XXVI.

THE HISTOPATHOLOGY AND HISTOGENESIS OF BENIGN GROWTHS OF THE NOSE AND ACCESSORY CAVITIES.*

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It has been the custom of the author of this paper to give more than average attention to the science of pathology in its bearing on otolaryngology, and he believes that this study of a branch of medicine somewhat removed from the usual routine of special work has been the source of much valuable information relative to the specialty and of a better understanding of many cases. As a knowledge of anatomy is essential to proper surgical skill and technic, so in a no less definite way is a knowledge of pathology assential to a proper understanding of diagnosis and treatment. We practice a somewhat limited specialty as otolaryngologists, and it is not too much to ask that we have a working knowledge of the fundamental sciences as applied to that specialty. We may not always be capable of making a histologic diagnosis with the accuracy expected of one making pathology his specialty, and it is not with such an expectation that attention is directed to the science, but in the hope that we may gain a clearer understanding of disease processes and of the changes taking place in the tissues with which we work.

The illustrations which accompany this paper have been limited to microphotographs, thus avoiding the tendency to draw into an illustration what we think should be seen in the section rather than what is actually present there. In this connection it must be kept in mind that no photograph can convey the impression gained from a study of the whole section, but a careful selection of the proper area for reproduction has been made in each case. The photographs were made

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by the author, using a very simple apparatus, consisting of an ordinary camera box with bellows and ground glass back and without lens, mounted on a vertical support. A Bausch and Lomb balopticon was used as a source of light, interposing a piece of flash opal glass for diffusion while filtration was secured with Wrattan gelatin filters. Orthochromatic plates were used. Exposures were made by turning on and off the balopticon, thus avoiding the use of a shutter.

The paper makes no particular claim for originality, but is more the result of a careful study of the literature and an endeavor to utilize that study to the best advantage; with an earnest effort to collect a series of specimens typical of the conditions they represent and a careful selection of those proper to be reproduced and presented herewith. Many have been discarded as unworthy, others have been selected in lieu of something more nearly perfect, and still others have perforce been omitted because it has not been the author's good fortune to have met with cases from which to secure specimens.

THE EDEMATOSES.

These, by far the most common pathologic conditions met with in the nose and accessory cavities, have been variously called polypi, edematous polypi, myxomata, fibromyxomata, myxofibromata, soft fibromata and edematous fibromata. Many writers have erroneously adopted terms descriptive of them which have not only resulted in a confusion of terminology but of understanding as to the actual histologic structure of the tissues under consideration. There is nothing in the structure of a nasal polyp which justifies the use of the term myxoma as applied to it, for it contains no myxomatous tissue in its substance. Wright,¹⁵ in 1900, emphasized this point very strongly, and it is also brought out in Delafield and Prudden¹⁶ and by Ewing in his "Neoplastic Diseases,"¹⁸ although many of the older pathologists fail to recognize this differentiation. Expressions such as "fibromyxoma" and "myxomatous" have doubtless been used by many writers with a full knowledge of the laxity of the terms, but they have failed to transmit that knowledge to their readers, with the result that there still exists a deplorable lack of uniformity of under-

standing and of terminology among rhinologists. The writer pleads guilty to this fault in his own case in the past and feels that a more accurate terminology should be adopted, if not histologically descriptive, at least not actually misleading. To this end the general term "edematoses" will be used in this connection, for the reason that a study of the histology of these growths will reveal that the fundamental underlying change in the tissues is a serous effusion, an edema.

SIMPLE EDEMATOSIS.

To that condition in which there is simply an edema, or serous infiltration, among the fibers of the loose areolar tissue constituting the subepithelial layer of the mucosa and unaccompanied by demonstrable fibrous hyperplasia or marked pathologic change in the tissues themselves, the term "simple edematosis" will be applied. This classification should include such conditions as the apparent hypertrophies due to hay fever and so-called vasomotor rhinitis, many of the more lasting polypoid hypertrophies of the turbinates, resulting, usually, from chronic conditions in the sinuses, and some of the earlier types of pedunculated polypi before they have undergone marked fibrous change. Figs. I, II and III.

EDEMATOUS FIBROMA.

