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SYMPOSIUM: STENOSIS OF ŒSOPHAGUS.

(A) **Anatomy, Anomalies, Instruments, and Technique.—Harris P. Mosher.**—After discussing briefly the comparative anatomy of the œsophagus, the essayist considered the œsophagus in man under the following subheads: (1) Congenital anomalies; anatomy; structure; lymphatics; position; direction; diameter; length; distensibility; subphrenic portion; movements; appearance of normal œsophagus. (2) Physiology; function; peristaltic action; respiratory movements; innervation.

He then discussed the contra-indications to œsophagoscopy. The only contra-indications to the performance of œsophagoscopy are acute inflammation, as after the swallowing of corrosive fluids, and aneurysm of the aorta. The chief danger in passing the œsophagoscope is rupture of the œsophagus, which almost always results in infection of the posterior mediastinum and death. Such an accident can be easily avoided by the selection of a tube of the proper size and by adhering to the fundamental axiom of all œsophageal examinations, namely, the examining tube must never be advanced unless the eye sees through the tube the open œsophagus ahead. It should be remembered also that in old people the œsophageal wall may be thin enough to rupture itself, so that smaller tubes and greater care in using them are necessary. It has transpired of late years that there is considerable shock from manipulations carried out in the œsophagus, more shock than is caused by working in the trachea and bronchi. Children bear œsophageal examinations less well than do adults. In poorly nourished patients, particularly those who are on the point of starvation from the presence of a stricture, it is better practice to open the stomach and feed the patient through a gastric fistula until his resistance has been restored, before attempting any prolonged examination.

The œsophagus may be examined under local or general anæsthesia, the author being strongly prejudiced in favour of general anæsthesia, doing most of his œsophageal work with ether.

The laryngologist, on beginning œsophageal work, should supply himself with a full set of general and special instruments, a full list of which is recommended in the paper.

A general physical examination of the patient should be made before œsophagostomy is attempted. An X-ray plate is indispensable before many examinations. It shows the location of metallic foreign bodies, pieces of bone, and buttons; it shows enlargements of the arch of the aorta and enlargement of the mediastinal glands, and, combined with the ingestion of bismuth, it shows the position of strictures, the size and location of diverticula, and the size of the dilated œsophagus.

The technique of œsophagoscopy under local and under general anæsthesia, is described in detail.

(B) **Causes, Symptoms, Pathology, Diagnosis, and Treatment.—Chevalier Jackson.**—Stenosis of the œsophagus may be classified as inflammatory, neoplastic, compressive, spastic, and angeioneurotic.

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The inflammatory stenoses may be œdematous or cicatricial; the neoplastic, benign or malignant. The compressive may be due to malignant, benign or inflammatory, or peri-œsophageal lesions, or to aneurysm or enlargement of the left auricle. Compression stenosis is also frequently caused by a pulsion diverticulum of the œsophagus itself when the pouch is full of food. Spastic stenoses are usually seen at the cricoidal level, due to spasmodic contraction of the inferior constrictors, especially the orbicular fibres, along with the adjacent orbicular fibres of the œsophageal wall. The next most frequent spastic stenosis is at the diaphragmatic hiatus, the contraction being due to the traction of the diaphragmatic musculature and the small bundles of fibres given off from the diaphragm and attached to the œsophagus. Angeioneurotic œdema producing severe stenosis of the œsophagus has been observed by Arrowsmith.

The ætiology varies with the character of the stenosis. Inflammatory stenoses are most frequently caused by swallowing corrosives, but they may be due to stasis of food held up by spasmodic stenosis. Other causes are the traumata of foreign bodies, the mixed infections associated with lues and with tuberculosis of the œsophageal wall.

The cause of neoplastic stenoses, like that of neoplasms elsewhere, is unknown. Inflammatory processes and their end-results probably contribute to the ætiology by affording a favourable soil.

