicz, Kirstein, and others to improve the method of lighting at a later date and to introduce an examining tube.

O'Dwyer (New York) invented and perfected in 1880 intubation of the larynx, and later a large tube for facilitating the expulsion of foreign bodies from the lungs.

Morell Mackenzie designed, in 1880, a skeleton oesophageal tube, one which could be opened and closed. It consisted of handle, stem, and skeleton tube, the handle being connected with the stem by a movable knuckle joint. At the top of the skeleton tube was a slot into which was fitted a laryngeal mirror. The skeleton tube could be opened after it was inserted, the rings brought into the horizontal position, and the gullet expanded.

Stoerk, in 1881, renewed his oesophageal experiments, and described an instrument which was really an addition to that of Waldenburg. It was provided with a pilot or director consisting of a piece of elastic tubing, terminating in a small bag, which projected beyond the end of the oesophagoscope. When the bag had been inflated the instrument was passed into the gullet, when the air was allowed to escape and the pilot was withdrawn. But this and the Waldenburg instrument were designed for indirect examination, and so were failures.

Mikulicz of Vienna, in 1881, with the help of Leiter, designed an optical apparatus illuminated by an interior electric lamp of platinum wire, with a cooling arrangement, and to this were attached straight rigid tubes. By its aid Mikulicz was able to carry out important anatomical, physiological, and pathological investigations on the oesophagus, and these form the basis of our knowledge to-day. He also designed a gastroscope, attempting to examine with it the stomach of normal persons. But he was said never to have reached the cardia.

Stoerk, in 1887, made use of a long rigid tube, which he passed with the patient's neck in the extended position, thus doing direct oesophagoscopy. In the same year an improvement was made in the illuminating portion of the instrument by the Leiter-Nietz oesophagoscope. This had an internal lamp and a system of prisms.

Von Hacker (Vienna), in 1889, brought oesophagoscopy to such a pitch of perfection that it became of practical use, and his efforts deserve almost as much credit as did those of Mikulicz himself.

Gottstein of Breslau, in 1891, designed and used endoscopic tubes with an extra tube inserted in their walls, to produce suction. He also advanced oesophagoscopy under cocaine anaesthesia.

Von Hacker, in 1894, made inspections into the tracheo-bronchial region for diagnostic purposes.

Rosenheim (Berlin), in 1895, began to study the subject and used this instrument, and recorded having removed many foreign bodies from the oesophagus.

During the following years further improvements in the problem of illumination were introduced by Kirstein, Caspar, Leiter, Guisez, Brüning, Einhorn, Schreiber, Gluckmann, and Chevalier Jackson.

It now remained for Kirstein and Killian really to arouse the interest of laryngologists in peroral endoscopy, and from that time great strides were made on the subject.

Kirstein (Berlin), in 1895, saw the interior of the larynx without a mirror for the first time, using first a flat spatula and later a tubular one. With the flat spatula the necessary light was obtained from a forehead lamp attached

to a vulcanite head-band. The electric lamp was enclosed in a cylindrical box containing a plano-convex lens, through which the light was cast on to a mirror which was fixed at an angle of 45 degrees, with a central perforation for the observer's vision. Later, Kirstein used this lamp attached to his spatula, and it was known as "Kirstein's auto-scope"; with this it was possible to inspect the deep pharynx and larynx directly.

From 1896 onwards tracheoscopy and bronchoscopy can be said to have passed its introductory stage and to have become one of the accepted and established proceedings of surgical practice.

Killian of Freiburg, in 1896, began to devote himself closely to endoscopy, and soon adapted the oesophagoscope to the systematic examination and treatment of the trachea and bronchi. In 1897 he designed a tube spatula which made it easier to reach and inspect the interior of the larynx; also oesophagoscopic and bronchoscopic tubes of different calibres and lengths, and a short split laryngeal spatula to help the easier introduction of the tubes. He also contrived an extension of his bronchoscope for introduction while *in situ*, consisting of a section of tube of smaller calibre passed into the first tube. He showed that the air passages could be explored far beyond the bifurcation of the trachea, and that it was possible to straighten out the bronchi with rigid tubes. He also introduced the dorsal posture of the patient for endoscopic work, and he showed that the lower limit or orifice of the hypopharynx was represented by a definite sphincter at the lower level of the cricoid cartilage, and corresponding to the commencement of the oesophagus. Killian's demonstrations of bronchoscopy caused a profound impression, and was a stimulus to laryngologists in all parts of the world.