On the other hand, it is true that many of the edematoses will reveal a sufficient amount of fibrous hyperplasia to justify the name of fibroma, and to these will be applied the term "edematous fibroma," as most descriptive. By this is meant a tumor consisting of loosely packed fibrous tissue, the site of serous effusion, containing fibrin threads, leucocytes in the form of the familiar round cell infiltration, blood vessels and at times glandular structure. In short, it may contain any of the constituents of the mucosa from which it springs, to which may be added the signs of subacute or chronic inflammation evidenced by increase in round cell infiltration, increased fibrosis around vessels, dilatation of gland acini and in places marked fibrous tissue hyperplasia. The epithelial changes manifest themselves both as hyperplasia of the normal columnar and in the form of metaplastic change to cuboidal or squamous, the latter usually stratified and frequently hyperplastic. Figs. IV, V and VI.

This classification includes the older forms of turbinate and septal edematoses and the majority of those having their origin in the accessory sinuses. At this point it is only fair to remark that the gradation from the purely edematous conditions to those justifying the use of the term edematous fibroma must be very gradual, and that there must of necessity be a certain elasticity in the application of these terms. It is true, however, that at one extreme there exists the typical simple edematosis and at the other the condition of undoubted fibrous hyperplasia with edema, and although histogenetically they are apparently one and the same process, their evolution from one form into the other justifies the use of slightly different terminology to signify that change.

The histogenesis of this type of nasal neoplasm has been deeply studied by numerous authors, among them Uffenorde and Hajek, whose views are quoted by Marquis,³³ Skillern⁴⁷ and others, and it is agreed that their formation is undoubtedly dependent upon some form of irritation or inflammation in the tissues from which they spring. This results primarily in transudation of serum and later in hyperplasia of connective tissue with definite tumor formation, necessitating an accompanying hyperplasia of the epithelial covering to keep pace with the increase in substance of its underlying structures.

PSEUDOCYSTS.

A condition not yet mentioned but frequently occurring in the development of edematous fibromata is that of so-called cyst formation. Although true cyst formation does occasionally occur in the mucous membranes of the nose and accessory sinuses as a result of obstruction of the opening of a mucous gland, the so-called cysts found so frequently in the pedunculated growths in the nose are in reality pseudo cystic in character and are simply dilated connective tissue spaces filled with serum. They are not lined with epithelium as are the true cysts, but with endothelium derived from the connective tissue in which they are formed. Figs. VII, VIII, IX and XI.

ANTRAL, CHOANAL, OR NASOPHARYNGEAL POLYPI.

The edematoses in general may have their origin from any portion of the mucosa lining the nose or accessory cavities,

but spring most frequently from the ethmoid cells and middle turbinate. When arising from the antrum they have attracted enough attention among rhinologists to have been given a special name, that of antral, choanal or nasopharyngeal polypi. Histologically they are identical with the edematoses as described above, but their peculiar origin and location make them worthy of special consideration in this connection. Since Zuckerkandl in 1893 called attention to their origin they have been a subject of considerable interest, and Woakes, Hajek, St. Clair Thompson and Killian among others have treated the subject thoroughly and have established beyond question the fact of their origin in the antrum. Avellis⁴ in 1913 and Ewing²⁰ in 1918 have reviewed the subject again, and Ewing has taken up that portion of the subject which is germane to this paper. He reports thirty-five cases, of which fifteen were studied histologically, and his observations in this field agree with those of the author⁵ expressed in a previously published paper but based on a much smaller number of cases. His conclusions regarding their development differ from mine in one detail, namely, the mode of exit of the polyp from the antrum. It has been my conclusion, from a study of the histology and the gross pathology at operation, that these growths start as either an edematous fibroma or as a cyst of the mucosa from a chronic inflammatory process, probably not suppurative. This fills the antrum, and extrusion through the antral opening occurs as a result of pressure. Plausibility is lent to this theory by the fact that at operation the antrum is usually found to be filled by the growth, that studies of the antral mucosa show an older or more advanced stage of pathologic change in the antral tissues, and because this is the only reasonable, logical conclusion that can be entertained. Ewing maintains that it certainly does not occur in this manner, for the reason that "the antral portion has often been found to be quite small, occupying only a small portion of the posterior part of the cavity." Such is sometimes the case, but since histologic observations show that the antral portion of the growth is always of quite marked fluid content, it is quite logical and reasonable to suppose that after its extrusion through the ostium and its resultant free expansion in the nose there occurs a migration of fluid from the antral tissues into the nasal

portion. This would be favored by the greater fibrosis of the older pathologic condition in the antrum and would result in the apparent loss of substance in those tissues. Or, knowing as we do how rapidly under certain conditions it is possible for edematous tissues to shrink from absorption of their fluid contents, is it not logical to suppose that such a simple occurrence might explain the condition in some instances? Figs. X and XI.