Spastic stenosis may be local or general. Local stenosis is often the result of a "vicious circle" started by rapid eating, with its associated gulping of large boluses of badly-masticated food, followed by stasis of the food, inflammation, and erosion, which, in turn, serve as a source of reflex excitement of more frequent and prolonged spasm, this inflammatory process being thus increased. The general causes of spastic stenosis are dependent upon some basis of nerve disorder, probably more functional than organic.

Pulsion diverticulum, as demonstrated by Killian, is chiefly caused by insufficient support of the œsophageal wall between the fundiform and oblique fibres of the inferior constrictor of the pharynx.

Extensive consideration of the symptomatology is useless, inasmuch as any abnormal sensation whatever, referable to the œsophagus, is an indication for œsophagoscopy, by which, rather than by symptoms, the diagnosis is to be made. An otherwise altogether unaccountable cough, "globus hystericus," and the filling to overflowing of the pyriform sinuses with secretions, are some of the signs which may lead to the diagnosis of œsophageal stenosis.

Radiography is of the greatest use in demonstrating the size and extent of dilatation and diverticula, as well as in assisting in making the diagnosis of their presence. Fluoroscopy affords very important aid by determining the functional activity of the œsophagus during the act of swallowing. Taken alone, however, these means may lead to error.

The bougie, passed blindly, is of no use for diagnostic purposes. The differential diagnosis of lues, tuberculosis, and malignancy is made by exclusion and by biopsy. The other types of stenosis are diagnosed by characteristic signs, which are detailed by the author.

Treatment should never be instituted while the patient is in the condition of water starvation. Enteroclysis or hypodermoclysis should be begun immediately. Immediate gastrostomy by the general surgeon, preferably under local anæsthesia, should be performed when the patient has had little or no water for as much as four days.

Œdematous inflammatory stenoses are best treated by the swallowing

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by the patient of small doses of bismuth with a little calomel, both given dry on the tongue.

Cicatricial stenoses, in the author's experience, are best treated by filiform silk woven bougies passed œsophageally.

Benign and endo-œsophageal growths are probably readily removable, though they are so rare that accurate data are lacking.

Malignant stenoses of the œsophagus are regarded by general surgeons as inoperable. There is reason to hope, however, that, when early diagnosis is possible, transthoracic œsophageal resection may be a justifiable procedure.

Spasmodic stenoses are best treated by divulsion. For this the author prefers a mechanical divulsor, such as that of Mosher, placed by sight through the œsophagoscope.

The treatment of compressive stenoses obviously depends upon the nature of the compressive mass.

Pulsion diverticula, according to the consensus of opinion, steadily increase in size and severity of symptoms; consequently amputation of the sac by the surgeon, operating through the neck, is indicated. The operation with œsophagoscopic aid, devised by Dr. Otto C. Gaub, has been successfully employed by the author in two cases. This method is described and illustrated with three figures.

Dr. Ross Hall Skillern recommended the suspension laryngoscope, which, with the suspension apparatus, gives a technique as simple as the passing of a naso-pharyngoscope into the nose. With the tongue depressor and the apparatus for lifting up the larynx the pyriform sinuses and the upper part of the larynx could be shown completely, without lifting the cricoid cartilage entirely. The instrument was fitted with a double light. The tube was passed, as one would pass the naso-pharyngoscope, and slipped down below the cricoid cartilage. By comparing this with the other method he had found it the simpler. He could see directly into the larynx. Children, as a rule, stood the œsophagoscope badly, but under the suspension apparatus they would stand for hours, or as long as necessary. He had had no child, thus far, to "go bad" with the suspension apparatus in position.

Dr. Sidney Yankauer recounted an experience with a stricture at the cardiac end of the stomach. The patient had suffered for many years from cardiospasm, and many attempts had been made to dilate the cardia, all without the slightest effect upon the cardiospasm. The man was unable to swallow other than liquid food, most of which came back into the mouth. He finally came into the hands of Dr. Willy Meyer, who, in the differential pressure chamber, opened the thorax, found the dilated portion of the œsophagus, which he corrected by plicating, but without improvement. The patient was put in the chamber again and an operation similar to Mikulicz's pyloroplasty performed on the cardia through the chest wall. There resulted not the slightest improvement in the swallowing or the cardiospasm. Dr. Meyer then turned the patient over to him to see what could be accomplished with the œsophagoscope. Upon putting in the instrument the scar-tissue from the plications could be seen forming ridges at the antero-lateral portion of the cardia; beyond this a bend of the lumen was located at the cardia, which it was impossible to pass. The lumen of the cardia was merely a slit. Attempts to pass through this brought so much pressure to bear upon the sides of the œsophagus that it was impossible to proceed. To pass and straighten out this tissue was a problem. He made for the purpose a wire probe which consisted of small joints, about a quarter of an inch long, so con-

