

uterine walls with caseous material, may occur. This process usually begins in the fundus, and may be especially marked at the cornua. Rarely does it pass the internal os. In the early stage a fine nodular roughening of the endometrium may be detected, but this may be indistinct, and a precise diagnosis is possible only after microscopic study. Later, irregular ulcers with yellowish necrotic bases and edges infiltrated by tubercles may be formed. A diffuse caseous necrosis with a complete destruction of the endometrium is the most common form in the uterus. It may occur in childhood, in middle or in advanced life. The internal os may be obstructed, and the process at times advances to the point of causing a perforation of the muscular wall of the uterus. Rarely there may develop in the uterus a pure interstitial or muscular form that may progress until it produces a perforation into the abdominal or uterine cavity. Early in the process such an involvement may predispose to uterine rupture during pregnancy or labor.

Primary tuberculosis of the uterus is very rare. It is usually secondary to tuberculosis of the Fallopian tubes or to phthisis pulmonalis. As a secondary condition it is not uncommon, and in such cases the tuberculous process is usually limited to the corpus, the cervix being healthy. On the other hand, in the rare cases in which the cervix is attacked, the corpus is usually normal. Merletti (*Archivio di Ostet. e Ginec.*, December, 1901) states that in one hundred and seventy-two cases of genital tuberculosis, seventy-five had the uterine body affected.

Tuberculosis of the cervix usually proceeds to the formation of ulcers or fungating papillary masses. The ulceration may extend over the vaginal portion of the cervix, the base of the ulcer showing reddish granulations and a superficial mass of caseous necrosis. Minute, firm, grayish or yellowish tubercles may be present throughout the surface of the ulcer or in the adjacent tissue. In the papillary form masses occur within the canal, and the clinical picture resembles that of carcinoma. There is, however, less bleeding on manipulation, and the induration is less wooden. Tuberculosis of the cervix is very rare. The first case was described by Virchow ("von Rud. Tuberkulose der Scheide," *Virchow's Archiv*, Bd. v., p. 404). In the majority of cases of cervical tuberculosis, tuberculosis of the vagina has been present. Tuberculosis of the corpus seldom exists in conjunction with tuberculosis of the cervix. J. Whitridge Williams ("Tuberculosis of the Female Generative Organs," Johns Hopkins Hospital Reports, 1892, vol. iii., p. 85) was able to collect only seven cases. It is probable that certain cases of tuberculosis of the cervix have been diagnosed as instances of cancer, thus forming a possible source of error in estimating the permanent results of hysterectomy for cancer of the cervix.

In the vagina and upon the labia minora tubercles and irregular ulcers with indurated yellowish or reddish bases and thickened borders have in rare instances been noted. In the vagina the posterior wall is the seat of election for the disease. Tuberculosis of the vagina is usually secondary to tuberculosis of the higher portions of the genital tract, though it may occur independently of any tuberculous infection of the rest of the genitalia. Tuberculous ulcers may perforate the wall of the vagina and, according to their location, lead to the formation of recto-vaginal and vesico-vaginal fistule.

The lupus occurring upon the vulva resembles that which occurs upon other portions of the body. The vulva is less often the seat of tuberculosis than any portion of the genitalia. J. Whitridge Williams ("Tuberculosis of the Female Generative Organs," Johns Hopkins Hospital Reports, 1892, vol. iii., p. 85) was able to collect only three cases in which the diagnosis, based upon microscopic and bacteriologic examinations, was undoubted. Many cases of supposed lupus have been due to syphilis or to non-tuberculous ulceration.

It seems probable that the supposed rarity of the disease below the Fallopian tubes is due in part to the lack of pathologic or bacteriologic study of obscure lesions.

Under the microscope the tubercles found in the genitalia resemble those found elsewhere in the body, frequently combining giant cells and caseous centres with a peripheral zone of epithelioid and lymphoid cells.

DIAGNOSIS.—Cover-glass smears made from the secretions of the uterus or local lesions when properly stained may show the characteristic bacilli. Care should be taken by inoculation experiments, or other tests, to exclude the smegma bacillus.

The most delicate reaction is by the injection of suspected secretion into the peritoneal cavities of guinea-pigs. In from three to six weeks, should virulent tubercle bacilli be present in the secretion, the animals will show a characteristic involvement of the organs. Uterine scrapings, scrapings or sections from ulcers, when sectioned and stained, may show characteristic tubercles or the bacilli. I have observed typical tubercles in bits of granulation tissue scraped from a pelvic sinus. Sections should be made of all excised organs, and, in doubtful cases, inoculation experiments in the lower animals should be carried out.