PURE FIBROMA.

Although pure fibroma, commonly called hard fibroma or fibroma durum, is exceedingly rare in the nose and accessory cavities, authentic cases have been reported. My search of the literature has revealed but three: one reported by Meigas³⁷ as fibroma of the septum, but with no histology has been eliminated as having probably been an edematous fibroma, as no other case of pure fibroma of the septum has been reported. Another, not included among the three, is reported by Dabney¹⁵ as having undergone sudden malignant degeneration, which leads to the belief that it was fibrosarcoma from the beginning, as malignant degeneration is questionable in pure fibromata. The original sections in this case may not have reached sarcomatous tissue. Worthington's case,⁴⁸ however, appears to be authentic, as is also that of Dempsey,¹⁷ particularly as the latter underwent retrogression and disappeared spontaneously. This growth sprang from the sphenoid and was not limited to the nasal cavities, extending into the nasopharynx as well. Coates' case¹³ of multiple fibroma had two parts, the nasal part being separate and distinct from the nasopharyngeal, and for that reason it has been included as being a nasal fibroma. Nasopharyngeal fibromata are more common and although outside the scope of this paper their histology is identical.

Here again we meet the same difficulty in the literature resulting from loose application of descriptive terms, and in view of the fact that most of the benign growths of the nose are, in a sense, fibromata the adoption of a more accurately descriptive term is suggested, that of "pure fibroma."

The histologic structure of pure fibromata consists practically entirely of closely packed fibrous tissue, showing very

few nuclei, blood vessels or cellular forms and none of the characteristics of the nasal mucosa. They may be the seat of hyaline change or of calcification. They have their origin in the periosteal connective tissue, and Zandonini⁵⁵ ascribes an etiologic significance to inflammatory processes.

PAPILLARY FIBROMA.

This subject cannot be properly treated without reference to Wright's⁵⁰ admirable review of the subject, wherein he took issue with Hopmann and others, and showed beyond question that Virchow's terminology of papillary fibroma should be adopted as the descriptive term for these growths, limiting the term to mean a tumor consisting of a profusely proliferated epithelial layer supported by a very small amount of connective tissue with small, poorly developed blood vessels. The epithelial layer has separating it from the connective tissue a delicate basement membrane, demonstrable in most cases, and a few round cells may be found scattered among its fibers. Mucous glands should be absent from the connective tissue stroma, as the tumor develops from the epithelial and sub-epithelial layers of the mucosa, which contain no glands.

Careless histologic diagnosis has caused great difficulty in the interpretation of the reports of some observers, for the reason that they have often been led to make a diagnosis of papillary fibroma by the papillated appearance of the mucosa caused by infolding from pressure and without the characteristic epithelial proliferation. It is safe to state, however, that the occurrence of papillary fibromata in the nose is rare and their commonest site is on the septum. Arrowsmith,³ in 1911, reported the thirty-fifth case up to that time, not including the one of Blumenthal⁶ reported in 1910, all of which were septal growths. Herzheimer,²⁸ in 1911, mentioned one case originating in the frontal sinus, Hannemann²⁶ one originating in the ethmoid and sphenoid, reported in 1912; Anziolotti² one in the same year, Johnston³⁰ one and Brueggemann⁸ two in 1913, Callison,⁹ one springing from the region of the bulla and middle turbinate in 1916, and Ide,²⁹ in 1917, a case in which two were present, one springing from the septum and one from the anterior end of the inferior turbinate. In all of these we are justified in concluding that the histologic diagnosis was

carefully and properly made, and although all were not located on the septum it is fitting that they should be considered and classed together as papillary fibromata, regardless of their point of origin. Figs. V and XII.

Scarlett⁴⁴ calls our attention to another question of interest in this connection, that of the so-called hard and soft varieties of papillary fibromata. This nomenclature has followed the rule that if composed of squamous epithelium the tumor is called hard, if composed of columnar epithelium it is called soft. It is obvious that such a method of terminology is purely arbitrary and should form no part of the histologic diagnosis. It should be replaced by the terms "squamous celled" and "columnar celled," and in Herxheimer's paper²⁸ he has made use of these terms, calling his case one of "fibroepithelioma papillare cylindrocellulare."