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structed that it would bend in one direction but could not return beyond a straight line. His idea was to use the curved part to go round the ridge to rotate the instrument and then to pass the straight part into the stomach. After several attempts he finally succeeded in straightening out the ridge and in passing a narrow tube beyond the ridge. He then saw what seemed to be a string coming out from the lumen of the cardia. It proved to be a silk suture from the cardioplastic operation. Subsequently he found another stitch which he cut and removed. Following the removal of these two stitches the scar tissue softened up considerably, after which the gastroscope could be passed. After this the patient could swallow liquid food without difficulty, and some semi-solid food. He then passed the gastroscope and manipulated the head and shoulders in an effort to loosen up the cicatricial tissue. The patient's condition improved to such an extent that he could swallow gruels and semi-solid foods, but not solid food. The case illustrated what could be accomplished by the exercise of patience and a certain amount of resourcefulness.

Dr. SAMUEL IGLAUER described a procedure employed in the treatment of a case of complete obstruction of the œsophagus following typhoid fever occurring in a boy about ten years of age. A gastrostomy had been performed, through which the patient had been fed for a number of years. In order to measure the thickness of the obstruction an olive-tipped bougie was passed from the stomach into the œsophagus and another was passed through the mouth, and the distance between the two olives was determined by an X-ray picture. The olives were found to be slightly overlapped and about one-sixteenth of an inch apart. Œsophagoscopy both from the oral and the stomach end of the œsophagus failed to reveal any fistulous tract through the obstruction. A few days later, working in conjunction with Dr. Murphy, of Cincinnati, an attempt was made to relieve the obstruction by an original method. An œsophagoscope was introduced through the stomach end of the œsophagus and at the same time a second œsophagoscope was introduced through the oral end. Both tubes were introduced as far as the obstruction, there being an observer for each instrument. When the light in one instrument was turned out the glow of the light in the other could at times be seen transilluminating the obstruction. With an electro-cautery an attempt was then made to burn through the transilluminated diaphragm from above. The cautery was followed by a slender bougie which apparently passed through, but digital examination showed the bougie under the mucous membrane in the stomach. The bougie had evidently dissected up the mucosa of the œsophagus and passed down into the stomach wall. After a few days the patient was removed from the hospital contrary to advice. While on the train on his way home he began to swallow naturally, and this continued up to the time of his death, which occurred about three weeks after the operation. Evidently the lumen of the œsophagus had been restored, and if the procedure outlined above had been followed more cautiously it would have proved more successful.

Dr. GEORGE F. COTT added a third condition to the two mentioned by Dr. Mosher, in which the œsophagoscope could not or should not be passed. He cited a case in which the patient could not swallow, and in whom, under ether, the œsophagoscope could not be passed, after strenuous efforts for some time. Upon further investigation it was discovered that there was ankylosis of the cervical vertebræ from syphilis.

Dr. G. HUDSON MAKUEN asked if Coley's fluid (mixed toxins of *Bacillus prodigiosus* and *Streptococcus erysipelatosus*) had been tried in malignant disease of the œsophagus. Many cases of marvellous cure

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have been reported not only by Coley himself but by other distingnished surgeons in this country and abroad, and it would seem that, unless there were some contra-indication against its use, it might prove to be quite as efficient, if not more so, as any of the other methods which have been suggested, not excluding radium. He had recently been talking with Dr. Coley about the preparation of the fluid and about its use—a work in which he has been engaged for more than twenty years—and he was encouraged to hope that it might be useful in the class of cases under discussion. He would be glad to hear opinions on the subject.