Clinically, tuberculosis is to be thought of when a marked salpingitis, perimetritis, or endometritis occurs in young children or in adults, provided we can exclude gonorrhoeal or puerperal infection. The diagnosis is rendered more probable when tuberculous foci are present in the lungs or other organs. Tuberculosis of the vulva, vagina, and cervix may be suspected when these tissues are infiltrated or ulcerated. The lesions resemble those of tuberculosis upon other mucous structures, but the diagnosis must rest upon histologic and bacteriologic studies. In tuberculosis the adhesions about the Fallopian tubes may be extensive, and yet the ostia of these tubes may not show the same tendency to undergo closure that is observed in other forms of salpingitis. As to the general symptoms, the great disproportion which exists between the marked cachexia and the insignificant amount of local disease is suggestive, while the injection of tuberculin causes a well-marked reaction. The pathologic process is aggravated by pregnancy, by coitus, and generally by debilitating conditions, especially such as occur in diabetes.

TREATMENT.—Tuberculosis of the uterus, whether of the corpus or of the cervix, when primary or when secondary to tuberculosis of the uterine appendages or of the peritoneum, should be treated by hysterectomy. Abdominal hysterectomy should be preferred as affording the opportunity of dealing more satisfactorily with the involved appendages and of inspecting the abdominal peritoneum. When tuberculosis of the uterus is secondary to tuberculosis in the lungs or other organs of the body, hysterectomy is still indicated, provided the tuberculous process elsewhere is not extensive and is not progressive, and provided also that the nutrition and vitality of the particular patient is sufficiently good to enable her to withstand a major operation. When tuberculosis of the uterus or cervix is secondary to or complicated by active tuberculosis in other organs of the body, or when the vitality of the patient is too greatly reduced to render a major operation advisable, treatment addressed to the cure or amelioration of the complicating conditions should first be instituted. Admission should be sought in a well-equipped sanitarium for the treatment of tuberculosis; or, if this is not available, the influence of rest, forced feeding, life in the open air, and tonic medication should be advised. During the continuance of such general treatment, should the discharges from the uterus be annoying or offensive, bland aseptic or mild antiseptic vaginal douches should be employed. In cases in which local discharge, whether of blood or of pus, is a marked feature, and in which a radical operation is contraindicated, curettage, with local applications of silver nitrate, iodoform, etc., may occasionally be indicated.

The treatment of tuberculosis of the vagina depends upon the character of the lesions, upon whether they be primary or secondary, and upon the complications in the particular case. Isolated lesions, when not too exten-

sive, should be treated by excision and suture. When this is not feasible, owing to the extent of the lesion or to too great involvement of the recto-vaginal and vesico-vaginal septa, the condition may best be treated by curettage, followed by the application of silver nitrate, iodoform, or other topical applications used in tuberculous lesions of mucous membranes in other portions of the body. In complicated cases in which the involvement of the vagina is but a minor part of a more general condition, local measures should be restricted to those which promote the comfort of the patient by the removal of discharges and the relief of pain.

Tuberculosis of the vulva should be treated by excision, when the lesions are not extensive. In cases in which the tissues are involved to a marked degree, Finsen-light treatment should be employed, this having given excellent results in lupus of other portions of the body.

The importance of general treatment, both in connection with local treatment addressed to the generative organs and as supplementary to local treatment whether topical or operative, cannot be too strongly insisted upon. It would be better if all cases supposed to be cured of local tuberculosis were treated by the methods which are considered necessary in the treatment of incipient tuberculosis.

The prognosis of tuberculous cases should almost never be hopeless. Not infrequently the most unpromising cases do well, and sometimes make good recoveries.

Charles P. Noble.

UVA URSI. See Bearberry.

UVULA AND SOFT PALATE.—ANATOMY.—The soft palate, or velum pendulum palati, is, as its name implies, a movable curtain or fold formed by a duplication of the mucous membrane which covers the hard palate and is continued backward from it. It contains muscular fibres, an aponeurosis, vessels, nerves, and mucous glands, and forms a valve, more or less complete, between the mouth and the pharynx. Its inferior border is free and pendulous, and is prolonged in the middle into a small conical process, the uvula. At each side it presents two curved folds known as the arches or pillars of the soft palate, and which, starting from above at a short distance outside the median line, extend downward and outward, diverging in their course to form the triangular space in which lies the tonsil. These folds are called respectively the anterior and the posterior pillars of the palate. The anterior descends to the side of the tongue, while the posterior runs downward and backward into the pharynx. The space which is situated between the anterior arches of the palate, and which constitutes the passage-way from the mouth to the pharynx, is called the isthmus of the fauces. The mucous membrane covering the greater part of the velum, as well as its free margin, is covered with pavement epithelium. At the upper part, however, and near the orifice of the Eustachian tube, ciliated and columnar epithelium is found. The epithelium of the gland ducts is also, in many instances, of this character. At birth the whole posterior surface of the velum is lined with ciliated epithelium, which later becomes squamous. The soft palate is acted upon by five pairs of muscles, two superior, two inferior, and one intermediate.

The superior muscles are the tensor palati and the levator palati, the two inferior are the palatoglossus and the palatopharyngeus, and the intermediate is the azygos uvulae.