Mikulicz (Vienna) and Gottstein (Breslau), in 1896, reported successful cases of tracheoscopy; and Einhorn of New York, in 1897, issued the first publication in America on the subject of oesophagoscopy; while Georg Kelling of Dresden devised, in 1897, a segmented oesophagoscope which could be straightened when desired.

Coolidge of Boston, in 1899, removed a broken tracheal cannula from the right bronchus by lower bronchoscopy.

Gordon King of New Orleans, in 1899, described oesophagoscopy and its application to two cases, and an account of two foreign bodies impacted in the oesophagus.

Chiari (Vienna), in 1899, employed and demonstrated upper tracheo-bronchoscopy.

Schrötter (Vienna), in the same year, removed a lead seal from the second division of the right bronchus in a boy patient aged 12.

Killian, in 1900, cut in half, by means of a galvanocautery snare, a vulcanite dental plate without any metal part, which was impacted in the oesophagus near the cardia, at a distance of 35 cm. from the mouth, and it was removed by him in two portions.

Von Hacker recorded, in 1900, removing a number of foreign bodies from the gullet, and devised several instruments for oesophagoscopy; and von Mikulicz, a year later, published a similar record; while both Schrötter (Vienna) and Pieniazek (Cracow) reported work done on lower bronchoscopy. Einhorn of New York first designed the distal lighting principle, and a stylet or mandrin to assist the introduction of the tube.

Killian, in 1902, wrote a paper on "Direct endoscopy of the upper air passages and oesophagus," and read it at the Manchester meeting of the British Medical Association in that year, emphasizing the fact that now the oesophagus could be systematically searched from above downwards.

Glucksman (Berlin), in 1903, demonstrated an oesophagoscope which he had devised for distal lighting.

Fletcher Ingals (Chicago), in 1904, following the idea of Einhorn and Glucksman, employed a distal light on a separate carrier in a Killian tube.

Von Eichen, who was Killian's chief assistant, wrote, in 1904, his well known article on endoscopy. It covered all the work on the subject which had been done to date.

Brüning, who was also an assistant to Killian, was notable for the mechanical improvements he made in Killian's endoscopic methods, and for his pioneer work in the teaching of the specialty.

Coolidge, in 1906, published a paper on "Foreign bodies

in the trachea and bronchoscopy," reporting a collection of forty-nine foreign bodies which had been removed from the lungs, the mortality having been 8 per cent. Three of the four fatal cases in the list were in a serious condition at the time of the operation.

Chevalier Jackson, professor of bronchoscopy, etc., in Pennsylvania University, in 1904 combined the distal lighting principle and the stylet of Einhorn with the Killian tube, by means of an auxiliary tube in the wall of the main tube. At a later stage he dispensed with the stylet. In 1905 he designed a bronchoscope with two auxiliary tubes—one for the light carrier and the other for the suction tube—and in the following year a gastroscope; a year later still he published a book on *Tracheo-bronchoscopy, Oesophagoscopy, and Gastroscopy*, and subsequently included it in his later work, *Peroral Endoscopy and Laryngeal Surgery*. He is responsible for a prolific literature on these subjects.

Kahler (Vienna) removed, in 1902, a tooth-plate which was impacted in the oesophagus, and in 1904 he removed a piece of bone from the bronchus. In 1909 he designed, with Leiter, a panelectroscope, rendering easy the introduction of operating instruments.

Guisez (Paris), a name foremost in France in this work, reported in 1903 having removed a nail from a bronchus, and in 1905 he introduced a head-lamp consisting of three small bull's-eyes arranged in a circle. In 1908 he commenced to use radium for gullet cancer.