Dr. ROBERT LEVY said the sign of which Dr. Jackson had spoken—the accumulation of secretion in the pyriform sinus—had been observed by him in cases of tuberculosis with painful deglutition. He had seen cases in which these sinuses were completely filled.

Dr. R. H. CRAIG (Montreal) suggested the use of the high frequency fulguration spark in the treatment of inoperable cases of this nature. He cited a case in which the pain absolutely disappeared, and the growth was greatly reduced. The patient, however, died six months later. In another case of malignant disease, involving the sphenoid and the naso-pharynx, after a month's treatment the growth was much reduced in size. He believed the high frequency fulguration spark is of great value in alleviating pain and diminishing the growth in these desperate cases. Where the growth was accessible carbon dioxide snow might be useful.

Dr. JOSEPH C. BECK asked Dr. Jackson if he had employed the Abderhalden test for carcinoma. He also asked Dr. Jackson to specify, in closing the discussion, what he meant by "small quantities" of radium. He had employed 19 milligrams of the salt or 10 milligrams of the pure radium element.

Dr. MOSHER, in reply, said Dr. Skillern's remarks interested him. He had tried the procedure of suspension œsophagoscopy, and had found it satisfactory in the examination of the upper part of the œsophagus. He had not had the trouble with the breathing which Dr. Skillern mentioned; in fact, he had been astonished to see how little trouble he had had in this regard. Referring to Dr. Iglauer's case he said he had reported a case three or four years ago where the same procedure was used. It was a case of absolute stenosis of the œsophagus, and he attacked it from above and below. The procedure which helped was that of picking the stricture apart, ballooning, and picking it apart again. In his experience perforating the œsophagus led to fatal mediastinitis.

Dr. JACKSON, in reply, said Dr. Mosher was the highest authority on the anatomy of the œsophagus. Dr. Jackson believed that all the early œsophagoscopists and many to-day mistook the hiatal constriction for the cardia. The question of anæsthesia was a matter of the personal equation. Every man should select the instruments which suit his needs best, and so it is with anæsthesia. The method should be selected which suits the operator's needs in the particular case. Personally the speaker had been very much interested in the case reported by Dr. Yankauer. He thought the work of Dr. Yankauer and Dr. Meyer would open a new field. The procedure mentioned by Dr. Iglauer was exceedingly interesting, and while it was a failure in the case cited it was justifiable in absolutely impervious strictures, and offered hope of success. In co-operating with Dr. Brenneman he had passed a tube to serve as a staff upon which Dr. Brenneman cut the occluding cicatrix from below through the externally opened stomach. Such procedures were, of course, indicated only in impermeable occlusion. If any lumen existed, however small, it could be cured by the safer endoscopic methods. Dr. Cott's

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point was well taken. Answering Dr. Goldstein's question concerning recurrence of spasmodic stenosis the speaker cited a case of spasmodic stenosis in which he absolutely failed. He stretched the abdominal œsophagus so completely that he could see into the stomach, and yet recurrence took place. This was, however, his only failure so far. The patient became discouraged and finally gave up treatment. Referring to Dr. Makuen's remarks concerning Coley's fluid, he said the method was applicable to sarcoma, and that it was in this disease that radium also gave best results, carcinoma being less amenable. Both methods could be used in the same patient. He suggested that in the cases of filling of the pyriform sinuses by secretions, mentioned by Dr. Levy, there might possibly be spasm in the crico-pharyngeal muscle causing temporary stenosis with resultant filling of the pyriform sinuses, or, in other instances, a disinclination to swallow because of the odynophagia which might exist. Or, in still other instances, an actual organic œsophageal stenosis due to tuberculous infiltration of the "party wall" might be present. Dr. Jackson hoped that fulguration and carbonic dioxide snow would be thoroughly tried, but he had had no experience with either. He had not employed the Abderhalden test, as suggested by Dr. Beck, but all diagnostic methods should be used. With reference to the dosage of radium, he said a small dose such as 10 mgrms. acts as an irritant, because it cannot be left long enough in the œsophagus. A hundred mgrms. left in for an hour or more was usually required. He did not speak as an authority; he depended upon Dr. W. H. Cameron and Dr. William Proescher for dosage and duration of the radium application in each particular case.