The tensor palati, or circumflexus, arises from the anterior aspect of the cartilaginous portion of the Eustachian tube, from the navicular fossa at the root of the internal pterygoid plate, from the spine of the sphenoid and the edge of the tympanic plate of the temporal bone; it descends vertically between the internal pterygoid plate and the inner surface of the internal pterygoid muscle, and terminates in a tendon which winds around the hamular process, being retained in this situation by some of the fibres of origin of the internal pterygoid

muscle, and lubricated by a bursa; it extends horizontally inward, and terminates in the anterior part of the aponeurosis of the soft palate and the under surface of the palate bone.

The levator palati muscle arises from the under surface of the apex of the petrous portion of the temporal bone, in front of the orifice of the carotid canal, and from the adjacent cartilaginous parts of the Eustachian tube. It passes downward and forward, approaching the median line, and is expanded upon the posterior surface of the soft palate as far as the median line, where its fibres blend with those of the opposite side. Superiorly, it is placed above the concave margin of the superior constrictor.

The palatoglossus muscle (constrictor isthmi faucium) is a fasciculus, narrower at the middle, which forms, with the mucous membrane covering it, the anterior pillar of the soft palate. It arises from the anterior surface of the soft palate, on each side of the uvula, where its fibres are continuous with those of its fellow of the opposite side, and, passing forward and outward in front of the tonsil, is inserted into the side and dorsum of the tongue.

The palatopharyngeus muscle, occupying the posterior pillar of the palate and forming, with the palatoglossus, the triangular space in which lies the tonsil, arises in the soft palate by fibres connected with those of the opposite side, and passing partly above and partly below those of the levator palati and azygos muscles. As the muscle descends it becomes greatly expanded, and its fibres are found extending from the posterior corner of the thyroid cartilage backward to the middle line of the pharynx, some of the fibres decussating posteriorly with those of the opposite side.

The azygos uvulae muscle (so called from having been supposed to be a single muscle) consists in reality of two fasciculi; these arise from the posterior nasal spine of the palate bone and from the tendinous structure of the soft palate, and descend to be inserted into the uvula. The fasciculi are separated by a slight interval above and unite as they descend.

DISEASES.—The diseases of the soft palate and uvula may be classified into two groups, namely, general and local. In the first division may be grouped such as are symptomatic, and merely the local manifestation of a general condition, such as measles, scarlet fever, diphtheria, syphilis, tuberculosis, and lupus. Although the local lesion in any of the above affections cannot compare in importance with the general disease, there may arise certain conditions under which the throat affection may become of decided importance, as will be seen later on in the study of chronic inflammation, diphtheria, and syphilis of the parts. Local affections of the soft palate include the various inflammations which may attack it, such as simple hyperæmia, acute, subacute, and chronic congestion, œdema, and phlegmon, as well as general relaxation, dilatation of the superficial blood-vessels, paralysis, new growths, and congenital malformation.

Inflammation.—Acute catarrhal inflammation of the uvula and soft palate presents the following symptoms: The uvula is reddened, swollen, and somewhat sensitive, the sensitiveness increasing at each effort of deglutition, and the patient experiencing a sharp pain, as from the presence of a foreign body in the throat. If the inflammation be severe, œdema of the submucous connective tissue and of the muscular tissue beneath may occur, giving rise to an acute prolapsus of the uvula, and attended with much irritation and discomfort. These anatomical changes are usually temporary, and disappear with the subsidence of the attack. Follicular and herpetic inflammations of the uvula are usually associated with the same condition in the pharynx, and therefore show no features which are distinctive.

Phlegmonous uvulitis is characterized by the greater intensity of the accompanying inflammation. The uvula is very much swollen and reddened, and the pain is excessive. The sensation is as of a heavy, voluminous body in the mouth, which in the act of deglutition gives

rise to lancinating, almost unbearable pain. Respiration, besides, is more or less seriously impeded. In such cases the inflammation involves both the mucous membrane and the submucous connective tissue, and also the azygos muscle, and it may extend to the neighboring parts.

The causes of the above-mentioned forms of inflammation of the uvula are, in general, as follows: Influence of cold, or of irritating substances, such as too hot food or drink, burning or irritating alkaline substances or mineral acids; and, finally, progressive inflammation extending from the neighboring parts. As already mentioned, the symptoms of acute uvulitis do not last long, and the disease can usually be shortened by the application of medicines such as are generally used for similar conditions elsewhere. Sometimes the disease becomes chronic, especially when the inflammation is often repeated, or the patient is suffering from constitutional disease or general disturbance of nutrition.

The chronic catarrhal form of uvulitis presents all the well-known changes in appearance which are common in like affections of the pharynx and larynx. A granular condition of the mucous membrane is especially frequent, originating in a hyperplastic inflammation of the mucous glands. The surface of the uvula is hard, reddened, and covered with small nodules. Between the latter the mucous membrane is indurated, hyperæmic, and insensitive. The condition is often associated with a similar disease of the pharynx, and it occurs most frequently in strumous and anæmic subjects, or in those whose general nutrition has become impaired. It is a somewhat stubborn affection, for which general as well as local treatment is required.