ADENOMA AND ADENOFIBROMA.

Here, as in almost all benign nasal growths, one finds in the literature a confusing lack of agreement as to proper terminology. Ewing's observations¹⁹ suggest that the only true non-malignant adenoma is that owing its origin to embryonal tissue and adenomatous morphology in general is due to various forms of irritation, functional activity or overgrowth. He recognizes, however, that it is not always possible to make the distinction on morphologic data alone without considering the conditions under which the process develops and its clinical course. Wright and Smith⁵² also state that "benign adenoma unassociated with marked evidence of its origin in the stages of chronic inflammation of the nasal mucosa is an exceedingly rare phenomenon." The most interesting case encountered by the author in this connection is that reported by Gault,²¹ in 1911, in which the growth is described as filling the whole nasal cavity and attached to the external wall at the ethmoid level and to the roof and necessitating the Moutre operation for its removal. The histologic diagnosis of benign adenoma was confirmed by Professors Jacques and Hoche of Nancy, and no evidence of recurrence was noted after five months. Caldera¹¹ in the same year reported a small tumor growing from the inferior turbinate and the meatus, the histology of

which was that of adenoma. These, with Mosher's case³⁸ and two of Wright's, are the only ones met with by the author that could be classed as benign adenomata, and Mosher, in his article, quotes Hasslauer as reporting but four cases up to 1900. On the other hand, growths partaking of the nature of adenomata but in reality adenofibromata are not so uncommon in the nasal passages. Johnston reports two cases, one in 1909³¹ and one in 1913,³⁹ which he calls fibroadenomata and describes as consisting of masses of fibrous tissue surrounding islands of glands. Allen¹ also reports such a case, which he describes as normal appearing gland tissue embedded in dense fibrous tissue with areas of calcareous degeneration and some areas of new bone formation. Myxomatous degeneration was also evident in places in the fibrous tissue. It is clear that these latter cases fall into the class of inclusions and cannot be considered as true adenomata, being primarily fibrous hyperplasias which include in their mass islands of normal gland structure. Their proper descriptive term, therefore, should be that of "adenofibroma," thus reserving the term "adenoma" for such rare occurrences of this tumor as may present themselves. Fig. XIII.

Wright,⁵¹ in reporting two cases denominated by him benign adenomata and which were practically identical histologically, gives the following description of their appearance microscopically: "Numerous fingerlike processes springing from a common base. These processes are made up of loose edematous fibrous tissue covered by one or two layers of columnar ciliated epithelium; but it is apparent that the epithelial development is a complex one. In no place is there any marked thickening of the layers, but the surface epithelium is seen to communicate and to be continuous with deep indentations and ramifications of it into the underlying stroma. Separate rings of epithelium, ovoid, circular or ramified in shape, and varied in extent, are seen to occupy and make up a large part of the bulk of the growth. Examined with the high power one is immediately struck with the amount of mitotic granules in the epithelial cells. Evidently proliferation is rapidly going on, but not in such a way as to increase markedly the number of layers." This description is so much superior to any of which the author is capable that he quotes it as a substitute, particu-

larly as it has not been his fortune to see sections from a true nasal adenoma.

ANGIOMA AND ANGIOFIBROMA.

These growths, most frequently termed bleeding polypi of the septum, are also subject to much confusion in their terminology, and for several reasons. Primarily, they were thought to be limited to the septum, but Malen³² in reporting two cases described by him as telangiectatic fibroma and telangiectatic adenomatous fibroma, suggests the term bleeding polypi of the nasal fossæ. Citelli,¹² in reporting five cases, one of which was not situated upon the septum, deals strongly with this part of the subject and advocates discarding the term bleeding polypi of the septum. Matsui³⁵ reports two cases, both of which he speaks of as bleeding polypi of the inferior turbinate, describing them histologically as consisting of "hyperplasia of connective tissue and increase in vessels, the latter greatly dilated." The cases of Mayer³⁶ and Callison¹⁰ were both of septal origin, the former defined as a "cavernous angiofibroma" and the latter as a "polypoid hemangioma." Reamer⁴¹ reports one case of angioma of the antrum histologically pronounced benign. Thus it may be seen that the terminology should not include the location, for although most such tumors spring from the septum they may have their origin from other parts of the nose and accessory cavities.

