The report on odontomes / by the Committee appointed by the British Dental Association.

REPORT
ON
ODONTOMES

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THE REPORT

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PREFACE.

THIS report upon odontomes has been written at the request of the Board of the British Dental Association, who desired the Museum Committee of the Annual Meeting, held in London in 1906, to prepare an extended and illustrated edition of the catalogue which was rapidly compiled for use at that meeting.

The classification of Sir John Bland-Sutton was adopted as a basis for the arrangement of the specimens in the Museum. Difficulty was experienced in placing many of them, and in order to emphasize the nature of the odontomes, they were divided into the clinical groups of "limited" and "unlimited" growth, a grouping which cannot be used for a permanent classification.

The opportunities afforded by this collection of examining and comparing specimens, and also of obtaining the opinions and criticism expressed by visitors, amongst whom were several well-known authorities on these tumours, convinced the members of the Committee that some alteration of the generally accepted views upon odontomes was necessary.

In order to thoroughly investigate the subject, notes of the recorded cases were collected. An attempt was made to examine all the publications in which tooth tumours had been described. For this purpose much assistance was obtained from the general indexes of dental literature, such as that by Oakley Coles and those published for many years in the *Dental Cosmos*.

A careful search was made through the *Transactions of the Odontological Society*, the *Journal of the British Dental Association*, the *Dental Cosmos*, and special books in which the subject was dealt with. The notes were systematically made upon forms similar to that shown on p. 134.

The book has been arranged according to the classification described in the Introduction.

The Committee wish to express their thanks to the Board of the British Dental Association for their generous support, to all those who have provided material for investigation, to those who have permitted the use of illustrations, and to Mr. W. H. Edmonds for photographing specimens.

April, 1914.

PREFACE TO THE CATALOGUE USED AT THE MUSEUM.

In arranging for the Museum of the London Meeting of the British Dental Association, the Committee have endeavoured to select a subject which would help to advance the knowledge of dental pathology; and noting the difficulties which are encountered when investigating the development of tooth tumours and abnormal teeth, it was thought that by gathering together a large number of such specimens some progress might be made in this branch of pathology.

Mr. Bland-Sutton's definition* of an odontome has been accepted in its widest meaning, and the Committee have arranged the specimens under the following headings:—

I.—Odontomes of Limited Growth.

A—Aberrations of the Enamel Organ.

B—Aberrations of the Dental Papilla.

C—Aberrations of the Tooth Follicle.

D—Aberrations of the Whole Tooth Germ.

II.—Odontomes of Unlimited Growth.

E—Aberrations of the Enamel Organ.

F—Aberrations of the Dental Papilla.

G—Aberrations of the Tooth Follicle.

H—Aberrations of the Whole Tooth Germ.

The descriptions given to the specimens for the most part correspond with those contained in the catalogues of the museums from which they have been borrowed.

* A tumour composed of dental tissues in varying proportions and different degrees of development, arising from tooth germs, or teeth still in the process of growth.

It has been impossible, in making a collection for such a Museum as this, to examine each specimen carefully ; and with most of the exhibits arriving only a few days before the meeting, the catalogue has, of necessity, been put together very hurriedly.

The Committee desire to take this opportunity of expressing their thanks to all those who have been good enough to lend specimens, diagrams, models, photographs and slides, and also to others who have helped in obtaining some of the exhibits for the Museum.

Specimens have been lent by the authorities of the following Public Institutions and Societies :—

The Royal College of Surgeons, England.
The Odontological Society of Great Britain.
The University of Birmingham.
The University of Leeds.
The University of Liverpool.
The University of Manchester.
The University of Pennsylvania.
The Royal Veterinary College.
L'Ecole Dentaire, Paris.
Charing Cross Hospital.
The Dental Hospital of Ireland.
Guy's Hospital.
King's College Hospital.
Middlesex Hospital.
The National Dental Hospital.
The Royal Dental Hospital.
St. Bartholomew's Hospital.
St. George's Hospital.
St. Mary's Hospital.
St. Thomas's Hospital.
University College Hospital.

CONTENTS.

INTRODUCTION.

An odontome is a tumour derived from the special cells concerned in tooth development. It is a tumour, because it is a mass of new formation which tends to grow or persist, fulfils no physiological function, and has no typical termination; it also fulfils Thoma's definition of a tumour being "an autonomous or independent new growth," and the law laid down by him that "it reproduces with more or less deviation the structure of the part from which it primarily arises."

The ætiology of odontomes is not known—a characteristic which is common to tumours in general. Various factors, such as irritation and mechanical interferences, have been suggested as having some influence in particular cases, but are insufficient in themselves to account for the phenomena.

Odontomes commence as aberrant growths of some of the cells of the tooth-germ or tooth-band.

Two classifications of odontomes are well known in this country; the earlier, made by Broca, was based upon the degree of development of the tooth when the abnormal growth commenced, and was generally accepted for many years; the more recent was due to Bland-Sutton, who recognized the defects in Broca's classification, and constructed one upon the nature of the particular cells of the tooth-germ from which the tumour arose.

We believe this to be the soundest basis for a classification, and unless the discovery of the causes of the tumours renders an ætiological classification possible, it does not seem likely to be superseded.

Bland-Sutton, in November, 1887, when introducing his classification, said :—

"In the present essay I shall venture to classify odontomes in four groups. The novelty of the method of classification proposed consists in including certain cystic formations and fibrous tumours of the jaws among odontomes."

"The accompanying table represents in a complete form the mode of classification suggested. One of the chief features in this proposed method of arranging these tumours is that the mode of genesis of the odontome, as well as its structure, is taken into consideration."

Bland-Sutton's classification of odontomes :—*

(*A*) Aberrations of the enamel organ.
1. Epithelial Odontomes.
2. Calcified Epithelial Odontomes.

(*B*) Aberrations of the Follicle.
1. Follicular Cysts.
2. Fibrous Odontomes.
3. Cementomata.

(*C*) Aberrations of the Papilla.
1. Radicular Odontomes.
(a) Dentomata.
(b) Osteo-dentomata.
(c) Cementomata.

(*D*) Aberrations of the whole Tooth Germ.
Composite Odontomes.

(*E*) Anomalous Odontomes.

All the specimens described under the heading, "Anomalous Odontomes" were afterwards called by the

* *Trans. Odonto. Soc.*, November, 1887.

author Compound Follicular Odontomes, and placed under "Aberrations of the Follicle."

The normal process of development of a tooth is primarily dependent upon active changes in the epiblastic cells, and resulting from these changes, which act as a stimulus, a reaction in the mesoblastic cells. The developing tooth in its earliest stage is composed entirely of epithelial structures consisting of an enamel organ connected with the oral epithelium by the tooth-band. These, for convenience, are referred to as the dental epithelium. Following, and depending upon, the formation of an enamel organ, the mesoblastic tissues become converted into special dental structures comprising the dental papilla and the tooth follicle. From these last two special structures dentine and cementum respectively are formed. The enamel organ has a double function, it forms enamel and also determines the development and external configuration of the dentine, even where no enamel is formed. The presence of the enamel organ is essential for the production of dentine. The existence of dentine thus postulates the pre-existence of an enamel organ. These facts are of importance in appreciating the pathology of odontomes, especially of those which contain dentine.

Following the basis of classification laid down by Bland-Sutton, some alterations in the detail of his arrangement of the tumours into classes and sub-classes are necessary. This is due to several factors, among them the recognition of the wider function of the enamel organ, the discovery of the epithelial lining in certain cysts, and the investigation of a larger number of specimens. The following classification has been adopted, in the belief that it is consistent with the present knowledge of these tumours :—

1. EPITHELIAL ODONTOMES.—*Where the abnormal development takes place in the dental epithelium alone—*

Multilocular Cysts.
Dentigerous Cysts.
Dental Cysts.

2. COMPOSITE ODONTOMES.—*Where the abnormal development takes place primarily in the dental epithelium, and secondarily in the dental papilla, and may occur in the follicle also.*

(*a*) Where the abnormal development of the dental epithelium is such, that the formation of numerous irregular dentine papillæ results, which are calcified in one mass or sporadically :—

Complex Composite Odontomes.
Compound Composite Odontomes.

(*b*) Where the abnormal development of the dental epithelium is such, that the formation of two or more tooth-like dentine papillæ results and are calcified as one mass.

Geminated Composite Odontomes.
Gestant Composite Odontomes.
Enamel Nodules.

(*c*) Where the abnormal development of the dental epithelium is such, that the formation of a dilated portion of the dentine papilla results and is calcified as one mass.

Dilated Composite Odontomes.

3. CONNECTIVE TISSUE ODONTOMES.—*Where the abnormal development takes place in the dental tissues of mesoblastic origin alone.*

Fibrous Odontomes.
Cementomes.

Odontomes vary in type according to the period at which they arise and to the nature of the cell development. The odontomes placed in classes I and II are due to aberrations of the dental epithelium, whilst those in class III are not dependent on these cells.

The term "epithelial odontome" is used to include three types: formerly it was used entirely for the first of these (multilocular cysts); the second and third (dentigerous and dental cysts) have been included, as they are of the same origin and nature. Malassez, in 1885, asserted this to be the origin of the three types described in this class. A fourth type, described as carcinomatous odontomes, is dealt with in the Appendix.