Relaxed Uvula.—Chronic inflammation of the uvula usually ends in prolapse and hypertrophy, a condition which may give rise both to direct and to reflex irritation of a serious nature. One of the chief causes of relaxed uvula or, more properly speaking, of the catarrhal troubles which occasion it, are vicissitudes of climate and variations of temperature, especially in countries where there is a frequent combination of cold and wet weather.

Exposure to night air, or to the vitiated atmosphere of crowded and overheated rooms, overindulgence in eating or drinking, and excessive smoking are among the causes of relaxed throat. It is a common companion of the alcoholic habit, often being associated with the gastric catarrh which attends that condition. Occurring in the morning, it is probably due to mouth-breathing from nasal or naso-pharyngeal obstruction; in the evening, from fatigue. It is often seen in those suffering from general depression, and when it is observed in women in whom uterine disease is present, it is probably the result of the general enfeeblement caused by the latter, rather than of any distinct reflex influence. Marked elongation of the uvula is often present in strumous children and in those in whom the tonsils are enlarged. It is sometimes congenital. In general, any cause which may produce a relaxation of the velum palati may also be followed by relaxation and elongation of the uvula.

The symptoms of an acute attack of relaxed palate are a sensation of fulness and stiffness of the throat, together sometimes with the sensation as of a foreign body. There are also an uncomfortable feeling of dryness, and a desire to make repeated efforts to dislodge the supposed foreign substance.

The symptoms may quickly subside, or they may continue for several days. Examination reveals more or less congestion of the parts, although this is sometimes so slight as hardly to be noticeable. There are also slight swelling, and often a varicose condition of the smaller veins. The elongated state of the uvula may give rise to a greater or less degree of local irritation. Sometimes this becomes excessive, occasioning persistent and severe attacks of coughing. In case the uvula be long enough to touch the epiglottis or the larynx, severe paroxysms of coughing may occur whenever the patient lies upon his back. This may cause him much distress upon lying down at night, and, should he turn upon his back

during sleep, may waken him with a sense of impending suffocation. When the condition has become chronic, or is congenital, these suffocative attacks may be of almost nightly occurrence, the patient being obliged to sleep with the head raised by several pillows to obtain any immunity from them. Sometimes the attendant hyperæsthesia of the pharynx is so pronounced that the patient may be subject to sudden fits of violent, spasmodic cough upon the slightest provocation, or even without any apparent reason at all. The writer has seen a case of spasmodic stricture of the œsophagus, in a patient suffering with elongated uvula and hyperæsthesia of the pharynx, which was cured by amputation of the uvula. Again, so great may be the irritation that cough, loss of appetite and sleep, and nausea and vomiting may result in such pronounced emaciation, anæmia, debility, and malaise that the case may, upon superficial examination, be taken for one of phthisis. Indeed this error is not infrequently made.

Proper treatment of relaxed uvula generally results in the cure of the disease. The various exciting causes of the trouble should, if possible, be carefully avoided. The patient should be directed to live in a dry and bracing climate. Indigestion or constipation, if present, should be corrected. Anæmia and debility must be removed by the administration of tonics, and the local condition is to be treated by the application of mild astringent sprays or insufflations. If the uvula be much elongated, if it be a source of irritation, and if it refuse to retract under the influence of local treatment, it should be shortened.

Amputation or abscission of the uvula has been practised among many peoples from a very early date. Although in itself an apparently insignificant operation, it is one of great utility and practical importance.

At the present day uvulotomy is practised with an increasing degree of discretion, as some reproach has been cast upon it by the indiscriminate and clumsy manner in which it has sometimes been performed.

For the more convenient and perfect performance of the operation many instruments have been devised.

By far the simplest and best instrument is a pair of long-handled scissors, having the blades curved sideways toward the right hand, and one blade hooked at its tip so that the uvula may not slip from its grasp. A holder, made on the principle of Sims' uterine thumb forceps, an instrument about eight inches in length, possesses the advantages over other forceps that it has not the inconvenient scissors handle, that it may be held firmly and with great steadiness by allowing its proximate end to rest in the hollow between the thumb and forefinger, the whole hand meanwhile being steadied by resting the fourth and fifth fingers against the patient's chin, and, finally, that in applying the scissors the forceps may be used as a guide.

In operating, the patient's tongue should be held down by himself, or by an assistant, with a tongue depressor. The amount necessary to be removed having been carefully estimated, the uvula is grasped by the forceps at a point below the proposed line of incision and drawn slightly forward. The scissors, carefully guided by the hand and eye of the operator, are then applied, and the separation of the redundant tissue is completed. The same result may be obtained by means of the Jarvis snare, in the use of which it is only necessary to seize the part to be removed in the loop of the écraseur, without the aid of the forceps. This latter method is not painful if cocaine anæsthesia is employed, and it has been found by the writer to be particularly convenient and effective. Should there be any fear of exciting undue bleeding, the galvano-caustic loop may be used, the uvula being first drawn forward as in abscission by the scissors. As was long ago pointed out by Llewellyn Thomas, the line of incision should be directed from below obliquely upward and backward, in order that the wound may be exposed as little as possible in the act of deglutition. Local anæsthesia should always be secured before the operation. For this purpose the holding of a