Suspension Laryngoscopy in Children.—Robert Levy.—Since the discovery of the laryngoscope by Garcia no more interesting chapter in the history of laryngology has been written than the most recent one by Killian in which he describes the discovery of suspension laryngoscopy. Since Killian's original communication, suspension laryngoscopy has been elaborated, its limitations and advantages have been carefully proved and commented upon. It has been generally conceded that in adults its limitations are greater than in children. All observers early recognised its value in children, even before it had been tried out in many cases.

The suspension method possesses many advantages over the ordinary direct endoscopy. These are: The entire field and surrounding parts are clearly before one; both hands are free; the dangers from asphyxia are practically *nil*; and a remarkably clear view may be obtained of the anterior commissure of the larynx and trachea. The after-effects of the suspension method are of no more serious moment than are those of the most simple laryngeal manipulation.

The technique of the procedure in children differs but slightly from that in adults. It may be said to be somewhat easier, although in no event can this procedure be considered a difficult one. The tongue need not be drawn forward; in fact, little attention need be paid to it except to keep it in the median line. The hand need not hang far over the table; in fact, if a pillow be placed under the shoulders the head may even rest upon the table. In many instances, especially when examining or operating in the œsophagus, the spatula need not be brought over the epiglottis, but, resting well at the base of the tongue, it will bring the parts into perfect view.

The question of anæsthesia is an important one in children. As a rule, local anæsthesia is not entirely satisfactory. On the whole, general

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anæsthesia, preferably with chloroform, has given the author the best results.

The specific uses to which suspension laryngoscopy has been applied are: for examination; for diagnosis; for operation through the nasal passages; for the removal of foreign bodies.

A brief summary of the uses to which suspension laryngoscopy has been put and which have been reported is given, together with histories of six cases in which the method was employed by the author.

Dr. SIDNEY YANKAUER agreed with all Dr. Levy said concerning suspension laryngoscopy. He had performed a number of operations with this apparatus. In one case, after several operations by the general surgeons, the patient's neck was so scarred that the lumen of the larynx was so small that he could hardly get a probe through. The arytænoids were so adherent to the epiglottis that by the ordinary direct methods the lumen could not be seen, but with suspension laryngoscopy this could be accomplished. The passage of the first probe was followed by a larger, and finally he could pass a uterine dilator. By means of the uterine dilator he could stretch the larynx sufficiently to get a rubber tube in, which was left in for two weeks, when a larger one was used. It was thus possible, finally, to introduce the intubation tube. The boy is now going about, and has been wearing the intubation tube for about four months. The suspension laryngoscope has been modified by Killian himself as well as by others. The new model which Killian has brought out does not appear as useful as the original model. He had not been able to bring the anterior commissure into view with the new device.

Dr. SAMUEL IGLAUER was interested in Dr. Levy's remarks, and agreed with practically every point. While it was true that the procedure was less difficult in children, it could be carried out satisfactorily in adults. In bringing the anterior commissure into view one should use counter-pressure with Albrecht's instrument or the finger. Killian recommended a dose of codein, preliminary to the anæsthetic, in children. He had frequently followed this suggestion. Atropin should be used with ether in order to dry up the secretions. He had tried tonsil removal under suspension, but thought the Beck method far superior and much simpler than that of Killian. Referring to the removal of a broken safety-pin from the larynx of the child five years of age, he really did not completely suspend the patient. He introduced the spatula, and, while supporting the spatula (and thus the patient's head) with his left hand, he could see the foreign body and remove it immediately with the forceps in his right hand. He had recently introduced radium into the larynx in the treatment of a papilloma in a young child. In another infant radium was applied to the outside of the larynx. He did not know the dosage because he did not own the radium.