This conclusion, however, does not settle the vexed question of terminology and classification as applied to them. Mosher,³⁸ referring to Haslauer's statistics, leaves the impression that the preponderance of benign new growths of the nasal cavities are angiomata, as out of 115 growths reported 57 were of that type. Wright and Smith,³³ on the other hand, state that "nasal angioma is a rare form of tumor." This evident disparity is explained by the usual laxity in application of descriptive terms and is probably due to the fact that apparent tumors consisting of simple granulation tissue are comparatively common, especially on the septum. Citelli¹² states: "It will be observed that the etiology of bleeding polypi is the same as that of all tumors, or of any neoformations upon which irritant causes have a marked influence. These irritant causal factors sometimes set up simple or spe-

cific granulations, at other times true tumors. These granulations must not be confused with the veritable tumors." Russo⁴² also, in reporting five cases under the title of bleeding polypi of the nose, recognizes this differentiation by diagnosing two of his cases histologically as granulation tissue only. He also refers to Citelli's statement to the effect that with the denomination of "bleeding polypi" tumors of various kinds are united in the same class, as, for instance, the granulations and pure angiomas; and quotes Macaigue, Casale-Brunetti and Denogany, who seem to think that all so-called bleeding polypi should be united in one group and, taking account of their histologic and clinical characteristics, called "fibrovascular benign tumors of the nose." In spite of all this, Russo clings to the old term, thinking a change would only confuse and would solve the problem for no one, but conceding that among the bleeding polypi there should be included neither the pure angiomas nor the granulation tissue masses.

Citelli, in the paper referred to above, goes on to discuss at some length this part of the subject, proposing that "all nasal tumors be classified according to their histologic structure, following the actual rules of pathology," and after a detailed description of his cases, states: "As a matter of fact, the larger part of the nasal tumors to which the designation 'bleeding polypi' has been applied are true angiomas: simple angiomas, cavernoma (or more often mixed, simple and cavernous); or mixed angiomas, with connective or myxomatous tissue." Personally, the author can think of no good, scientific reason why these tumors should not be classified according to their histology as granulation tissue masses, angiofibromata, either simple, cavernous or mixed; and pure angiomas, either simple, cavernous or mixed. The term angiomyxomata would be inapplicable here for reasons previously elaborated.

It seems likely, from a study of the description of many of the cases reported by Citelli, Russo and others, that the term "angioma" has in many instances been applied to tumors more properly falling into the present classification of "angiofibromata." There must, of course, be a certain elasticity in the application of these terms and the personal bias and opinion of the observer must be taken into consideration.

Histologically, the granulation tissue masses are simply collections of rapidly growing blood vessels, their walls formed by a single layer of endothelium and supported by a stroma of young connective tissue containing many cells.

The angiofibromata are made up of blood vessels supported and surrounded by fibrous tissue of varying degrees of density and in some instances the site of edematous infiltration. The vessels, particularly those of capillary size, often consist solely of a single layer of endothelium, although in many of the older tumors with larger vessels the vessel walls may present both fibrous tissue and muscular structure, the latter rarely. The vessels run indiscriminately through the tumor mass so that in sectioning they are cut at various angles. Endothelial proliferation in the extravascular substance is common, particularly in regions showing rapid growth of small vessels, so that in some cases the intervascular structure is largely made up of endothelial outgrowths from the vessel walls. These cells sometimes form themselves into rows as if in an effort to form new vessels. The cavernous types usually show the above picture in some sections, with the addition of dilated blood spaces in others. These spaces frequently show an increase of fibrous tissue in their walls, including proliferating endothelial elements and some fibroblasts. Extravasations of blood into the fibrous tissue stroma are frequently observed. The epithelial covering is usually stratified and may be either the normal columnar or squamous, the latter usually in the anterior part of the nose from local irritation.

The pure angiomas, practically never met with in the nose, are made up practically entirely of vessels with virtually no fibrous supportive structure and may be either capillary, arterial, venous or cavernous. Their intervascular substance may be made up entirely of endothelial elements and their covering is subject to the same variations as above. Figs. XIV and XV.

ANGIOMYOMA.

Citelli,¹² in the paper referred to above, adds the report of a case of nasal tumor which he defines as an angiomyoma and describes as consisting of capillaries, mainly arterial, which presented a marked hyperplasia of their muscular layer. These vessels were interwoven with and surrounded by bundles of

pliable muscular fibers with characteristic elongated nuclei and such fibers enveloped the surface of the tumor like a capsule. It appears that in this instance there occurred in the muscular coat of the vessels a marked hyperplasia resulting in the above histologic findings and as it is the only case of its kind on record is of corresponding interest.