The term "composite odontome" is no longer restricted to those irregular calcified masses of dental tissues (here called "complex composite odontomes"), but is used to include all odontomes dependent upon aberration of the enamel organ with other dental tissues. This class thus includes almost all the calcified odontomes, which as the result of an endeavour to arrange a large number of specimens were found to fall into three sub-classes and types. These types, although definite, contain specimens grading from one to another.

The sub-classes are dependent upon the general effect that the irregular development of the dental epithelium has upon the dentine papillæ, with the result that three sub-classes are produced according as the tumours are irregular, tooth-like, or dilated.

Compound composite odontomes have been so imperfectly recorded, and are apparently so difficult of examination, that their position in a classification must be uncertain. Their position appears to be among composite odontomes, and they are better named compound composite than compound follicular odontomes.

The next two types (geminated composite odontomes and gestant composite odontomes) are sufficiently distinctive from other forms of composite odontomes to merit the special names that have been given to them. Enamel nodules, the third type of this sub-class, are restored to the category of odontomes, because they fulfil the definition of an odontome.

The name dilated composite odontomes has been introduced to describe some odontomes which possess certain characteristics.

They present an appearance of dilatation and contain a hollow.

Three varieties are found, where the crown, the whole mass, or the root respectively is enlarged; the last of these was formerly called a "radicular odontome."

The term "connective tissue odontome" has been introduced to include odontomes of mesoblastic origin; it thus includes the two "follicular" odontomes (fibrous odontomes and cementomes) and a possibly malignant type (sarcomatous odontomes) dealt with in the Appendix.

EPITHELIAL ODONTOMES.

1.—MULTILOCULAR CYSTS.

2.—DENTIGEROUS CYSTS.

3.—DENTAL CYSTS.

MULTILOCULAR CYSTS.

Also called—

Multilocular cystic epithelial tumour.
Epithelial odontome.
Fibro-cystic tumour of the jaw.
Cystic epithelioma.
Cystic sarcoma.
Cystic adenoma.
Proliferating follicular cystoma.

MULTILOCULAR CYSTS.

A MULTILOCULAR cyst is an innocent tumour arising from the dental epithelium with the formation of numerous cystic cavities.

Various growths have been described under the different names used for these tumours. Sir John Bland-Sutton is of the opinion that several of them are endotheliomata. Tumours also have been described in which the epithelium has been replaced by enamel, but the specimens contain other dental tissues, no case yet being recorded where enamel alone has been found.

The majority of multilocular cysts which have been recorded have attained a considerable size, and in only a few cases apparently have they been removed when quite small.

The tumours are composed of several cysts, lined by epithelium and separated from one another by septa, which vary in thickness. When the cysts are large they frequently communicate with one another. In the early stages the tumour is composed chiefly of epithelial cells, with little indication of cyst formation. A definite capsule is present.

The process of tumour formation consists of excessive proliferation of the dental epithelium and its subsequent degeneration.

The tumours on examination usually present an irregular outline corresponding with cystic cavities which are found to be present when a section is made. Two

types have been described; the commoner form where some of the cysts are large, and a rarer type where the cysts are small and more uniform in size.

The lining of the cysts is smooth, but frequently papilliferous projections are present even to the extent of rendering the tumour almost solid. The latter condition appears to be the state of the tumour at an early stage. The growing edge of the tumour is described as of a reddish colour. The fluid contents vary considerably and may do so in the different cysts of the same tumour; in large cysts it is generally of a brownish serous character, but it may be white, glutinous and colloid; in small cysts and in the more recently formed portions the cavities may be filled with a reddish, friable substance.

The septa between the cysts differ in thickness and are composed of fibro-cellular tissue with a variable amount of bone. Where the cysts are large the osseous tissue may be almost completely absent. The bone is derived partly from the original tissue of the jaw and is partly of new formation. It is well seen in some macerated specimens. The original form of the jaw may have been so distorted as to render it almost unrecognizable. In the maxilla, the antrum usually becomes involved and distended.

In the early stages, the various cysts are probably quite distinct, but with the increase in size they present thinner walls until communications may be established. The large ones may be formed in this manner, by the fusion of two or more cysts, or merely by the continued growth of a single cyst due to degeneration of the lining cells.

The teeth in contact with the tumour usually become loose and fall out; when this occurs a communication with the oral cavity may be established. If teeth are present they may become considerably enveloped by the

growth of the tumour, whilst their roots are usually found to be extensively absorbed. It is said that the teeth are often free from caries, but in several of the recorded cases the roots of carious teeth were present. The cysts are not often in communication with the buccal cavity except as the result of traumatism, and this is usually where a tooth has been lost. It is more common when the cysts are large.

On section the individual cysts may be found to vary in size from those as large as a hen's egg to those just visible to the naked eye, or they may be small and uniform in size, presenting a honeycomb appearance. Where the cysts are small the septa are relatively much thicker. The small cysts may appear almost solid from the papilliferous projections from the cyst wall. If the cyst is large these projections may only interrupt the smooth appearance of the lining.

Microscopical sections present a great variety of conditions according to the size of the tumour and the position from which the sections are taken. The large cysts may be found to possess a single layer of spheroidal or flattened epithelial cells. One observer states there is no epithelial lining in some of the large cysts and that they consist of fibrous connective tissue with some osseous tissue which is similar to that formed in the septa. It seems highly probable that the epithelial cells were lost during the preparation of the specimens.

The smaller cysts present one or more layers of epithelial cells with a central cavity, the cells directly lining the cavity are undergoing degeneration. Towards the growing edge of the tumour and in the first stages columns of epithelium are found, which in places show a mass of epithelial cells with degeneration commencing towards the centre. This gives rise to an alveolar appearance

which is commonly seen in microscopical sections. The cells are mainly of a spheroidal type; there are small cells showing proliferative changes, whilst some are large and show degenerative changes. The outer layer of cells may show a distinctly columnar character. It is held by many observers that the cells closely resemble those of the enamel organ, the cells undergoing degeneration corresponding with those of the enamel pulp (stellate reticulum).

The epithelial columns have been demonstrated in several cases to be directly connected with the epithelium of the gum. The remaining part of the tumour is composed of adventitious structures; the periosteum of the jaw becomes stretched out over the tumour and forms an outer bony capsule. This capsule is deficient in places where the tumour is large. The septa are composed of fibro-connective tissue with some bony tissue probably derived from the bone which has been otherwise destroyed. The vascularity of these tumours is usually not marked. Dilated blood capillaries may be seen surrounded by layers of epithelial cells projecting as papillæ into a cystic cavity.

The cause of these tumours is at present obscure. A direct injury has been stated to be the cause, such, for instance, as the injury associated with the fracture of a tooth or fracture of the jaw. Inflammation of a chronic character has been thought to be a factor. In some of the recorded cases all the teeth have been free from caries, although it must be remembered that inflammation from other sources might have occurred.

A point of considerable importance is the absence of a tooth from the normal series, but this has been assumed in some cases without sufficient evidence. If the tumour has its origin in the enamel organ this would naturally follow, except in the case of a supernumerary enamel

organ. It is from the record of the early stages that these points can be determined, and at present the number of such cases is very small. When the tumour becomes large the teeth are lost, and accurate information of the previous history is unobtainable.

With regard to the exact site from which the tumour arises several views have been expressed. Falkson, who first thoroughly investigated one of these tumours, believed it resulted from an abnormal development of the enamel organ. Bryk was of the same opinion, as is also Bland-Sutton. Eve stated that they result from an ingrowth of the epithelium of the gum, and is supported by Heath. Malassez says they have a similar origin to dental and dentigerous cysts and are due to an overgrowth of the rudimentary paradental epithelium.

All the various opinions expressed support the view that these tumours arise in connection with the epithelium which is particularly associated with tooth development, but no definite statement can be made as to which particular cells give rise to the tumour, whether they originate in the enamel organ, as seems to be the most common site, or in other parts of the tooth band.

Multilocular cysts occur more frequently in women than in men, in the proportion of about 2 to 1 in the cases clearly recorded. They are found much more commonly in the mandible than in the maxilla. Bernays gives the proportion as 11 to 1, but it seems to be even greater than this.

The age at which they occur is very variable. The earliest recorded case is at 6 months, the latest at 75 years. About half the recorded cases came under observation between the ages of 21 and 35 years. The period during which the growths had been present, when this is stated, is frequently of considerable length and is

so variable that it is impossible to give accurate data as to when they most commonly appeared. The exact site of origin is rarely stated, but probably occurs most frequently in the molar region.

The clinical aspects of these tumours vary with the length of time they have been present, which is represented by the size of the tumour. The rate of growth is usually slow, so that many cases are recorded where the tumour has been present for twenty or more years.

When the tumour is small it has the characters of a simple cystic tumour of the jaw; the multilocular character is usually not recognizable in the early stages; in fact, before the bony capsule is perforated the diagnosis of the tumour may be very difficult to determine.