It was not long before British laryngologists began to adopt Killian's methods. Waggett, in 1903, was the first in this country to begin the study of endoscopy, and to employ Killian's tubes, with headlight; and the same year he diagnosed a malignant growth in the oesophagus. In 1924 he removed a tooth-plate, 1½ in. long and ¾ in. broad, from the right bronchus, by inferior bronchoscopy.

D. R. Paterson of Cardiff seriously took up endoscopic work in 1904, and in that year he removed a stay-eyelid from the trachea of a child of 8 by Killian's tracheoscope, and later recorded other cases. In 1905 he designed and introduced his laryngeal forceps for the direct removal of laryngeal papillomata. In that year he removed a tooth-plate having four teeth and two hooks attached from a female aged 36, at the level of the suprasternal notch. In 1906 he contributed the first paper in this country on direct examination of the oesophagus and upper air passages. He also introduced a modification of Brüning's tubes to facilitate the easier passage of the tube through the larynx.

Mosher (Boston) began to use oesophageal tubes in 1904, and later designed a special oval oesophagoscope.

A. Coolidge, in 1904, published a paper on "The extraction of foreign bodies from the bronchi," and gave an account of the removals of foreign bodies he had carried out.

Exner of Düsseldorf was the first to employ, in 1904, the rays of radium salts and radium emanation for malignant disease of the gullet, and palliative results were claimed.

E. D. D. Davis first began, in 1905, to practise oesophagoscopy and bronchoscopy, with Waggett, employing Killian's tubes and Kirstein's headlight. In 1908 Davis recorded his first case of extraction, that of a farthing, from the oesophagus of a child aged 9 months. In 1914 he published a paper entitled "The importance of a very thorough examination in cases of foreign bodies alleged to have been swallowed or inhaled"; it was to show the dangers of delay in such cases.

Thomas Claytor (Washington) wrote a paper in 1906 on "Foreign bodies in the bronchi"; and Jefferson Faulder, in the same year, contributed one on "Bronchoscopy" and one on "Direct oesophagoscopy."

William Hill started this work in 1907, and in the following year removed his first foreign body. In 1909 he designed an improved direct-vision pharyngo-laryngoscope, with a lateral slot to facilitate operation. In the same year he started radium work for malignant disease of the gullet, and was the first in this country so to apply it. He has published a valuable series of contributions on the subject, and in 1912 he designed an improved radium apparatus for gullet cancer, having an adjustable collar to prevent displacement of the radium.

Herbert Tilley, in 1907, took up the methodical study of endoscopy, and the same year he removed a shawl-pin

2½ in. long from the left bronchus of a woman aged 23. He has also published a paper on direct bronchoscopy, one on direct examination of the larynx, and a report of numerous foreign bodies which he had extracted.

W. G. Howarth studied bronchoscopy and oesophagoscopy in 1907, and in 1912 he published the translation and amplification of Brüning's textbook, and in the year following he contributed a paper on "Some difficult foreign bodies in the air passages."

Irwin Moore commenced the practice of oesophagoscopy and bronchoscopy in 1908, and his work has been chiefly confined to the diagnosis and treatment of diseases of the gullet. In 1910 he designed a "universal" foreign body forceps, and cutting shears for dividing dental plates which had become impacted in the oesophagus. In 1916 he published a paper on the removal of foreign bodies from the oesophagus and bronchi, and described instruments which he had designed. He also published a plea for the abolition of the coin-catcher. In 1919 he published some statistics of end-results of pins accidentally inhaled into the lungs. In 1921 he designed tubes to allow proximal and distal lighting to be interchanged without disturbance of the tube *in situ*.

Thomas Halstead (Syracuse, N.Y.) published, in 1908, a paper on his personal experiences in the use of the bronchoscope, oesophagoscope, and gastroscope, with cases; Brown Kelly (Glasgow) and Ingersole (Cleveland) did likewise, while Gay French, in 1909, related the removal of foreign bodies from the oesophagus by Brüning's direct instrument. Souttar and Theodore Thompson, in 1909, published a paper on "The gastroscope and its uses," describing a new form of apparatus they had designed.