LYMPHANGIOMA.

This condition is so rare in the nose as to receive no more than passing mention in the literature. Johnston³¹ mentions a case reported by A. Schmidt, and Wright and Smith³⁴ refer to one case reported by Hamm and also to one reported by Hajek and Polyak²⁷ called lymphangiectasis myxoma but which they suspect was a myxosarcoma.

Histologically, lymphangiomata are tumors composed of lymph vessels instead of blood vessels, as in the hemangiomata and their microscopic appearance is very similar to the latter. Never having seen a lymphangioma of the nose, the author will not attempt a description of one.

PAPILLARY HYPERTROPHY OF THE TURBINATES.

This style of hypertrophy is sometimes so marked as to form what is practically a tumor and will be included in this paper for that reason. Although most common on the posterior end of the inferior turbinate, it has also been observed on the anterior end and on the posterior end of the middle turbinate. Its pathologic interest is the same, regardless of its site, and one description of its histology will suffice for all.

The chief factor in the histology of this condition is the marked hyperplasia of the fibrous tissue in the subepithelial layer, usually unaccompanied by edema. This results, of course, in engorgement of venous spaces, in partial obliteration of glands from pressure with dilatation of some of the acini, and in hyperplasia of the epithelial covering. The latter occurs as a direct result of the papillation of the surface produced by fibrous overgrowth, necessitating epithelial proliferation to keep pace with the increase in surface area. Metaplastic changes are also frequently met with in certain places, accounted for by the irritating effects of pressure and disease upon the epithelium. Fig. XVI.

CHONDROMA.

This type of tumor is also of great rarity in the nose, although many such have been described by authors who have doubtless taken septal spurs (ecchondromata) to be such. Sherrill⁴⁶ reports a case of enchondroma of the antrum, and Schwerdtfeger⁴⁵ also reports a tumor diagnosed as genuine chondroma of nose, frontal sinus, antrum, ethmoid and sphenoid. His histologic findings are quoted: "The section shows the tumor consisting of several small nodules, connected with little tissue containing few blood vessels. The cartilaginous tissue itself contains numerous cartilage cells and some homogeneous matrix negative to elasticin staining and presenting in spots distinctly fibrillary structure." He concludes that these areas show commencing mucous metamorphosis, and if this is true we would here have an example of true myxomatous tissue in the nose. He is led to this conclusion by finding spots wherein the matrix separates into fibers, with evidence of mucous degeneration of the protoplasm of the cartilage cells in the more central portions of the growth. Guggenheim²⁴ reports a case which he considers benign, with photograph and description, and Moure and Pierre-Nadal³⁹ report a case of osteochondroma of the nasal fossæ without histology.

OSTEOMA.

A number of cases of osteoma of the nose and accessory cavities have been reported, probably occurring with greater frequency in the sinuses than in the nasal cavities proper. Marx reports three cases,³⁴ one originating in the anterior ethmoids, one in the frontal and one in the sphenoid. Culbert¹⁴ also reports an osteoma involving multiple structures, including the ethmoid and frontal sinuses, while Boardman and Donovan,⁷ reporting a case of osteoma of the frontal sinus, cite Sewell's paper, wherein he states that he found ninety-two cases of osteoma frontalis in the literature. Thus it may be seen that osteomata are not uncommon, but they must not be confused with bony occlusions of the posterior nares such as that reported by Rutland,⁴³ which are developmental defects and not new growths. Also, they must be differentiated from exostoses, frequent in the nasal cavities, especially on the

septum. Histologically they usually consist of dense lamellated bone with few Haversian canals, although they may consist of spongy bone with many vessels and abundant marrow spaces and cells.

LIPOMA.

Goldstein²³ reports the only case of lipoma of the nose or accessory cavities which the author has been able to discover in the literature. His case is described as being a fatty tumor mass in the antrum, the histology of which was reported by Thompson to be as follows: "Connective tissue stroma, holding fat cells in its meshes and enclosed in what appeared to be a fibrous capsule. Small capillaries were found in the mass, and the cells were typical of fat cells of the adult type, although some were larger than those usually found in fatty tissue."

TERATOIDS.