Dr. THOMAS J. HARRIS confirmed what Dr. Levy had said with reference to the simplicity of the method in children and the wonderful view of the larynx obtained in the average case. He referred briefly to a case in which he applied radium in a child six years of age, using the suspension apparatus, with rectal anæsthesia, 100 mgrms. of radium, of one million activity, being applied for twenty minutes. The first time he attempted to apply the radium, without the suspension apparatus, he thought it went into the œsophagus instead of the larynx. When the apparatus was employed it was very much easier to see the papilloma and to make the application of radium. He recommended the use of rectal anæsthesia in these cases.

Dr. LEVY, in reply, had not found the report of Dr. Yankauer's case

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in his search for all cases to date in which suspension laryngoscopy had been employed in children. He thought the old Killian model of suspension apparatus better in children, but in adults he liked the Albrecht or Howarth modification. He had used cocain in adults, but in children he used general anæsthesia. Morphine and hyoscin in cases in which a large percentage of cocain did not seem to abolish the laryngeal reflex were useful in adults. He had never been able to see why adrenalin was added to the cocain, inasmuch as it is not an anæsthetic and as there is very little loss of blood in these cases. In some cases of children with chloroform anæsthesia the adductors contracted, the vocal bands came together, and the spasm of the larynx continued for some time. In such cases a dilute solution of cocain was of advantage.

The Clinical Significance of Bacteræmia.—John E. Sheppard.—Four cases were reported, which seemed to the author to be fairly illustrative of a considerable series of cases encountered at the Jewish Hospital in Brooklyn. The four cases and others of the group from which these were selected would appear to demonstrate that not all cases of otitic bacteræmia need operation. To distinguish between cases which do and those which do not require operation calls for one's closest observation and best judgment. As aids, all too meagre at times, it is true, in coming to a conclusion as to whether or not to operate, the author suggested the following points: (1) The general condition and appearance of the patient. Is there a markedly septic condition? Is it increasing or decreasing? As of the greatest aid in determining this: (2) The temperature curve. (3) Whether the process is localising or tending to become general? (4) Blood-counts, frequent enough to keep a careful line on the patient's resisting power. (5) Blood-cultures, sufficiently often to have a definite knowledge of the persistence of the organism in the blood, and whether the number of colonies per cubic centimetre is increasing or diminishing, thus showing whether or not the patient is in need of assistance in taking care of the bacteræmia.

Dr. Arthur B. Duel thought the interesting reports by Dr. Sheppard served to emphasise certain principles in infectious processes which were of great clinical importance. It must be evident that in all infections the general clinical symptoms usually noted are the result of the action of bacteria or their products which have been poured into the circulation. When the general clinical manifestations are slight, the infecting focus is confined to an unfavourable locality for getting into the circulation, or the invading organism is slightly virulent. Thus, a follicular tonsillitis of streptococcic origin will produce much more violent manifestations than a streptococcic otitis or mastoiditis. Similarly, a staphylococcic follicular tonsillitis, being in a favourable field for pouring its products into the circulation, may cause considerable general upset (though comparatively less than its more virulent cousins), while, confined to a bony cavity, it may cause hardly enough disturbance to be recognised. Whatever manifestation there may be, however, is undoubtedly caused by the bacterial invasion of the circulation. It may be asked, then, why bacteræmia is not always demonstrable in suppurative conditions. The answer is twofold. In the first place, the methods of examination are not sufficiently delicate; in the second place, most of the organisms are destroyed almost immediately by the blood cells. Only a few of the most virulent type are able to live and multiply in the circulation. Is a demonstrated bacteræmia, then, of no value as an operative indication? Of course it may be of the greatest value. In a case, for example, in which bac-