The tumour first appears in the body of the bone and usually presents itself as a small swelling of the outer alveolar plate. It slowly increases in size, and later fluctuation can be obtained at points where the bone over it has been lost. With the increase in size the multilocular character becomes evident, globular swellings at the surface of the tumour corresponding with the component cysts. The multilocular character is not marked in those cases where the tumour is composed of small cysts of more or less uniform size, and which have been described as the "honeycomb type."

The growth of the tumour is painless. Discharge, commonly of a brownish albuminous fluid, occurs when the tumour is ruptured. The large size of the tumour may cause considerable inconvenience, giving rise to symptoms which are due to mechanical disturbance of the neighbouring parts.

Great deformity may be produced. Disturbance of the functions of mastication, deglutition or respiration may result. Hypersecretion of saliva with dribbling from the

mouth occasionally causes great discomfort. Pain is unusual but may be produced by ulceration of the surface, as in the case of contact with a tooth in the opposing jaw.

Inflammatory changes do not seem to occur very readily. Some of these tumours have been described as becoming malignant, and in one or two cases as possessing malignant characteristics from the first. In the early stages it is difficult to be certain of the nature of the tumour; it closely resembles a dental or a dentigerous cyst. In the maxilla a solid growth of the antrum must be distinguished from it.

In the late stages the tumour is not likely to be mistaken, although extensive operations have been done under the impression that the tumour was of a malignant character. The lymphatic glands are not affected by these growths.

If an early diagnosis is made, the tumour should be completely removed in its capsule; but, later, when the jaw has been considerably distorted, the surrounding tissues usually have to be removed with the tumour. This frequently means excision of a large part of the jaw. It is stated that removal of the tumour with scraping of the surrounding parts will suffice, and should be attempted before a more extensive operation is done.

CATALOGUE OF SPECIMENS SHOWN IN THE MUSEUM.

Lent by ROYAL COLLEGE OF SURGEONS, ENGLAND.

1. The right side of the body of a lower jaw completely and uniformly dilated into a large spherical cyst, with very thin bony walls covered with periosteum. The condyle has become detached from the dilated body of the jaw. No tooth or rudiment of a tooth can be discovered in the cyst, but its inner surface is lined by a layer of small epithelial cells and is thrown in places into thick projecting folds. The cyst, perhaps, originated in the enamel organ of an abortive "wisdom" or supernumerary tooth. 2194

From a woman, aged 35. The cyst had been growing for three years and contained a thick dark fluid. The patient recovered from the operation and six months afterwards could masticate her food perfectly on the left side. (Presented by Mr. W. D. Spanton, 1879.)

2. The left side of a lower jaw from the condyle to the canine tooth, removed by operation. The walls of the jaw are expanded by a large oval multilocular cystic tumour, of which some of the cysts are filled with glairy fluid, others with firm fleshy substance. The outer wall of the tumour is so thin that it is in some parts transparent, and its continuity with the posterior margin of the jaw is in several places interrupted. There is an ulcerated opening on the gum covering the tumour corresponding to the socket of the first molar tooth. (*Plate I, fig.* 1.) 2198

The tumour consisted microscopically of columns or rounded masses of small round epithelial cells or nuclei, resembling those forming the deeper layer of the epithelium of the gum; in some places the external layer of cells was elongated. A few alveoli were seen lined with a layer of cylindrical cells enclosing a delicate network of stellate cells, and thus precisely resembling the rudiment of an enamel organ. The matrix of the tumour was composed of a well-developed fibrous tissue. Sections taken from the inner side of the ulcerated alveolus mentioned above showed papilla-like processes of epithelium extending downwards from the gum and continuous with the columns and masses of cells forming the bulk of the tumour. For further account of the structure of the multilocular cystic tumour see a lecture on "Cystic Tumours of Jaws" (*Brit. Med. Journ.*, 1883, i, p. 1).

The patient was a middle-aged man, and the disease had existed for several years. The cyst, which was first formed in the situation of the last two molar teeth, had been regarded as a simple cavity in the bone containing fluid, and setons had been passed through

MULTILOCULAR CYSTS.

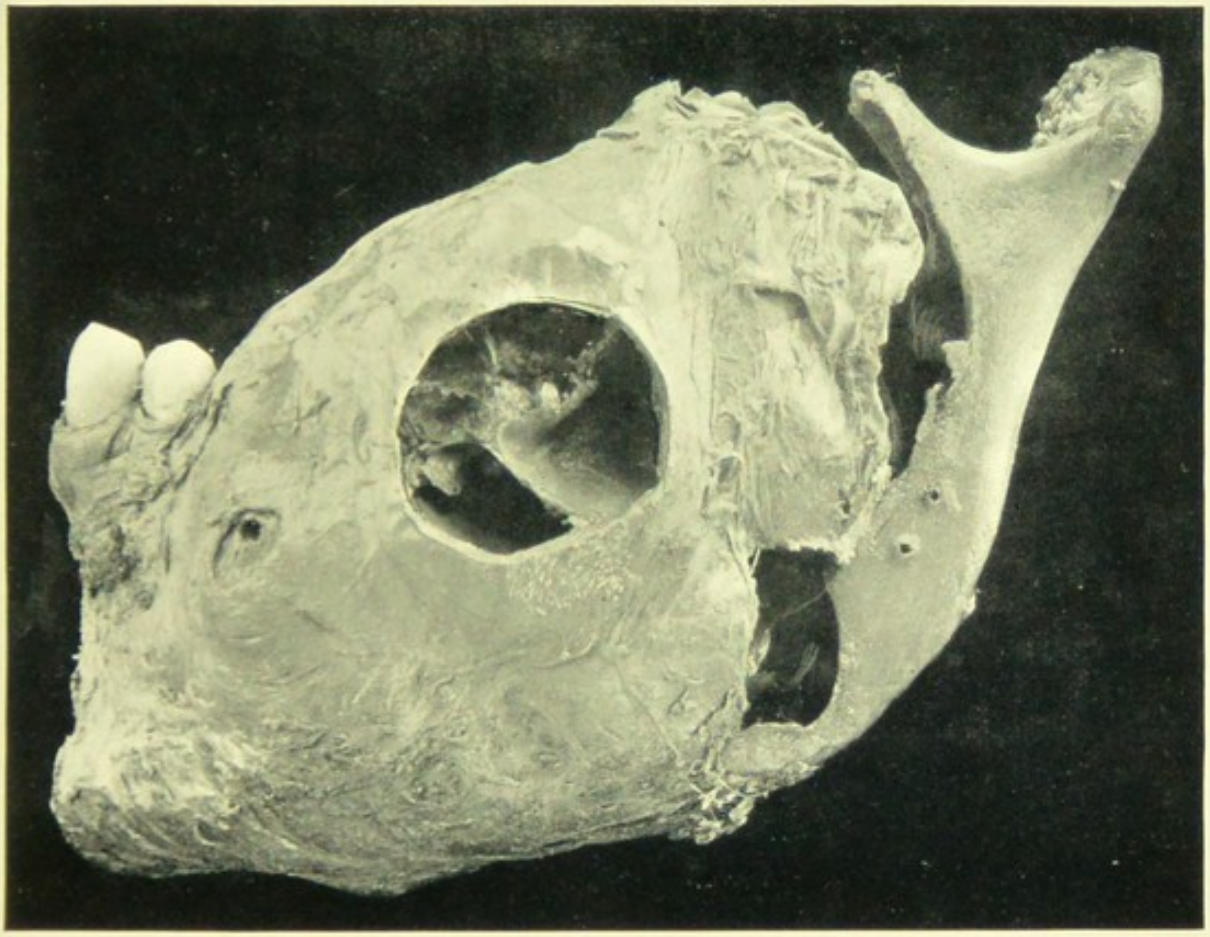

FIG. 1.—Left half of mandible with multilocular cyst. Specimen 2198, Royal College of Surgeons Museum. (See p. 18.)

it with seeming benefit, but the swelling returned and increased rapidly. The operation was permanently successful. (From Museum of Robert Liston.)

3. Part of the left ramus of a lower jaw, from the interior of which has grown a tumour about the size of a hen's egg. A small portion of the tumour projects through the internal, but the greater part through the external, wall of the ramus. A vertical section which has been made nearly through its outer part shows the interior structure to be that of a multilocular cyst. The cavities are mostly of small size, and divided from each other by strong fibrous septa, containing numerous spicula and plates of bone, with no very definite arrangement. The ulcerated socket of a molar tooth passes down into the substance of the tumour at the centre of that portion of the jaw from which it springs. The margin of the socket is surrounded by raised and infiltrated mucous membrane. 2199

In microscopic structure the tumour resembles the preceding specimen.

4. The symphysis and part of the body of a lower jaw, occupied by a multilocular cystic tumour. Upon the anterior surface two large cysts with smooth walls are exposed. A section, removing the posterior wall of the bone, shows that its cancellous tissue is occupied by many cysts of various sizes filled with a reddish granular solid material. The left incisor teeth had fallen out. 2200

The tumour consisted microscopically of large and small alveolar spaces filled with epithelial cells, and also of tortuous columns of similar cells, lying in a matrix of fibrous tissue. The masses and columns were composed of round epithelial cells with an external lining of elongated cells. The cells had in places undergone colloid degeneration. An ingrowth of the epithelium of the gum was observed near the socket of the left incisor tooth. From a woman in whom the disease had been observed for five years. (Presented by Sir Wm. Fergusson, 1870.)