piece of ice in the mouth for a few moments before the operation is effective and free from the objectionable features of cocaine. Pain during and after the operation will vary greatly in different cases. While in the case of a slender, anæmic uvula it may be very slight, in a thick, congested, hyperæsthetic one it may be severe and annoying, and the process of healing may be protracted for from two days to a week. Morell Mackenzie insisted that, where there is any follicular disease of the throat, it is most important to cure that affection before the uvula is amputated, as, owing to the after-pain caused by the removal of the uvula, patients will not submit to any further treatment when they have recovered from the operation. Hence the patient remains uncured, and the operation, and he who performed it, are brought into discredit. The amount of relief, however, which is possible from this apparently insignificant procedure is sometimes remarkable, the whole train of symptoms, local and reflex, vanishing as if by magic, the general health returning to a normal basis, and the voice gaining markedly in quality and power. This, however, is not invariably the case, as the reflex symptoms may be slow in leaving, not disappearing entirely until a considerable length of time has elapsed. This possibility should be recognized and explained to the patient in order that he may not be subjected to unnecessary disappointment.

While the operation of uvulotomy is attended with the slightest possible degree of danger, and the bleeding which follows it is seldom more than a few drops in amount, in certain rare instances hemorrhage, more or less troublesome in its character, has resulted. The existence of an anomalous distribution of the arteries or veins of the velum palati may be an important factor in producing hemorrhage, while excessive hypertrophy or the presence of a varicose or hemorrhoidal condition of the vessels would certainly predispose to bleeding. Operations performed during the existence of acute inflammation, œdema, or ulceration are more likely to be succeeded by bleeding than when made for simple prolapsus.

The character of the bleeding is usually arterial, as is evidenced by the color of the blood, the spurting of the vessels, and the pulsation of the stump. Nevertheless, venous hemorrhage is sometimes noticed.

Troublesome bleeding is not necessarily attributable to the removal of too much of the uvula, for a simple clipping has caused profuse hemorrhage, while extensive removals may be almost bloodless. The existence of the hemorrhagic diathesis would of course exert an influence in rendering bleeding after uvulotomy persistent, although there is not a clearly established case of this nature on record.

The most reliable surgical methods for controlling uvular hemorrhage are the ligature, compression by the clamp or forceps, or the use of the galvano- or the actual cautery.

The most reliable styptics are, in the order named, adrenalin, solutions of antipyrin, tannogallic acid, alum, or the solid silver nitrate, directly applied to the bleeding stump, the local use of ice, ice water, and vinegar.

Ordinarily, the best plan for preventing bleeding is to urge the patient to refrain from attempts at clearing the throat. Should the hemorrhage persist, it may usually be checked by the sucking of cracked ice, or by gargling the pharynx with hot water. Applications of the solid nitrate of silver, or of the galvano-cautery, are also effective, or in severe cases a ligature may be applied to the stump. A device at once simple and effective is the method of applying direct pressure. One of the small spring clamps used in retaining shirt sleeves in position is trimmed down with shears, the spring weakened, and a string attached to a perforation made in one of its arms. The arms of this improvised instrument are widely separated by means of a dressing forceps, and quickly slipped over the uvula and well up on the soft palate; the forceps are then withdrawn, and the clamp remains securely fastened and in the desired position. The teeth of the clamp should be slightly filed down prior to introduction,

and the string attached to the instrument secured to the patient's ear.

Occasionally the operation of uvulotomy is followed by a somewhat slow process of healing, and attended with considerable pain, deglutition becoming almost impossible, and even the swallowing of the saliva causing inconvenience. In such cases the patient should be directed to abstain from such articles of diet as seem likely to increase the irritation. Indeed, it is well in all cases to recommend that bland and unirritating food be taken until the healing process is fairly completed. Gum arabic, or a marshmallow drop allowed to dissolve in the mouth, will give decided relief, while, in case the granulations become exuberant, an application of the solid nitrate of silver will hasten recovery. When much pain is experienced in swallowing, the application of a two-per-cent. solution of cocaine is indicated. Pain reflected to the ears may be annoying. The highest authorities are unanimous in insisting upon the deleterious effects of an elongated uvula upon the voice, and upon the vital importance to that function of remedying the evil.

MALFORMATIONS of the uvula are not infrequently observed. In addition to asymmetry or absence of the part, two common varieties of deformity are met with, viz., congenital elongation or undue length, and the condition known as bifid or double uvula. In the former the whole structure, including the muscular tissue, is lengthened to a greater or less degree beyond the normal limit, the amount of elongation in some recorded instances being incredible.

Congenital elongation of the uvula has been observed by the writer as an hereditary trait, several members of the same family showing the same condition of general hypertrophy and lengthening. The condition is easily remedied by the amputation of the redundant part.