Sir William Milligan, the pioneer of endoscopy in Manchester, started the work early in 1909, the year in which he first removed a foreign body from the oesophagus, and in 1920 he contributed a paper on "Some practical points in the removal of foreign bodies impacted in the food and air passages," exhibiting, when he read the paper, fifty foreign bodies which he had successfully removed.

Sir StClair Thomson (with whom Irwin Moore worked) successfully removed, in 1910, a tooth-plate which had become impacted in the oesophagus, and had remained at the bifurcation of the trachea two and a half years. In the same year Sir StClair removed a shawl-pin from the lungs after twenty-seven hours of impaction. In 1917 he removed a tooth from a secondary left bronchus, by means of tracheotomy and lower bronchoscopy, after he had made two attempts at removal by peroral bronchoscopy.

Killian, in 1911, published a history of bronchoscopy and oesophagoscopy; in that year also he brought in suspension laryngoscopy, and he described the process in London in 1913.

Claoué (Bordeaux), in 1912, following Killian's example, divided a vulcanite denture which had become impacted in the oesophagus 24 cm. from the aortic arch, by means of a galvano-cautery knife.

Glucksmann (Berlin) contributed a paper in 1912 on "The newer methods of extraction of foreign bodies from the air and food passages."

Thomas Guthrie, the pioneer of endoscopy in Liverpool, published, in the same year, a paper on twelve cases of removal of foreign bodies.

Logan Turner and J. S. Fraser (Edinburgh) published a paper, in 1913, on "The direct method of examination of the lungs, trachea, bronchi, and oesophagus, with illustrative cases." They also reported seven cases in which they removed papillomata from below the vocal cords by the direct method.

H. L. Lynah (New York) published, in 1915, two papers on these subjects, and in 1921 two further papers on the radiographical aspect of the question.

Somerville Hastings was the first to cut in half a vulcanite denture which had been impacted at the level of the aortic arch; it was so securely fixed that it could not be moved by forceps. He employed Irwin Moore's denture shears. In 1914 he successfully removed a half-sovereign from the right bronchus, and in 1918 he recorded having removed a piece of mutton bone through a tear or rent in the posterior wall of the oesophagus, which had been produced by a bougie that had been passed down the gullet

prior to the patient's admission to hospital. The patient recovered.

Gay French, in 1917, also divided and removed a denture in a similar way to Somerville Hastings, and complete recovery ensued.

Ellen J. Patterson (Pittsburgh) has made valuable additions to the literature of endoscopy.

In 1920 the oldest medical school in the United States, that of Pennsylvania, established the first chair and professorship for the teaching of bronchoscopy and oesophagoscopy, and Chevalier Jackson, in whose honour this was done, was made professor. Many veterinary schools have also taken up the teaching of endoscopy for application to animals. In the five years that the professorship has been in operation 400 students have taken the course.

Gabriel Tucker (Philadelphia), in 1923, was appointed associate professor on the subject at the Pennsylvania University, and in the following year he wrote a thesis on "Cicatricial stenosis of the oesophagus, with particular reference to treatment by continuous string retrograde bouginage with the author's bougie." In the same year he published an article on fifty cases of foreign bodies, and he has designed valuable bronchoscopic forceps.

Louis H. Clerf (Philadelphia) has also contributed articles on foreign bodies impacted in the food and air passages.

W. F. Manges (Philadelphia) published, in 1923, a paper on "The mechanism of physical signs, with special reference to foreign bodies in the bronchi," and in the following year one on "Atelectasis as a Röntgen sign of foreign body in the air passages." To him the profession is indebted for bringing to high perfection the x-ray diagnosis of non-opaque foreign bodies in the lungs.

Scott Ridout (Portsmouth) contributed a paper in 1923 on the subject and recorded five cases of removal of foreign bodies.