5. The right half of a lower jaw, with a portion of its left side, including the left incisor teeth, removed by operation. A multilocular cystic tumour, developed in the interior of the bone, extends from the middle of the ascending ramus to the right incisor tooth. It is of an elongated oval form, and projects equally on

both sides of the jaw and into the mouth. It has removed in the progress of its growth all the molar and the second bicuspid teeth, and has expanded and in some situations perforated the walls of the jaw. In these situations it is covered by the distended periosteum. An opening has been made into a cyst, in front of the coronoid process, exposing its interior, which is only partly filled with the morbid growth. 2201

The patient was a woman aged 50. The disease had been observed for a year, and had produced intense pain. She died a month after the operation, with pleuritic effusion. (From the Museum of Robert Liston.)

6. A lower jaw, the right half of which is distorted and in part destroyed, apparently by the growth of a tumour in its interior. 1713

Lent by Guy's Hospital.

7. Greater part of lower jaw removed on account of fibro-cystic disease producing great enlargement of the bone. The section has a spongy appearance and contains mucous cysts. Boy, aged 13, under the care of Mr. Key, 1841. 1091^{a0}

8. Cystic disease of jaw. The right side of the lower jaw is hollowed into a cavity, which was filled with decomposing fluid and blood. The trouble began as a solid growth on the outer side of the jaw, in 1860. P.M. Insp. 215, 1875. 1091^{a}

Lent by St. Mary's Hospital.

9. Part of the lower jaw with multiple cystic growth, which expands and thins the bone. The microscope shows the growth to consist of epithelial columns supported by fasciculi of oat-shaped cells. The central cells of the epithelial columns have undergone a change exactly resembling that seen in enamel organs. 389

F., aged 35, no secondary growths. (Mr. Owen.)

10. Multiple cystic growth of left side of mandible. The inner and outer walls of the bone are in parts completely absorbed. 390

Microscopical appearance as in No. 389. Man, aged 25, seven years' growth (Mr. Lane).

11. Multiple cystic tumour of lower jaw. The bone is greatly expanded, and in places completely absorbed. 391

Microscopical appearance as in No. 389. (Mr. James Lane.)

12. A growth springing from near the alveolar margin, and involving the greater part of the body of the lower jaw. Opposite the symphysis the growth projects in front and behind, and has caused absorption of the bone, except at its lower border. The cut surface shows the presence of small cysts. The minute structure resembles Nos. 389, 390 and 391. 392

13. Growth of the lower jaw, springing from the symphysis and neighbouring parts and projecting forwards. Septa run in from the capsule. 393

There are numerous cysts which resemble histologically those of the preceding specimens. (Mr. Owen.)

Lent by University College.

14. The outer half of a large cystic tumour, which involved the lower jaw. The subcutaneous surface is recognizable by the portion of the masseter adhering to the tumour. On this surface openings have been made into two large cysts, both of which have thick membranous walls and a smooth interior. On the opposite side of the specimen the parts have been divided through a large cyst, from the sides of which there project nodules and lobulated outgrowths of tumour substance. The cut surface of the solid portions of the tumour and of the intracystic growths, as best seen on the left of the preparation, presents small, closely set spaces of various forms, and filled with a soft granular material, giving to the whole a gland-like structure. The bone has for the most part disappeared before the growth which has invaded it. 1400

Microscopic Structure.—A section of the solid part of the growth presents a scanty fibrous stroma enclosing large spaces occupied by masses of epithelial cells. The peripheral cells present in parts a columnar shape, whilst the remaining cells are either small and branched or spindle-shaped.

From a man, aged 22, who was admitted into U. C. H. on July 10, 1871, under the care of Mr. Heath. Six years previously patient first noticed a small hard swelling on the right side of the lower jaw. The tumour steadily increased in size, and had been lanced and tapped several times in the mouth. On admission the right side of the face presented a large, smooth, globular swelling reaching forwards to the angle of the mouth, backwards to an inch behind

the lobule of the ear, upwards to the lower margin of the orbit, and downwards to the level of the hyoid bone. The overlying skin was not involved. On July 12 the tumour was removed by operation together with the affected portion of the jaw. The patient made a quick recovery.

Before section the tumour was almost globular, had a diameter at its widest part of 3½ inches, and was somewhat lobular on the surface; it weighed 13½ ounces. Over the whole of the lower part was a thin shell of expanded bone; for the greater part this was over a solid growth, but at the upper and outer aspect was a large cyst capable of holding about six ounces of fluid. The lower part of the wall of the cyst was bony, but the whole of the upper part was free from bone; all the inner wall of the cyst was invested with a thin osseous layer. Anterior to the large cyst was a smaller one containing about half an ounce of thick fluid in which was a large quantity of cholesterin. Both cysts were lined by a smooth thin membrane. On the inner aspect of the tumour there were two openings, each about three-quarters of an inch in diameter, which had opened into the mouth; they communicated with a large cavity in the centre of the tumour, into which the finger could be passed for nearly three inches. On making a section this inner cavity was found to be about three inches in length; its inner surface was irregularly lobulated, the lobules varying in size from that of a pea to a filbert. The tumour was moderately firm, of a whitish colour, and small points of bone were scattered through its substance.

The other half of the specimen is in the Museum of the Royal College of Surgeons. (*Lancet*, March 23, 1872, p. 397; and Heath, "Injuries and Diseases of the Jaws," 1894, p. 200.)

15. The greater part of a lower jaw removed by operation, the bone having been disarticulated at the temporo-maxillary joint on the right side, and sawn through a short distance in front of the angle on the left side. On the right side the condyle, neck, and upper part of the ramus are normal, and on the left side the bone is unaffected for a distance of 1 cm. in front of the sawn surface; but in the rest of the specimen the jaw is occupied by a large cystic tumour. The tumour is most extensive in the right half of the body of the jaw, where it forms a lobulated mass expanding the bone, and projecting from the alveolar border. The smaller lobules consist of solid tumour substance, but the larger lobules are produced by cysts in the growth, several of which have been laid open. These cysts are partly surrounded by a shell of bone, and are lined with a soft membranous layer. The largest cyst, which measures 4 cm. in diameter, projects from the lower border of the body, and contains a large mass of brownish coagulated material.

To the left of the middle line the disease is much less extensive, and only involves the upper half of the

body of the jaw, the lower border of which is unaltered. In this position the expansion is more marked on the outer than on the inner aspect, and a very thin layer of bone still covers the growth, on the upper surface of which the sockets of some of the teeth can still be seen. 5150. 1401

Microscopic Structure.—Large branching masses of epithelium cells, the peripheral rows of which are columnar, lie in a scanty cellular stroma. At one place the columns of epithelium cells are continuous with the epithelium covering the gum.

From a woman, aged 51, who was admitted into U. C. H. in August, 1882, under the care of Mr. Heath. At the age of 35 the patient first noticed a lump the size of a pea beneath the tongue on the right side, which gave some pain and for which a tooth was extracted. From that time abscesses formed in the lower jaw, some of which discharged internally and one externally, and several teeth were extracted. At the age of 44 patient was admitted under Mr. Heath's care, and presented considerable expansion of the right side of the lower jaw by a lobulated tumour. The tumour was freely incised within the mouth ; a quantity of dark-coloured fluid escaped, the semi-solid contents of the large cystic space were cleared out, and the bony walls of the cavity crushed together. A month after the operation patient was discharged, the cavity in the jaw being nearly closed. In October, 1878, there was a recurrence of the cystic growth, which was again treated by gouging and crushing in the thin bony walls of the cavity. In August, 1882, extensive recurrence had again taken place, and the parts preserved in the specimen were removed by operation. The patient made a good recovery. (Heath, "Injuries and Diseases of the Jaw," 1894, p. 203).

16. The greater part of the left side of the body and ramus of a lower jaw, except the neck and condyle. The whole of the ramus and the greater part of the body are expanded by a solid central tumour, the angle and the lower border being the parts least affected. On the outer aspect the most prominent part of the expansion forms an elliptical swelling, measuring 6 cm. by 3·5 cm., over almost the whole surface of which a very thin layer of bone can be felt. On the inner aspect the expansion is less marked and more irregular, the bony shell being, over a considerable part, wanting. In the expanded ramus the central growth is readily separable from the shell of bone. All the corresponding teeth are wanting, and at the anterior part of the inner aspect of the growth, surrounded by lobules of the tumour, is an irregular cavity which opened into the mouth. 6282. 1402

Microscopic Structure. "The growth consisted of a number of tubes lined with one or more layers of cylindrical cells, and separated from one another by a highly refracting matrix composed

apparently of closely packed spindle-shaped cells ; some of the tubes have a distinct lumen, others are nearly filled by small, round and illformed spindle-shaped cells. In many places the resemblance to the structure of the enamel organ is marked ; the tubes are lined by one or more layers of cylindrical cells, enclosing a tissue composed of spindle cells and many stellate cells, the branches of which unite with one another ; there was nowhere any squamous development of the epithelial cells."