Bifurcation of the uvula, a result of arrested development, is quite common. It may be regarded as the least possible manifestation of cleft palate, and may occur in any degree, from a slight indentation at the tip of the organ to complete division of it to its base. It often exists without giving rise to symptoms indicative of its presence. When it is attended with much hypertrophy it causes the same abnormal symptoms which are observed in ordinary hypertrophy. Abscission of the redundant portion is effective in securing relief. This, however, is a clumsy method of operation, since, if the bifurcation be extensive, a broad, truncated stump is left. To avoid this, in the opinion of the writer, some attempt at a plastic operation should be made, in order to secure, if possible, the union of the two stumps in the median line. This may be accomplished, in the majority of instances, by first removing the tips of the two uvulae, and then denuding, with small curved scissors or the galvano-cautery, the inner aspect of each well up to the base.

NEW GROWTHS.—Papillomatous growths, generally of small size, but sometimes of sufficient dimensions to cause irritation, are occasionally seen upon the uvula. They are usually located near its free extremity and may be either pedunculated or sessile. They are also found independently of any diathesis. Myxomata of the uvula are occasionally seen. Angiomata or vascular growths may also occur.

Occasionally a benign growth may be attached to a pedicle so long that the tumor itself escapes observation until drawn upward and forward. In all of these cases amputation of the uvula above the site of the growth is at once successful in relieving the difficulty.

Malignant growths of the uvula and soft palate are occasionally encountered, usually, however, as an extension of the disease from adjacent parts.

Syphilis, tuberculosis, lupus, and lepra of the velum and uvula are met with, the first often, the last three rarely.

The main points in the differential diagnosis between them are, that in syphilis the various lesions common to this disease are usually disposed upon the soft palate in a markedly symmetrical arrangement, they are but slightly painful, and they yield quickly to specific treat-

ment. Tuberculous ulcers are far less common than the former; they are usually superficial; they often give rise to extreme pain, and they coexist with well-marked disease of the lungs, and generally with other manifestations of ulceration in the pharynx. The differentiation of lupus from syphilis of the soft palate is sometimes difficult, especially if the patient be also suffering from general syphilis. The chief characteristics of lupus are that the normal sensitiveness of the part is maintained; or, if altered, there is anaesthesia. The tubercles are multiple, which distinguishes the disease from carcinoma; they are rounded, their surface is smooth and glistening, and their color is bright red. They are firm in consistence, but less firm than epithelioma. The diagnosis may be confirmed by the presence of external manifestations of the disease. Lesions of the mucous membranes, common in leprosy, never occur until the disease has clearly manifested itself in other parts of the body. As a rule, therefore, little doubt can arise as to the true nature of the pharyngeal disease. Here, as elsewhere, the course of lepra is one of active and widespread destruction.

SYPHILIS OF THE VELUM PALATI.—The occurrence of the primary lesion of syphilis, although now and then observed upon the tonsil, is, upon the velum, almost unknown.

In the secondary manifestations of the disease, however, the soft palate and uvula are frequently involved. The conditions presented are those commonly seen in the adjacent parts of the oral cavity, and include simple erythema or congestive patches symmetrically disposed, submucous infiltration, mucous tubercles, followed by mucous patches, or by the formation of condylomata. A peculiar feature of these manifestations is their symmetry, which, as is often seen upon the uvula, is so well marked as to attract the attention of the observer. Early in the disease the congestion may be so indistinct as to escape observation. Gentle irritation, however, will often cause the distinctive character to be intensified. Considerable rise of temperature often accompanies the first appearance of this form of sore throat.

The tertiary form of syphilis may occur in the soft palate at any period of time beyond two years after the primary infection. It is characterized by true ulceration or loss of tissue, and is the result of the degeneration of gummatous deposit.

The effects upon the velum palati of tertiary syphilis are often most disastrous. A frequent seat of gummatous infiltration, its exposed situation and delicate texture render it liable to serious injury as the result of tertiary ulcerative processes. These are often characterized by extensive loss of substance, and are followed by marked cicatricial contraction and the formation of adhesions between the remaining tissue and the neighboring soft parts, which not only destroy the velum itself and abolish its functions, but result in a closure or a shutting off of the upper pharynx from the lower. This closure is more or less complete in proportion to the extent of adhesion present, and may vary from a slight narrowing of the aperture, due to adhesions at the outside angles of the velum, up to a degree of occlusion which seems absolute. Two varieties of cases may be described: (1) Those in which simple ulceration has taken place, at or near the margins of the velum, without material loss of substance. In such cases, the adhesions being limited to a somewhat narrow band of union between the edge of the velum and the pharynx, and the greater part of the velum itself being intact, the prognosis is good. (2) When the loss of substance has been considerable, and when the soft palate has become extensively adherent to the pharynx, relief becomes a matter of extreme difficulty, and, in many cases, is next to impossible by any known plan of treatment. In the worst cases the whole posterior surface of the velum, and the superior surface of the soft palate, seem to be firmly incorporated with the posterior pharyngeal wall. In these cases the roof of the mouth and the posterior wall of the pharynx seem to be continuous, the line of adhesion not being traceable in the confused mass of cicatricial bands which represent

the original structures, and which are sometimes disposed in the shape of irregular vertical digitations, between which there may be one or more places in which the adhesion is incomplete, and through which a probe may be passed. Cases, however, in which complete occlusion has actually taken place are rare. Should the opening be invisible upon inspection of the pharynx, it may generally be demonstrated by forcing air into the nasal cavities by means of a Politzer inflator. If an opening exists, its presence will be indicated by the appearance of bubbles in the pharynx, when the air is forced through the opening.