Crow (Brighton), in 1924, recorded his successful removal of part of a safety-pin by peroral bronchoscopy from a child.

Souttar, in 1924, published a paper on "A method of intubating the oesophagus for malignant strictures," in which he described a simple, close-spiral flexible wire intubation tube. The advantages were that food did not tend to cling to it, it did not cause ulceration, and it was retained without difficulty; sometimes it had been worn for a year. In 1925 he read a paper on "Cancer of the oesophagus."

T. McCrae (Philadelphia) delivered the Lumleian Lectures before the Royal College of Physicians, London, on "The clinical features of foreign bodies in the trachea and bronchi."

Harrison (Newcastle-on-Tyne), in 1925, removed a bead from the left superior lobe bronchus of a child aged 2½ years.

Frank Wilson (Newcastle-on-Tyne) devised, in the same year, an ingenious method of detecting non-opaque foreign bodies in the oesophagus by giving the patient small pledgets of cotton-wool soaked in barium or bismuth paste to swallow, followed by a radiogram, when the shadow is seen to be the shape of an inverted cone.

Endobronchial Therapy.

Endobronchial therapy was assured when, in 1907, Nowotony of Cracow discovered that adrenaline when applied bronchoscopically favourably influenced a case of bronchial asthma. He obtained a "lasting result" in seven out of eight cases so treated.

Ephraim (Breslau) confirmed Nowotony's observations, and worked at other endobronchial treatments in 1910. In this country Syme (Glasgow) has ably carried on Ephraim's work, and has been able to produce some striking results. The bronchoscopical method of applying medicaments will control haemorrhage from the trachea, also pain arising from growth there, and from wounds caused by foreign bodies.

W. F. Moore and R. M. Lukens (Jefferson College, Philadelphia) recorded, in conjunction with E. H. Funk, in 1923, their results from the use of autogenous vaccines prepared from secretions which were obtained bronchoscopically, along with the instillation of adrenaline, cocaine,

and normal saline into the bronchi. In the next year they also published an analysis of cases of pulmonary abscesses, including those which were complicated with bronchitis.

Ewart Martin (Edinburgh), in 1924, published his experiences of bronchoscopy in relation to lung diseases, and gave results of treatment, some cases having extended over one and a half years.

Howarth, in 1925, published, in association with Cassidy, a case of abscess of the lung and bronchiectasis treated by bronchoscopic aspiration and lavage.

Owing to successive researches and inventions, these methods have now become much simplified, and are part of the usual routine of the laryngologist. Success in this country has been largely associated with becoming accustomed to using the largest endoscopic tubes which can be safely employed in each case. Endobronchial therapy now offers a wide and expanding field for further research work.

THE ETIOLOGY OF DIVERTICULA OF THE INTESTINE.

BY

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IN the interesting paper on intestinal diverticula, published in the *BRITISH MEDICAL JOURNAL* of January 23rd (p. 130), a prediverticular state of local inflammation of the colon is described which, it is suggested, is responsible for the formation of the diverticula.

The etiology of diverticula has for a long time been of special interest to me, and of the various theories put forward to account for them none have seemed very convincing. I have for some years believed and taught that inflammation is a probable factor in producing the condition, at any rate in some of the cases in which the colon is affected, and I therefore particularly welcome the paper as supplying confirmatory evidence. My reasons for believing diverticula of the colon to be due to an inflammatory cause were two in number:

1. The most common seat of diverticulosis is one at which evidence of chronic inflammation in the shape of peritoneal adhesions is very often found—that is, the lower end of the sigmoid flexure. Clinically also patients are frequently seen in whom the sigmoid is hard and tender, suggesting that a mild degree of inflammation is present. The obvious criticism will perhaps be made that if these signs of inflammation have anything to do with the liability of this part of the colon to form diverticula, diverticula should be still more common in the caecal appendix, where inflammation is far more frequent than anywhere else in the gut. The answer to this is that the appendix is prevented from being a common seat of diverticulosis by the greater relative thickness of its muscular covering, and also by the fact that its lumen is rarely distended sufficiently to stretch its walls, and therefore the final factor in the production of diverticula—internal pressure—is wanting.