From a man, aged 34, who was admitted into U. C. H., under the care of Mr. Heath, in 1887. He first noticed a lump on the left side of the lower jaw eight years previously ; a few weeks later the swelling was lanced and the wound closed. A few months afterwards the swelling increased in size, gathered and burst into the mouth ; since then there had been a discharge from the sinus. The swelling of the lower jaw steadily increased. On admission the left cheek was rendered very prominent by the enlargement of the jaw, which in most parts was hard but in some places soft and elastic. The left half of the jaw was excised in the usual way, but in disarticulating the condyle the neck broke through. The patient left the hospital a month after the operation. (*Surg. Reg. Rep.*, 1887, pp. 38 and 190, No. 178).

17. Half a multilocular cystic tumour, which has extensively destroyed the right half of a lower jaw. Anteriorly the growth reaches to the mental foramen and posteriorly involves the whole of the ramus. The growth, which has originated in the interior of the jaw, consists of a number of cystic spaces, the largest of which measures 5 cm. in diameter. At nearly all parts the cysts are surrounded by a thin shell of the expanded bone, and they are separated one from another by septa, which are partly bony and partly membranous. The cysts are lined by a smooth membrane which can easily be peeled, as a distinct layer, from the bony wall. Between the most anterior cyst and the large one which lies above and behind it is a layer 2 cm. in thickness, in which the bone is infiltrated by solid new growth. 7238. 1403

Microscopic Structure.—A section of an intracystic growth, which was found projecting into one of the cysts, showed a delicate stroma of connective tissue and spindle cells containing spaces of varying size with columnar epithelium.

From a woman, aged 40, who was admitted into U. C. H. in 1894. The tumour was first noticed in the position of an abscess which followed the extraction of a tooth eight years previously. The upper part of the tumour was soft and fluctuating and the lower part formed by the much expanded body of the jaw. The teeth were absent behind the bicuspid and cysts were visible beneath the mucous membrane. The right half of the jaw was successfully removed by operation. (*Surg. Reg. Rep.*, 1894, p. 44, No. 969.)

18. Part of a lower jaw, from the first bicuspid tooth on the right side to the second molar on the left inclusive,

PLATE II.

MULTILOCULAR CYSTS.

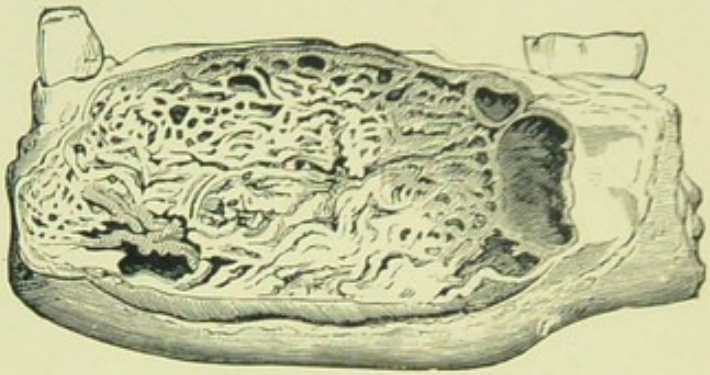

FIG. 2.—Section of a multilocular cyst showing honeycomb appearance. Specimen 1404, University College Museum. From Paper by J. Bland-Sutton, *Trans. Odonto. Soc.*, 1887. (See p. 25.)

FIG. 3.—Radiograph of mandible with multiloculer cyst. From Paper by W. W. James and J. G. Forbes, *Proc. Roy. Soc. Med.* (Odonto. Sec.), July, 1909. (See p. 32.)

expanded by the growth of an oval tumour within it. The projection of the tumour is greatest anteriorly, and in this situation the bone is wholly wanting; the lower part of the jaw is unaltered in form. The growth is composed of intersecting fibrous bands, the meshes between which are occupied by cysts of various sizes; the larger cysts are round, and have a smooth interior; the smaller, mutually adapted and variously elongated, are filled with a pale yellow, soft, granular substance. 3619. (*Plate II, fig.* 2.) 1404

Microscopic Structure.—The tumour consists of a fibrous stroma enclosing spaces varying much in size, and some of them showing epithelial contents, but the condition of the specimen prevents an accurate histological examination.

The patient, who was under the care of Mr. Liston, first noticed a swelling of the jaw about six years previously; the disease progressed much more rapidly during the later period of this time. There had never been ulceration or hæmorrhage from the tumour; mastication and articulation were interfered with. When the patient was admitted the tumour had the following characters: It was hard, smooth on the surface, like healthy gum, slightly elastic at parts, as if it were situated between the walls of the bone; it extended from the first bicuspid tooth on the right side to the second molar on the left; and the chin was rendered very prominent and round by the growth. In addition to the parts shown, a piece of jaw on the left side was removed with saw and bone forceps, owing to a doubt arising whether the whole of the disease was taken away. The wound healed favourably, and the woman was discharged a month after the operation.

19. The right half of a lower jaw, removed by vertical division of the bone in front of the canine tooth. Excepting the condyle and neck, the jaw has been greatly expanded by the growth of a central tumour, consisting of a firm, slightly spongy, fibrous substance and large cystic spaces, the largest of which occupies the bone in the position of the angle. The expansion of the jaw is much more marked on the outer than the inner aspect, and in the former situation the shell of expanded bone is extremely thin and in some parts wanting, the tumour being enclosed merely by a dense fibrous capsule. By the growth of the tumour the wisdom tooth has been almost inverted and displaced upwards as far as the neck of the jaw. 3695. 1405

Microscopic Structure.—The solid part of the tumour consists of a dense cellular fibrous tissue enclosing spaces filled with epithelium. The peripheral cells are columnar, whilst the remainder of the cell masses consist of small irregular cells which in the central parts have undergone colloid degeneration. (See Heath, "Injuries and Diseases of the Jaws," 1894, p. 317.)

20. The right half of a lower jaw, except the neck and condyle. Between the lateral incisor tooth and the upper part of the ramus the jaw is expanded into a thin bony shell deficient superiorly, the only part of the alveolar border which remains being that including the lateral incisor, canine, and two bicuspid teeth. The expansion of the jaw is more marked on the outer than the inner aspect, and viewed from within the bony shell is marked by circular ridges, and the inferior dental canal can be traced on its outer wall. 2699. 1406

The expansion of the jaw was probably caused by a central multilocular cystic tumour.

Lent by Mr. E. W. Roughton.

21. Microscopical section.

The tumour occurred in a woman aged 50, was of the size of a filbert and situated in region of left mandibular canine; was diagnosed as a myeloid epulis; gouged out, and diagnosis only made on microscopic examination; duration eighteen months. No. of microscopical section, 530, Royal Free Hospital.

22. Microscopical section of epithelial odontome.

History unknown. Number of microscopical section, 161, Royal Free Hospital.

Lent by St. Bartholomew's Hospital.

23. Sections of a tumour with the side of the body of lower jaw in which it originated; removed by operation. Part of the mucous membrane of the mouth, unaltered in structure, is extended over the upper surface of the tumour. The disease originated in the cancellous texture of the jaw. The walls of the bones are expanded into a thin case enclosing the tumour, but in consequence of the absorption of the bone in some situations, this case is incomplete. The morbid growth consists of granules of a peculiar fatty-looking substance, partitioned by fibro-cellular tissue, and having cysts dispersed through it which contained a glairy fluid. The boundaries of some of the cysts are thin plates of bone. I. 147. 535

Microscopical examination of the tumour showed that it consisted of fibrous tissue embedded in which were cylinders and alveoli of elongated, narrow, almost spindle-shaped epithelial cells. The tumour may be regarded as essentially of the same nature as the following.

See microscopical sections, No. 51.

From a man aged 25.

PLATE III.

MULTILOCULAR CYSTS.