The results of extensive adhesion of the velum to the pharynx are most distressing, and may be summed up as follows: (1) Mouth-breathing, with all of its attendant evil results; (2) impairment of the quality and tone of the voice; (3) interference with drainage from the nasal cavities and nasopharynx; (4) consequent upon this, loss of hearing from irritation of the Eustachian tube, and from the almost inevitable occurrence of serious middle-ear disease; (5) loss of the sense of olfaction, owing to the lack of a current of air through the nasal passages, such a current being necessary to bring the odoriferous particles in contact with the olfactory membrane. When the passage to the lower part of the pharynx is contracted, there is sometimes dysphagia as well as dyspnoea.

The treatment of this condition consists in the attempt to separate the adherent tissues, and to establish, more or less perfectly, communication between the upper and the lower pharynx. To carry out this design with success is one of the most difficult problems of surgery. Perforation of the velum through the breaking down of gummatous deposits is said to be a cause of serious danger to that organ, since, having thereby lost to a greater or less degree its muscular vigor and resiliency, it is liable to swing backward against the pharynx, instead of being held at a normal distance from it. Furthermore, a perforation renders it all the more liable to form adhesions subsequently with neighboring parts. The mechanism, however, by which adhesion commonly takes place, is the same as that which is observed in the cicatricial union of the fingers of the hand following burns. Despite all possible care, the cicatrizing surfaces begin to unite at the bottom of the angle between the members, and the process of adhesion continues until the denuded surfaces, throughout their whole extent, have become firmly joined to each other.

In the treatment of these unfortunate cases the first care should be to prevent adhesion, by checking with all possible diligence the appearance and spread of ulceration upon the parts. Not only should the iodide of potassium be freely administered, combined if necessary with mercury, but local applications should also be made to the ulcers: of nitrate of silver, or the acid nitrate of mercury, if they be spreading, or of a solution of sulphate of copper (gr. xv. ad ʒ i.) if they be indolent. If this treatment fails, means should be used to keep the ulcerated surfaces apart. For this purpose several methods have been proposed, but as they apply as well to the separation of the parts after operation, they will be described later.

The prognosis as to the results of operation must depend largely upon the extent of deformity present in a given case. Where the degree of adhesion is comparatively slight, the adherent surfaces may be separated by means of a small, flat knife. As, however, the separated parts have a very strong tendency to reunite, it will be necessary, after operation, to use means for preventing such a reunion. Of these the simplest is the application to the cut surfaces of monochloroacetic acid. This forms an adherent eschar, under which the healing process seems to progress to such a degree that, when the eschar separates and comes away, the period in which adhesion would have taken place has passed, and the parts heal without uniting.

Few cases, however, are so simple as to render the above method possible. Perhaps the most valuable plan

of treatment yet suggested is to separate the united parts by means of the galvano-cautery, and then to use great diligence in keeping them apart, and in maintaining full dilatation of the passage. This may be done by repeatedly drawing forward the remnant of the velum by means of a palate hook—a procedure which the patient can carry out himself; or, as has been suggested, a piece of tape may be passed through each nostril and out at the corresponding angle of the mouth, the velum being thus drawn away from the posterior pharyngeal wall; or, finally, given the best results, a piece of metal shaped to fit the space between the velum and the pharynx may be suspended from two stout threads passed forward through the nose, and tied so as to hold the plate in position. This, worn constantly, serves as a permanent dilator.

Since readhesion after operation is due to granulation and union at the external angles of the wound, as in web finger, Nichols has devised the following excellent operation: Before attempting the separation of the velum from the posterior wall of the pharynx, openings should be made through the adhesions and at their extreme outer angle, one on each side. These openings should be kept packed until their surfaces have healed. Thus the granulating angle will have been destroyed, and in favorable cases the remaining adhesions can be separated and kept apart with success.

In cases in which the degree of deformity is excessive, the best that has hitherto been accomplished has been to widen the channel of communication between the upper and lower pharynx sufficiently to allow the nasal secretions to be drained away. This has been done by applications of the galvano-caustic knife, followed by persistent dilatation, practised by the patient himself by means of some form of sound. It is highly probable that by the last-mentioned method an opening of considerable size may be maintained. Preliminary to operating upon such a case, much aid may be secured by passing a sound backward through the nose, and demonstrating the lowest and most superficial point of the pharyngeal pouch. By cutting against the point of the sound used as a guide, an entrance may easily be effected.