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teræmia is demonstrated, where the blood-count shows a low resistance, and where the patient is doing badly, the obvious thing to do is to localise the process—to cut off the blood-stream at that point—without regard to whether or not there is a demonstrable disintegrating clot. In fact, in his opinion, to look upon bacteræmia alone in suppurative otitis or mastoiditis as indicative of septic sinus thrombosis is unwarranted. The bacteræmia always precedes the clot formation—indeed the alteration of the vessel wall by bacterial invasion is essential to the formation of the clot. At this stage it may not be always demonstrable by present methods, but theoretically it is present, and if methods of investigations were nice enough it might possibly be demonstrated a day before, or perhaps a week before, a recognisable clot has formed. Of course, after the clot has formed and has begun to disintegrate, the chance of demonstrating a bacteræmia is much greater, because the infecting focus is in the most favourable situation for the constant discharge of large numbers of organisations into the circulation. Yet, without a patient doing badly, one might feel quite justified in isolating the infecting area, whether bacteræmia could or could not be shown. On the other hand, with the patient doing very well, the demonstration of a bacteræmia might not necessarily demand an operation. Hundreds, of course, recover every year without its having been thought necessary to demonstrate the bacteræmia, which is undoubtedly present, and will doubtless continue to do so. One should carefully avoid taking too narrow a view of the clinical significance of bacteræmia.

Dr. Charles W. Richardson considered the demonstration of bacteræmia an important point in the history of all cases of probable sinus infection. Whether a positive bacteræmia is always indicative of sinus thrombosis was a question still subject to considerable dispute. In cases on the borderline, as it were, the condition of the blood was of much value to the clinician, and should be of great assistance in deciding whether operative intervention was demanded. Without clear and definite indications from a clinical point of view there was no doubt that many would be loath to go into the sinus, although the experience of Gruening and others would seem to demonstrate that in cases of simple bacteræmia, without very pronounced clinical symptoms, there might be sinus thrombosis. How far one would be warranted, with the evidence of bacteræmia and without clinical evidence of sinus thrombosis, in delaying operative intervention was a question. With bacteræmia, even without clinical evidence, he would be loath to delay. Dr. Sheppard's cases were almost negative, in a certain sense, especially his non-operative cases, in which he was fortunate in that they recovered without operative intervention.

Dr. Seymour Oppenheimer was under the impression that Dr. Duel and his *confrères* at the Manhattan Eye and Ear Hospital were no longer at variance with Dr. Libman and Dr. Celler and others at the Mount Sinai Hospital with reference to this question of bacteræmia. At Mount Sinai it was held that acute otitis *per se* never caused bacteræmia, and these views had been corroborated by the clinical findings. This difference of opinion was thought to be largely a matter of variance in laboratory technique, the fact that the Manhattan Eye and Ear Hospital reached different conclusions being considered at Mount Sinai to be due to some error in laboratory technique. He and his associates at the latter institution had not changed their view-point at all, being still of the opinion that suppurative otitis *per se* does not cause bacteræmia. They were also of the opinion that demonstrable bacteræmia is a clinical expression of sinus thrombosis. Up to the present time they had had from ninety to

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ninety-five cases of sinus thrombosis in which bacteræmia had been demonstrated in advance of operation, and in not one case had the operation failed to demonstrate sinus thrombosis. It was a curious fact that if they were wrong in their deductions they were able to demonstrate conclusively, a few hours after operation, that the blood-culture became sterile, showing that the operative procedure must have attacked some local focus which was responsible for the infection. In two hours, in some instances, the blood had become sterile. In some cases the blood-culture still remained positive, but there were other explanations, such as vegetations on the heart-valves secondary to the initial infection.

Dr. S. MacCuen Smith asked Dr. Oppenheimer whether he depended upon the blood-cultures for indications for operation, or whether he was guided by other symptoms of the disease.

Dr. William B. Chamberlin said, if he understood Dr. Sheppard correctly, he opened the lateral sinus but made no mention of ligating the jugular. He could see no reason, under the circumstances, for not immediately ligaturing the jugular.

Dr. Ewing W. Day called attention to one point that seemed to have been overlooked. There was a tendency to take for granted that every lateral sinus patient, unless operated upon, dies. If a patient with thrombosis got well it was no indication that the sinus was not blocked. He had had cases in which the sinus was completely obliterated by clot, and he could not say that if the patient got well there was no clot.