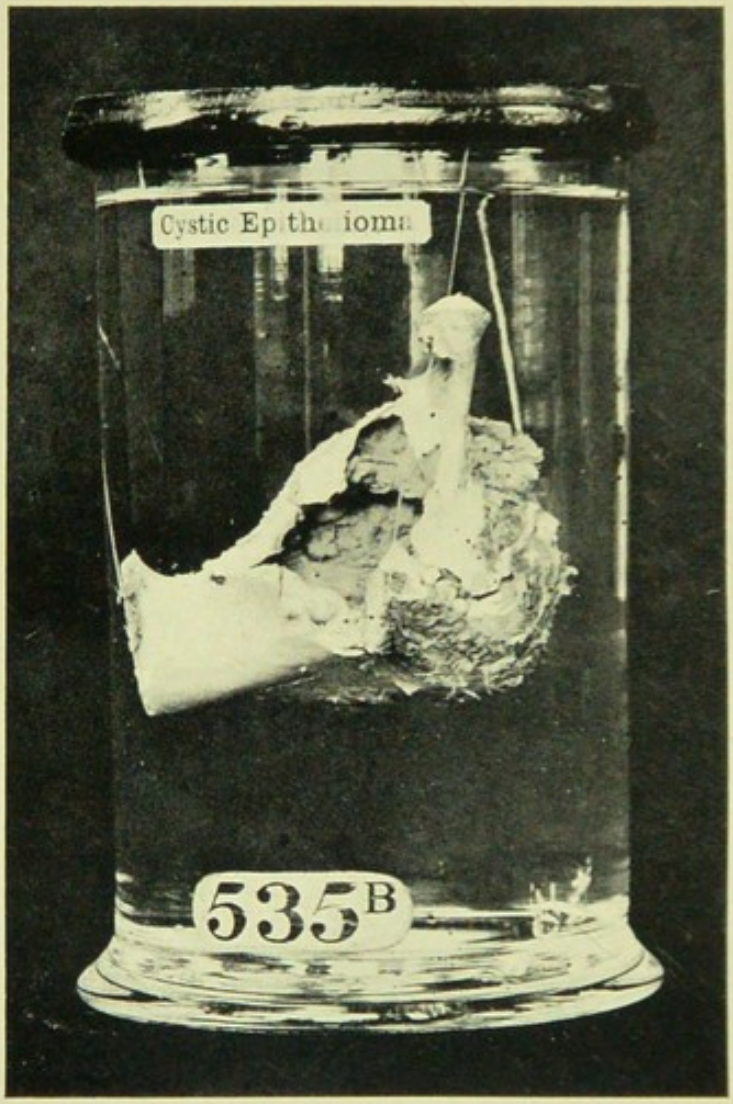

FIG. 4.—Portion of mandible with multilocular cyst. Specimen 535B, St. Bartholomew's Hospital Museum. (See p. 27.)

24. A portion of the left half of an inferior maxilla removed by operation. The whole of the body and the greater part of the ramus is occupied by a new growth, which appears to have originated in the substance of the bone itself. The two bicuspid teeth are firmly fixed in their normal position ; the first and second molars are absent, but the wisdom-tooth is thrust upwards by the growth, so that it now occupies the base of the expanded coronoid process. The body of the jaw is distended by a tumour, which has thinned and destroyed the compact bone. The growth protrudes both externally and internally, and in the former position has infiltrated the masseter muscle. The section of the body of the jaw shows that the tumour extends as far forward as the canine tooth. The growth is soft and friable, in parts cystic, with its anterior portion definitely encapsuled. In the recent state these contained a brownish blood-stained fluid. Microscopical examination shows that the tumour is a cystic epithelioma. The bone is infiltrated with masses of epithelial cells, which are breaking down in their centres so as to form cavities. The stroma consists of connective tissue. 1887. 535A

The patient, a married woman, aged 29, had been admitted five years previously on account of a tumour which had grown for seven and a half years on the site of a left lower molar tooth. The tumour was removed by cutting away an outer shell of bone and subsequently gouging out the growth. On re-admission to the hospital, the left side of the inferior maxilla was found to be very much swollen immediately above the scar resulting from the previous operation. The swelling extended on to the alveolar border of the jaw in such a manner that when the jaws were closed the growth covered the outer aspect of the upper molar teeth, whilst it extended for more than an inch and a half on the inner side of the jaw towards the middle line. The growth was ulcerating at the time when the excision was performed. After the operation the patient made a good recovery.

Sections are preserved in Series lv., No. 70.

See *Trans. Path. Soc.* xxxviii, p. 359, and *Female Surgical Register*, 1886, vol. iii, No. 423.

25. The greater part of the right side of the inferior maxilla, removed by operation on account of a large tumour which occupies the posterior portion of the body, and extends upwards into the ramus as far as the sigmoid notch. The bone was sawn through just behind the mental foramen, and disarticulated from the temporal bone ; its interior is greatly expanded by the growth, a thin shell of bone only remaining on the outer side,

while on the inner side the bony covering has been broken away. The interior of the expanded bone was occupied by soft and pulpy material, which gave way during the operation. (*Plate III, fig.* 4.) 535B

The patient was a man aged 28, who had noticed a swelling in the jaw for two and a half years. He made a good recovery, and left the hospital thirty-eight days after the operation.

Microscopical examination showed that the growth consisted of masses of epithelium infiltrating the bone and breaking down to form cysts; there were no "cell nests."

See *Male Surgical Register*, 1891, iv, No. 1514.

26. A cystic tumour involving the left half of the lower jaw and extending slightly beyond the symphysis. The outer and lower surfaces are covered by a thin expanded plate of bone. On the upper and anterior edge of the growth the left incisors, canine, and first bicuspid teeth are crowded together. Large cysts containing turbid brown serous fluid, which were ruptured during the operation, are seen on the upper and outer surface. Part of the inner surface is covered by the buccal mucous membrane, where an elongated ulcerated depression is seen, which was produced by the pressure of the upper teeth. The section shows an agglomeration of cysts of various sizes; most of them are filled by a red granular material, which was found on microscopical examination to be composed of blood-clot and colloid material; a few contain a cream-like glutinous fluid; others were filled by a turbid brown serous fluid. The cyst walls are formed of tough fibrous tissue, containing rarely a plate of bone, and are lined by a shining membrane. A portion of the right side of the symphysis is preserved, in which a cavity is seen—produced by expansion of the compact layers of the bone—filled with a soft, red, solid growth. 395. I. 536

Microscopical Characters.—The solid portion of the tumour was composed of columns of cells and nuclei of the epithelial type, which, when cut transversely, presented the appearance of alveoli; similar small columns branched out from the sides of the larger. The cells in the centre of the columns had, in many places, undergone a colloid change, and by the complete metamorphosis of the cells the cysts were formed. From the buccal mucous membrane covering the tumour, in certain parts club-shaped and branching cylinders extended down from the deep stratum of the epithelium, as in the ordinary formation of epithelial cancer. The microscopical examination of the tumour indicates that it is an epithelial cancer extending from the gum into the jaw, and undergoing colloid metamorphosis.

MULTILOCULAR CYSTS.

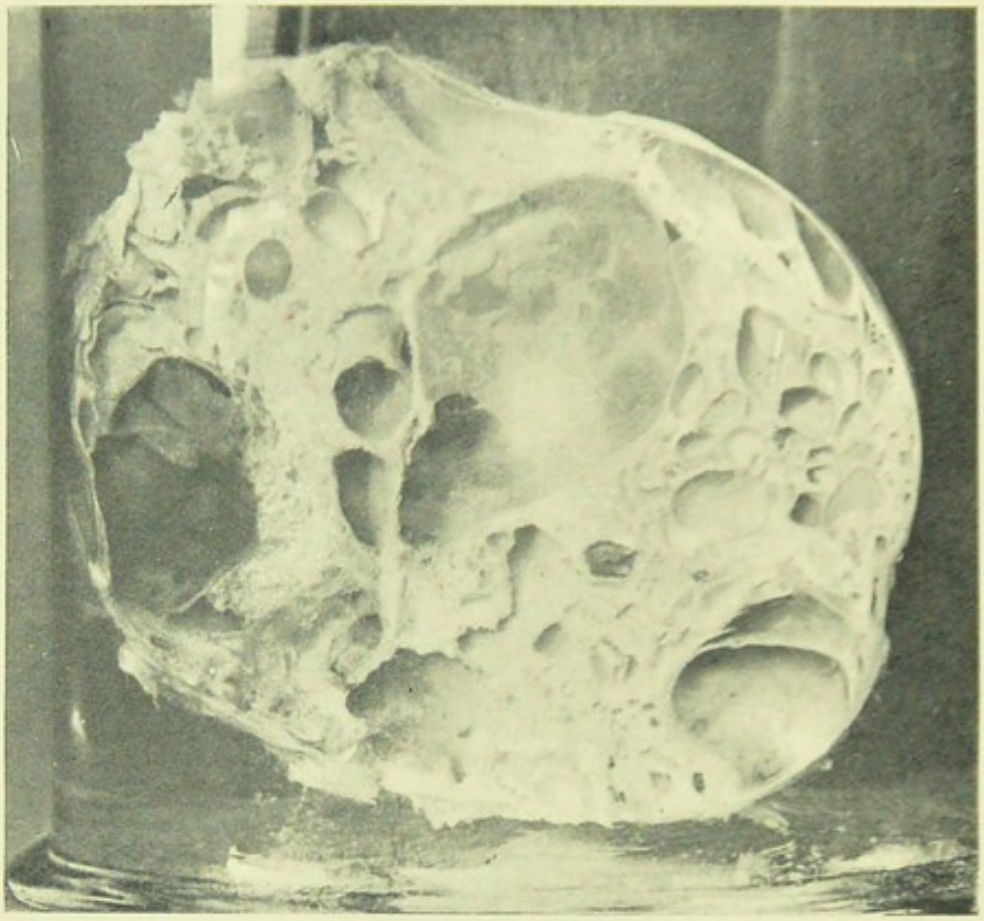

FIG. 5.—Section of multilocular cystic tumour, showing cysts varying in size. Specimen from the Royal Infirmary, Derby. (See p. 29.)