Finally, it must be said that, although the prognosis as to relief of adhesion of the soft palate to the pharynx is often most unpromising, much may be done to help the sufferer by skill, ingenuity, and unremitting patience in the application of the means already at hand.

NEUROSES OF THE VELUM PALATI AND UVULA.—These may be either sensory or motor. With the former may be classed anaesthesia, hyperaesthesia, paraesthesia, to which may be added vaso-motor neuroses, and, possibly, neuralgia. Motor disturbances include spasm, or increased mobility, and paralysis, or diminished mobility. The causes of these neuroses may be either central or peripheral, and they may be either unilateral or bilateral.

In addition to the central causes which may produce anaesthesia of the velum, it may also be present in epilepsy, chorea, and hysteria. It commonly occurs after diphtheria. It may be caused artificially by certain drugs, among which may be mentioned cocaine, morphine, chloral, and bromide of potassium. The symptoms, if present, consist usually in a feeling of relaxation of the part, or a sensation as of the presence of cotton or wool in the pharynx, sometimes associated with a feeling of pain.

Hyperaesthesia is often met with, and may be due to elongation of the uvula, inflammations of the pharynx, acute and chronic, the presence of a new growth, or a dilated condition of the blood-vessels.

Neuralgia seems to exist in certain rare cases, in which, without apparent cause, lancinating pain is experienced, and areas of localized tenderness may be found.

Paraesthesia often occurs. Schech observes that the affection, when independent of disease of the mucous membrane, is most frequently associated with hysteria and hypochondriasis, or with a fear of diphtheria or syphilis. Those individuals are most prone to it whose

occupation demands excessive use of the vocal organs, as also are chlorotic or anaemic persons, women who suffer from gastric or uterine disease, and those whose temperament is excitable; more rarely it is a symptom of disease of the brain, or of bulbar paralysis.

Of the motor disturbances from which the velum may suffer, spasm is the more unusual. It is almost always associated with a similar condition of the pharynx, and is found associated with the same disorders as those which cause it in the latter region.

Paralysis of the velum is a common condition, and one of much importance. It may be due to central causes, such as acute, chronic, and degenerative diseases of the brain; to diphtheria; to local diseases; or, finally, it may be associated with facial paralysis. The paralysis may be either unilateral or bilateral, partial or complete. When it is unilateral the velum and uvula are drawn toward the unaffected side, the faucial arch on the affected side is wider, and that of the sound side is narrower than normal. During phonation there is distinct distortion toward the healthy side. In bilateral paralysis the uvula hangs loosely in the pharynx, showing no sign of voluntary motion, and flapping back and forth with the acts of respiration. During phonation, in partial paralysis, a slight upward movement of the soft palate may be noticed, while, when the paralysis is complete, it remains immovable.

Besides the causes mentioned, there are several influences under which parietic conditions of the velum may occur. Thus, it is not uncommon to find this organ more or less paralyzed after severe acute affections of the pharynx other than diphtheria, and while the presence of such paralysis, after what appeared to have been a simple follicular tonsillitis, may cause the accuracy of the diagnosis to be held in question and suggest the presence of diphtheria, there are so many other disorders, evidently not diphtheritic, by which it may be brought about that the possibility of its occurrence from simple causes is beyond doubt.

Not only may paresis be found after acute affections of the throat and nasopharynx, but, as is more common, it may be present in chronic conditions, as, for instance, chronic pharyngeal catarrh, chronic hypertrophy of the tonsils, and hypertrophy of the adenoid tissue at the pharyngeal vault. It is found in cases of chronic nasal catarrh, and associated with posterior hypertrophy of the inferior turbinated bodies. It may also occur as an accompaniment of an elongated uvula.

The results of this condition are generally evident, both to the patient and to the observer, and it is probable that the defects of speech generally present in, and attributed to, adenoid hypertrophy at the vault, are due rather to the attendant paresis of the soft palate than to the mechanical obstruction of the pharynx.

The treatment of neuroses of the soft palate must be conducted in accordance with the exciting cause present in a given case. This must be demonstrated, and, if possible, removed. Catarrhal conditions must be treated, hypertrophied masses of adenoid tissue must be removed, and the various systemic disorders with which it may be associated properly dealt with.

Locally, direct therapeutic measures are required, the most important thing being to restore tone to the enfeebled muscular structures. To this end the faradic current is valuable, the negative pole being applied to the affected part, or outside, along the angle of the jaw. Systematic exercise of the velum is also beneficial, and may be secured by such gymnastic exercises as frequent gargling, the singing of high notes, or, better still, blowing through a small tube. In the case of children this may be accomplished by allowing the patient to practise daily at blowing soap bubbles. *D. Bryson Delavan.*

VACCINATION is defined as "Inoculation with vaccine, or the virus of cowpox, as a preventive of smallpox; in an extended sense, inoculation with the virus of any specific disease. . . . It consists in the introduction under the skin, or application to an abraded surface,