Of this rare condition, a true developmental phenomenon, but few cases appear in the literature, and but two with histologic description have come to the author's notice. Onodi⁴⁰ describes his case as consisting of stratified squamous epithelium, hornified, papillated and containing hair follicles and sweat and mucous glands. The stroma was formed of hyaline connective tissue, containing fibroblasts. Haenisch,²⁵ in 1916, gave virtually the same description of his case, except that it contained muscle, mucous glands and serous glands and adipose tissue. In addition, Gaudier²² reports a case of cyst of the middle turbinate of dermoid contents and concludes that it was probably congenital. These tumors are not teratomata, being too simple in their construction for that term to be properly applied to them, but the first two evidently fall into the classification of nasal teratoids, the latter being, of course, a dermoid. They are probably of little more than passing interest, as their occurrence is so rare that no one individual is likely ever to encounter one in practice.

CONCLUSION.

From the foregoing it would appear that our classification of nasal growths should be revised and the revision adopted by rhinologists as a whole in order to avoid the confusion

resulting from the loose application of terms with indefinite meaning. Thus we should be enabled to differentiate nasal neoplasms according to their histogenetic and pathologic characteristics and not according to their morphology as we are now constrained to do. First, of course, we have to contend with the question, very general among pathologists, as to what constitutes a true neoplasm and whether any of the benign growths in the nose are really neoplastic when histogenetically considered, for so close a relationship exists between the products of inflammation and new growths in the nose that it is at present too difficult a task to differentiate them. It would seem, however, that for practical purposes as rhinologists a classification accepting nasal growths as they are and based on their genetic and histologic characteristics would be sufficient and certainly helpful.

And finally, although many of the conditions mentioned herein are rare, it is the opinion of the author that if more rhinologists had a slight acquaintance with the histopathology of the nose the number of reported cases would be greatly increased. It is not always sufficient to refer specimens to a clinical pathologist, for his knowledge of gross nasal pathology may be insufficient to aid him in the recognition of conditions which, while quite common in general pathologic diagnosis, might be rare and interesting specimens when considered in relation to their origin and causation.

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FIGURE I.

· Simple Edematosis. Posterior End Inferior Turbinate, Case of Hay Fever.—This section shows no pathologic change whatever, except the marked edematous infiltration of the subepithelial layer, and some increase in round cell infiltration due to diapodesis. Some of the cells are red cells, the majority being small round cells. The normal fibrous tissue of the subepithelial layer is greatly infiltrated with serum with marked distention and great increase in thickness. Epithelium practically normal, glands in some portions of this section show mucous distention in a few acini. Blood spaces apparently normal. Low Power.

FIGURE II.

Simple Edematosis. Polypoid Middle Turbinate, Chronic Ethmoiditis.—Distention not so acute in this specimen, although it shows no apparent increase in fibrous tissue. Round Cell infiltration apparently normal. A number of dilated gland acini noted, no evidence of vascular congestion. Epithelium practically normal. Low Power.

FIGURE III.

Simple Edematosis. Chronic Ethmoiditis, Lining of Cell.—Note marked edema distending fibrillar structure. Normal columnar epithelium, slight increase in round cells, small blood vessel apparently normal. High Power.

FIGURE IV.

Edematous Fibroma. Middle Turbinate.—This section shows marked fibrous hyperplasia with slight edematous infiltration. Other sections of same growth show more marked infiltration. Mucous glands show considerable dilatation in places, in others normal. Dilated glands show retained secretion and in places marked fibrosis around glands with obliteration of gland structure. Blood vascular spaces over full and at places extravasations have occurred, possibly caused by operation. Fibrosis also marked around vessels in places. Epithelium normal. Low Power.

FIGURE V.

Edematous Fibroma. Septum.—Various sections through this growth reveal marked fibrous hyperplasia with but slight edematous infiltration in most places, although same is more marked in others. Increase in usual amount of round cell infiltration and many blood vessels evident. No mucous glands are seen in this growth, probably because of its origin affording fewer such and the effect of fibrous tissue overgrowth in obliterating them. Two interesting changes are noted in this specimen; one that the surface in places shows marked folding from pressure to resemble papillary fibroma but without hyperplasia of epithelium and the other that this section shows metaplasia from normal columnar to stratified squamous epithelium. Other regions of same growth show normal stratified columnar. Low Power.

FIGURE VI.