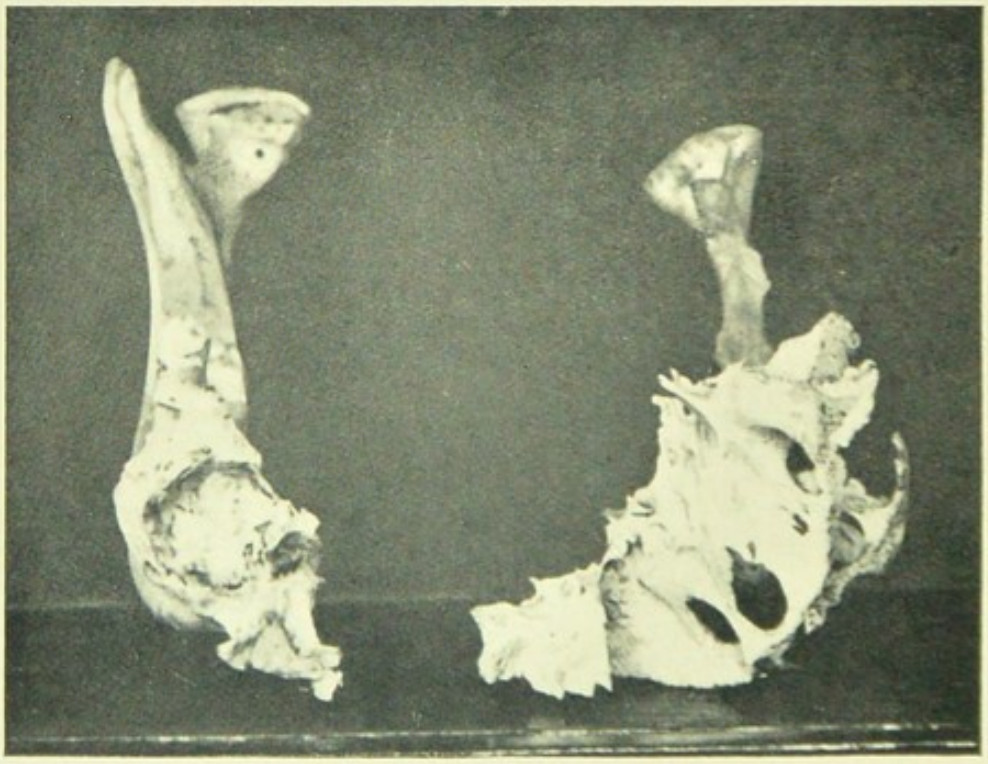

FIG. 6.—Macerated specimen of a multilocular cyst, showing distortion of mandible and arrangement of bony septa. Specimen 537, St. Bartholomew's Hospital Museum. (See p. 29.)

It was removed from a lady, aged 45, and had been growing for ten years. The tumour did not cause any pain, and did not affect the general health. The submaxillary lymphatic glands were not enlarged. Ten years before the swelling of the jaw commenced, she had, for a long period, a discharge from the socket of an extracted tooth, and was told by a surgeon that the jaw was necrosed. The tumour grew in this situation.

Microscopical sections are preserved, No. 52.

27. Microscopical slide of above.

28. An inferior maxillary bone, the greater part of which is irregularly expanded to form imperfect septa between cysts. These, which originated independently of one another in the interior of the bone, were lined with a highly vascular membrane, and contained thin, serous, or grumous, blood-tinged fluid. Of some the walls were thin; of some, thick and resisting, as in the case of the posterior mass, which, in its increase, pressed upon, and caused absorption of, the left ascending ramus and coronoid process. I. 308. (*Plate IV, fig.* 6.) 537

This preparation was obtained from the body of a man aged 75. The disease had been five years in progress. The age of the patient prohibited its removal, but the various cysts were from time to time punctured and their contents evacuated. See an account by Mr. Coote, *Lancet*, October 10, 1857.

Lent by Odontological Society of Great Britain.

29. Left half of mandible distended by cystic tumour (?) Epithelial odontome. (T. Underwood.) 420

Lent by Dr. C. H. Hough, from the Royal Infirmary, Derby.

30. Multilocular cystic tumour. (*Plate IV, fig.* 5.)

The patient, a woman, aged 50, was admitted to the hospital with a large tumour of the right side of the mandible, which had been noticed for twenty-five years. A photograph taken when the patient was 25 shows the swelling.

The tumour involved the whole of the right side of the mandible, body and ramus, the outer table of which was spread over the lower part of the tumour. The tumour was obviously cystic.

The mouth was pushed over to the left side of the face, a fibrous looking mass presenting between the lips, which were not able to be completely closed. The tongue was pushed to the left and made a prominence behind the left angle. The teeth remaining were pushed forward. Those of the right upper jaw had apparently gone.

The patient was able to take her food fairly well, and the tumour caused her little pain, but had been increasing in size lately. There was no pulsation, and the vessels over it were not especially large or numerous. The carotid vessels, external and common, were felt with difficulty behind and below the swelling.

A cyst was tapped soon after her admission and 1½ ounces of clear fluid were withdrawn.

The right half of the mandible was excised, and the patient eventually made a complete recovery, although the shock immediately following the operation was so severe that Dr. Hough feels it is due to his house surgeon, Dr. Olver, who promptly transfused, that the patient lived.

The tumour weighs 44½ ounces; measures 6 inches × 5 inches × 4 inches.

Lent by Prof. R. F. C. Leith, from the University of Birmingham.

31. A multilocular cystic tumour.

32. A multilocular cystic tumour.

Lent by Mr. J. A. Woods (Liverpool).

33. A multilocular cystic tumour of the mandible. (Dr. Newbold.)

34. Microscopical section.

Lent by Mr. A. Hopewell-Smith.

35. Serial sections through the wall of a small cyst, showing the method of its formation.

36. Microscopical section through the main mass of an epithelial odontome.

Lent by King's College Hospital.

37. Multilocular cystic tumour of the inferior maxilla of a woman, aged 50, removed by Sir T. Lister. It was first noticed six years previously as a soft swelling, the size of a pea, on the outer side of the gum opposite the first bicuspid tooth. It increased in size and was treated by injection and seton, and the fluid always reaccumulated. Gradually it appeared as a swelling of the whole bone, rounded and extending in all directions. At parts fluctuation could be detected, in others the tumour was firm, and in still others an intermediate condition was present, the thinned and expanding bone yielding beneath the pressure of the finger. 180

PLATE V.

MULTILOCULAR CYSTS.

FIG. 7.—Microscopical section of a multilocular cyst. From Paper by James and Forbes. (See p. 32.)

FIG. 8.—Higher magnification of part of section shown above.

The tumour was removed by an incision commencing at the angle of the mouth and carried in a curved direction downwards and backwards to the base of the jaw, to the angle, and upwards along the posterior border of the ramus for ¼ inch. The facial artery was tied. The jaw was divided, the second incisor tooth having been previously extracted. The bone was also divided above the ramus, the coronoid and condyloid processes and the greater part of the ramus being left behind. The genio-hyoid and genio-hyoglossi were divided at their origin. The patient made a good recovery.

Lent by Guy's Hospital.

38. Cystic tumour of mandible. It contains some soft-looking growth in its cavity, and above is an inverted wisdom tooth. (Mr. Jacobson.) 1091[28]

39. Right half of lower jaw with which is connected a large cyst filled with a coagulum and a soft fibrous growth. It was thought to be malignant and to be dependent on an aneurism, as a small tumour of the gum was first opened which bled profusely on being opened. The nature of the specimen is not at all clear. (Mr. Dendy, 1827.) 1091[30]

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MULTILOCULAR CYSTS.

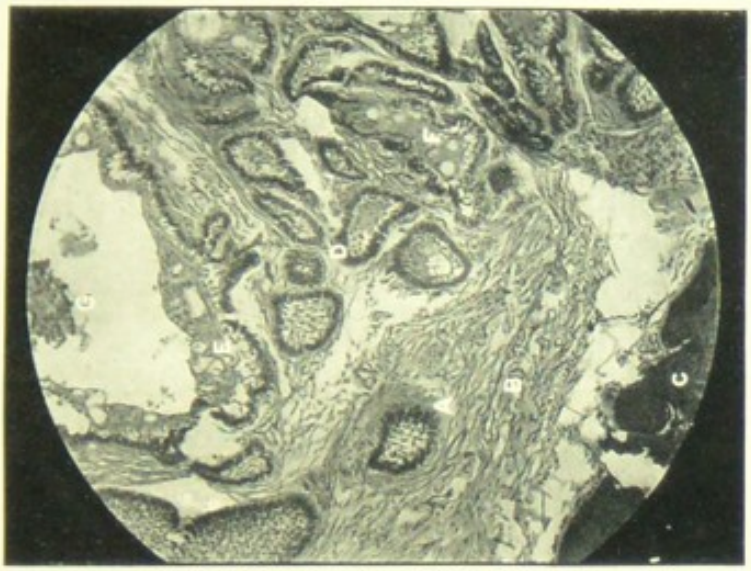

FIG. 10.—Low power. A, cell masses; B, fibrous stroma between the masses of cells; C, osteoid tissue; D, a single layer of columnar cells at the periphery of the cell masses; E, cells of a myxomatous type in the centre forming a stellate reticulum; F, cells resembling horny epithelium; G, granular matter. From Paper by T. S. Tirumurti, *Brit. Dent. Journ.*, November 15, 1913.