Dr. Oppenheimer, continuing the discussion, said, in answer to Dr. Smith's question, he had been particularly cautious, by reason of these controversies, in not being too enthusiastic. Many cases had been admitted to the hospital with but the fewest of otitic symptoms, with suggestions of typhoid fever, possibly, with no symptoms of mastoiditis, but with a positive blood-culture. He had been extremely cautious in saying he was dealing with infectious phlebitis, and had deferred operating until all other possible causes had been ruled out. Invariably they had found a thrombotic condition in the sinus. Answering a question by Dr. George L. Richards as to whether all his ninety or ninety-five cases were operated upon, he said they were.

Dr. Wendell C. Phillips verified Dr. Day's statements. He had been struck, years ago, in operative surgery on the ear, to find occasionally an obliterated sinus from an old sinus thrombosis.

Dr. John A. Thompson recalled having treated a brother laryngologist for suppurative ethmoiditis. He developed an abscess in the big toe, which was opened under antiseptic precautions, and examination of the pus revealed the presence of streptococci. The nasal accessory sinuses were sometimes at fault in bacteræmia.

Dr. Sheppard, in closing the discussion, said he simply reported four cases as a part of a group of cases of bacteræmia, many of the group being cases which had been operated upon. Regarding the tying of the jugular, he had rather settled down to the rule of not tying it if there is a reasonably good return flow from the bulb. Should there be no return flow he waited a day or two and then tied off the jugular. It was probably true, as Dr. Richardson suggested, that he was fortunate in not having bad results. Possibly more than simple good fortune is indicated by the fact that the cases referred to were selected from perhaps fifty or more cases of bacteræmia, of which he had kept careful records, and of which twenty-five at least had not been operated upon. Dr. Thompson referred to other sources of bacteræmia. This fact need always to be kept in mind. He very decidedly does not advocate operating upon all cases of

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bacteræmia. Dr. Oppenheimer spoke of his cases as being cases of suppurative otitis. Three of his cases reported in the paper were non-suppurative otitis. He questioned the necessity of operating upon all these cases if they are properly watched, especially if in conjunction with a practical bacteriologist. He thought more extensive observations would ultimately teach in which cases to operate and in which surgical intervention was not necessary.

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Otological Section.

Mr. A. Cheatle, *President, in the Chair.*

(*Continued from p.* 323.)

The Pathology of Acquired Deaf-Mutism.—Report by Holger Mygind (Copenhagen).—Mygind's paper consisted of an analysis of the *post-mortem* findings in 38 cases of acquired deaf-mutism reported in the literature. Of these, 17 were due to meningitis or acute disease with brain symptoms; 4 to scarlet fever; 5 to measles; 2 to head injury; and in 10 the cause was unknown. These cases represent 75 petrous bones.

In none of the cases were there any abnormalities found in the cerebral part of the hearing organ which could be considered as causing the deafness.

Pathological Changes in the Middle Ear.—Thirty-four out of the seventy-five exhibited abnormalities in the middle ear, exclusive of acute catarrh or suppuration. The predominant change was chronic suppuration, either active or healed, often combined with osseus lesions, but in no case could the middle-ear changes alone be credited with the deaf-mutism as, in practically all, abnormalities in the cochlea were also present. This points to the middle ear as being the primary seat of the disease which destroyed the hearing, but at the same time too much stress must not be laid upon this conclusion, since not only may the coincidence of changes in the middle ear and internal ear be accidental, but in cerebro-spinal meningitis labyrinthitis and otitis media may be produced simultaneously. In general, however, a distinction can be drawn, for deaf-mutism of tympanic origin is characterised by the presence of gross changes in the middle ear and of moderate changes in the labyrinth, whereas in deaf-mutism of meningitic origin the relative severity of the changes in the middle ear and in the tympanum is the reverse of that.

The route by which the disease spreads to the labyrinth from the middle ear is difficult to find. It is true that the fenestræ were frequently found to be closed by bone or fibrous tissue, but the same, though to a less extent, was found in the meningitic cases, where the process spreads from within outwards.

Pathological Changes in the Labyrinth.—In most cases the changes

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