2. The second reason was the outcome of an investigation which I made some years ago of a number of specimens of gut removed either by operation or after death from cases of diverticulitis, by which I hoped to be able to trace some definite causal relationship between the fat of the appendices epiploicae and the occurrence of diverticula. I discovered nothing that seemed to me at that time sufficiently convincing for publication, but my suspicions were aroused by the fact that in several of these specimens I found in the wall of the gut, extending for a distance of some inches from the inflamed diverticula, localized patches of inflammation, some of which were evidently of long standing, in the bases of attachment of the appendices epiploicae, whereas in places where the muscle fibres were in direct contact with the peritoneum and had no fatty covering there were no signs of inflammatory change.

It seemed to me probable that these inflammatory patches might be accounted for by a lack of free lymphatic drainage at the points where the intestinal muscle was coated with a thick layer of fat, and that there might thus be a twofold cause which determined the onset of diverticulosis—

first, an abnormally heavy deposit of fat in the appendices epiploicae; and secondly, an inflammatory process in the deepest portion of the fat, which in the course of time so weakened the muscle that it eventually gave way to the pressure exerted by the intestinal contents and allowed herniation of the mucous membrane to occur.

But whatever part inflammation may play in the production of the diverticula it must, I think, be assumed that the intestinal fat is in some way primarily responsible, for not only do the diverticula invariably occur at points where the intestinal wall is normally covered by fat and never where it is covered by peritoneum alone, but also an abnormal degree of adiposity is an accompaniment of diverticulosis to which nearly every writer on the subject has drawn attention, and in fact might almost be said to be a *sine qua non*. My experience has been limited to cases in which inflammation of the diverticula has occurred; of seventeen cases at Guy's Hospital of which I have notes, only two were in people not unusually stout, and both of these had passed through a period of obesity before the symptoms of diverticulitis manifested themselves. Therefore no theory of etiology can be held to be satisfactory which does not make the fat the starting-point in the process of which the herniation of the mucosa is the final outcome.

Three possible explanations occur to me, each of which I think is reasonable in that a parallel can be found for it in pathological processes occurring elsewhere in the body. They are as follows:

1. The subperitoneal fat weakens the intestinal wall by inducing a simple atrophy of the muscle from pressure.
2. The fat invades and separates the muscle fibres, and so produces weak spots. In this case the natural line of invasion would be along the vessels which penetrate the muscular coat, so that these would be the most likely points for herniae to occur.
3. The fat becomes infected, probably by the intestinal contents, and the muscle in contact with it is weakened by an inflammatory process.

In the light of the x-ray evidence now added to the reasons which I have given above there would seem to be good grounds for believing that this last alternative is the true explanation of most of the diverticula occurring in the colon, though some in the colon and perhaps most of those in the small intestine, where infection of the fat is less likely to happen, may be ascribed to one or other of the non-inflammatory causes I have suggested.

FISH AS THE SOURCE OF CERTAIN COCCIDIA RECENTLY DESCRIBED AS INTESTINAL PARASITES OF MAN.

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For some time the attention of the authors has been devoted to the study of protozoal parasites in the organs of fish, which, since they are a common item in the human dietary, were readily obtained from various retail fish shops in London. While the present communication is to be regarded as a preliminary note on this subject, there have been made already certain observations which appear to prove conclusively that three recently described coccidia, up till now presumed to be true intestinal parasites of man, are merely parasites of fish passed unaltered through the human alimentary tract.

Wenyon (1916) discovered a coccidian belonging to the genus *Eimeria* in human faeces, but, rightly doubting that it was not a true parasite of man, refrained from creating a new species until something more was known of its habitat and life-cycle. Dobell (1919), however, named it *Eimeria wenyonii*. It will be seen later that this organism is morphologically identical with *Eimeria clupearum* Thélohan, 1894.