Edematous Fibroma. Epithelial Metaplasia with Hyperplasia.—This section shows strikingly changes in normal epithelium possible in the nose. Although subepithelial structure shows nothing but typical edematous fibrillar tissue, the normal columnar epithelium is replaced by stratified squamous with marked hyperplasia until the section suggests papillary fibroma. This epithelium dips down into the subepithelial stroma but is distinctly separated from it by indefinite basement membrane. Study of the whole section shows that this is simply the epithelial covering of an edematous fibroma, enormously hypertrophied but not making up the body of the growth itself. Low Power.

FIGURE VII.

True Cyst Formation.—This section shows the formation of a mucous cyst from obstruction of the opening of mucous gland occurring from fibrous tissue formation in the substance of an edematous fibroma of the middle turbinate. Cyst contains mucous secretion and is lined with glandular epithelium, flattened from pressure of cyst contents. Note marked fibrous tissue hyperplasia around cyst and numerous smaller and one fairly large cyst in same section. Note also surface epithelium dipping down close to cyst wall from folding of growth. Very Low Power.

FIGURE VIII.

Pseudocyst of Edematous Fibroma.—This section shows formation of pseudo-cyst from accumulation of fluid in ordinary edematous polyp, so-called. The contained fluid has been coagulated and shrunken from fixing solution. Very Low Power.

FIGURE IX.

This section taken from above slide to show endothelial lining of pseudocyst and edematous structure of the growth, with its delicate fibrous reticulum, and pseudo-cyst cavity formed in the center from accumulation of fluid in connective tissue space. Note slight cell content of fluid. Low Power.

FIGURE X.

Lining Membrane from Antrum in Case of Nasopharyngeal Polypus with Cyst Formation in Antrum.—Note marked fibrous hyperplasia from old condition in antrum. Also beginning cyst formation from dilatation of mucous glands. Also marked round cell infiltration and entire absence of epithelium from pressure. Low Power.

FIGURE XI.

Cyst Wall From Antral Cyst.—This section was taken from wall of antral cyst in same case as above. This cyst was probably originally a true cyst, formed by dilatation of mucous gland as shown in above section in its beginning. All trace of epithelial lining or covering has been lost from pressure, however, and cyst wall consists only of fibrous tissue. High Power.

FIGURE XII.

Papillary Fibroma, Turbinate, Squamous Celled.—Section shows marked hyperplasia stratified squamous epithelium, forming papillae with slight fibrous supportive structure, few blood vessels and no mucous glands. Definite basement membrane. Low Power.

FIGURE XIII.

Adenofibroma, Septum.—Marked hyperplasia fibrous structure, with infiltration and vascular congestion. Most noticeable feature consists of glandular inclusions surrounded by fibrous tissue, these glands apparently normal except for dilatation of acini and greatly increased number. Not an adenoma, simply an inclusion tumor so far as glandular substance is concerned, primarily a fibroma. Edematous in areas. Epithelium, stratified squamous. High Power.

FIGURE XIV.

Cavernous Angiofibroma.—This section shows in other parts numerous capillaries with proliferation of their walls to form new vessels or grow in long strings of endothelial cells often several rows in depth. A comparatively thin stroma of fibrous tissue is present. This field shows most clearly the enormously dilated vessels filled with blood, with endothelial proliferation between the cavernous spaces and fibrous tissue proliferation in their walls including proliferating endothelial elements and some fibroblasts. Some hemorrhage in places. Low Power.

FIGURE XV.

Simple Angiofibroma.—Capillaries and arterioles surrounded and supported by fibrous tissue overgrowth. Some thickening of vessel walls, especially the larger vessels. Some of the smaller vessels show no fibrous tissue in wall whatever, being formed entirely of endothelium. No endothelial hyperplasia is noted in this section, few cellular elements and no hemorrhage. Low Power.

FIGURE XVI.

Papillary Hypertrophy Anterior End Inferior Turbinate.—This section shows marked fibrous tissue overgrowth in subepithelial layer with no edema. Fibrosis evidently old with increase in small blood vessels and apparent lessening in normal number of blood spaces with marked fibrosis around them and around larger vessels. Marked increase in round cell infiltration in subepithelial layer. Mucous glands appear to be normal in number with many dilated acini. The surface of this section shows papillated effect from fibrous tissue hyperplasia. Epithelium practically normal, stratified columnar, following configuration of surface without hyperplasia except as necessary to accommodate to increase in surface area from papillation. Low Power.