FIG. 9.—Hindu lady, aged 30 years. Duration of tumour, 10 years. A, the place where the skin was ulcerated as the result of applying some irritating paste. From Paper by T. S. Tirumurti, *Brit. Dent. Journ.*, November 15, 1913.

DENTIGEROUS CYSTS.

Also called—

Follicular Odontomes.
Cystic Follicular Odontomes.

DENTIGEROUS CYSTS.

DENTIGEROUS cysts are innocent cystic tumours arising from the dental epithelium and connected with unerupted teeth.

These cysts arise, at or about the period of eruption, by proliferation and degeneration of the cells of the tooth-band or of the enamel organ; in the latter case, probably those of the external epithelium. They increase in size by a continuance of the process, the fluid collecting about the crown of the tooth and the epithelial cells forming a lining to the cavity. An adventitious fibrous capsule is produced which varies in thickness; in some cases it is quite thin; in others it may be as much as one or two centimetres thick, when calcareous particles are commonly found. The cyst wall is composed of epithelial cells varying in number, from two to forty deep. These cells may not be found if suppuration has occurred. The cells usually form a flat layer, but may present a papilliferous arrangement.

The cavity contains a viscid, glairy fluid, in which degenerating epithelial cells, *débris* and cholesterin crystals have been demonstrated. The associated tooth may be fully or partially developed; the common condition is one in which the crown of an incompletely developed tooth projects into the cavity, but the whole tooth may be within the sac, or within the wall. Rarely, the tooth may be represented by an ill-shaped denticle. Coleman stated that rudimentary teeth found in dentigerous cysts have no proper pulp cavity.

Nasmyth's membrane has been found on some teeth removed from dentigerous cysts.

Malassez explains the origin of dentigerous cysts in the same manner as he explains the formation of dental cysts—viz., by the proliferation and degeneration of the epithelial rudiments of the enamel organ. These odontomes arise in relation with teeth which have remained buried within the jaws, and it has been suggested that the swelling is a cystic formation due to an unsuccessful attempt at eruption. It is of interest to note that the teeth most frequently affected correspond with those which commonly fail to erupt, and especially since it has been recently suggested that eruption of a tooth is dependent upon the proliferation and degeneration of the cells of the external epithelium and toothband.* In a few cases a history of injury has been obtained.

Formerly the cysts were thought to be due to excessive formation of fluid around a retained tooth either by secretion from, or degeneration of, the follicle. Also, it has been said that the fluid of these tumours is formed by the degeneration and liquefaction of the stellate reticulum, and that the wall is derived from the tissue which would form Nasmyth's membrane. In support of the former view, it was pointed out that the eruption of a tooth is sometimes preceded by a vesicle at the surface of the gum, and if a lancet be employed a small quantity of fluid escapes, leaving the enamel of the coming tooth exposed. In favour of the latter view it has been stated that teeth removed from these cysts did not possess Nasmyth's membrane.

Details of more than one hundred cases have been

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* *Proc. Roy. Soc. Med.* (Odonto. Sect.), 1909, vol. ii, p. 297.

collected where dentigerous cysts have occurred in man, sheep, pigs, and porcupines. In the lower animals they were often bilateral, and usually in the incisor region. Of 84 cases occurring in the human subject, 43 were found in the mandible and 41 in the maxilla; 30 cysts were in connection with canine teeth, 16 with incisors, 15 with third molars, 12 with first and second molars, 11 with premolars. The average age at which the symptoms commenced was fifteen years; the youngest being two, and the eldest thirty. Out of 76 in which the sex is recorded, 39 occurred in females and 37 in males. Four cysts are recorded in association with temporary teeth, and 4 in connection with supernumerary teeth.

The growth is progressive although the rate is variable, some cases coming under observation after a few months, others after several years.

On examination, a rounded, painless swelling is found projecting from the jaw. At first it is small and bony, later it is large, soft and fluctuating. On incision the fluid escapes. The tooth may be observed with its crown projecting into the cavity, or obscured by a layer of tissue over it; the root, if formed, is usually external to the cyst.

The clinical course can be briefly summarized in three stages. In the earliest stage there may be no sign of any abnormal condition beyond the absence of a tooth. Later, a tumour is found which steadily increases in size and after a time "egg-shell crackling" is obtained. If neglected the cyst continues to increase, when injury may occur and inflammatory symptoms supervene, probably leading to suppuration and the formation of chronic sinuses.

Inflammation and its sequelæ are the most common complications; the neighbouring teeth may be lost and

necrosis may supervene. Complete calcification of the wall has been recorded. By extension of the growth encroachment on the antrum, nasal obstruction, or displacement of the mandible—in one case resembling a dislocation—may occur.

When the tumour projects from the jaw, forming a globular swelling, it may be confused with other innocent growths and particularly with multilocular cysts or dental cysts. If suppuration occurs the nature of the tumour may be obscured and sometimes it is mistaken for a malignant growth. The absence of a tooth from the series associated with a cystic swelling are the signs which are most likely to lead to a correct diagnosis, but the possibility of such a tumour arising in connection with a supernumerary tooth must be borne in mind. From a dental cyst it can be distinguished by the age of the patient and the history of previous infection.

Dentigerous cysts were thought to be more frequently connected with molars, but in the cases which the authors have collected the canine teeth were those most frequently involved. In only four cases have dentigerous cysts been recorded in connection with temporary teeth.

The treatment consists in the complete removal of the tumour.

Summary of Cases.

Case	Age	Sex	Region
Canada Med. Record, quoted in *Dental Cosmos*, xxiv, p. 553.	14½	F.	$\overline{321}\mid$
Storer Bennett. *Trans. Odonto. Soc.*, 1893-94, p. 115	25	M.	$\underline{2}\mid$
Bryant. *Trans. Odonto. Soc.*, 1873-74	12	F.	$\underline{3}\mid$
J. F. Colyer. *Trans. Odonto. Soc.*, 1893-94, p. 158	17	M.	$\mid\overline{8}$
Carter. *Brit. Dent. Journ.*, 1888, p. 303	12½	F.	$\underline{\mid 4 \text{ or } 5}$

Case	Age	Sex	Region
F. Coleman. *Trans. Odonto. Soc.*, 1907, p. 26	7	M.	$\underline{\vert 1}$
Fothergill. *Trans. Odonto. Soc.*, 1879-80, p. 2	13	F.	$\underline{\vert 3}$
Garretson. *Dental Cosmos*, vii, p. 230	—	M.	$\underline{3 \vert}$
Garretson. *Dental Cosmos*, vii, p. 188	—	F.	$\underline{\vert 3}$
J. H. Gibbs	21	F.	$\overline{\vert 8}$
Lisfranc. Forget's Anomalies..	30	F.	$\overline{8 \vert}$
Bryant. *Trans. Odonto. Soc.*, 1873-74	26	F.	$\overline{\text{Molar} \vert}$
Bryant. *Trans. Odonto. Soc.*, 1873-74	6	M.	$\underline{\vert 2}$
Fearn. *Brit. Med. Journ.*, 1864	12½	F.	$\overline{\vert 3}$
R. W. McCoy. *Dental Cosmos*, xiii, p. 550	11½	M.	$\overline{\vert 3}$
A. W. Stocks. *Brit. Med. Journ.*	15	F.	$\underline{3 \vert}$
C. Heath, *Lancet*, Dec. 21, 1879	25	M.	$\overline{4 \text{ or } 5 \vert}$
Nelaton. Forget's Dental Anomalies	30	F.	$\overline{\text{Ramus} \vert}$
Marshall. Prof. J. van Dryn, *Brit. Dent. Journ.*, 1884, p. 177	16	F.	$\overline{\vert 8}$
J. Tomes. *Trans. Odonto. Soc.*, 1861-63	30	F.	$\overline{8}$
E. B. Dowsett. *Guy's Hospital Gazette*	19	F.	$\overline{\vert 3}$
J. H. Harris. *Brit. Dent. Journ.*, 1906	18	M.	Upper incisors
Hopewell-Smith. *Dent. Surg.*, 1904	9½	M.	$\overline{\vert 5}$
E. W. Roughton	10	M.	$\overline{\vert 7 \text{ or } 8}$
T. A. Goard. *Brit. Dent. Journ.*, 1897, p. 664	14	F.	$\overline{\vert 5}$
Goodwillie	12	M.	$\underline{3 \vert}$
W. Hern. *Trans. Odonto. Soc.*, 1893-94, p. 91	9	M.	$\underline{\vert 3}$ $\underline{2 \vert}$ $\underline{\vert 2}$
Hodges	10	M.	$\overline{?\,3 \text{ or } 4}$
Hodges	10	M.	$\underline{\vert 1}$
P. Turner and J. L. Payne ..	18	M.	$\underline{\vert 8}$
Moore	11	M.	$\overline{\vert 5}$
Nelaton	—	—	$\underline{\vert 3}$
Mullet	13	F.	$\underline{\vert 3}$
Philip Turner	11	M.	$\underline{\vert 1}$
J. G. Turner	—	—	$\overline{8}$
Julien Tellier, Lyons	35	F.	$\underline{8 \vert}$

Case	Age	Sex	Region
Wormald, R.C.S. Museum ..	14	M.	4 or 5
Royal Free Hospital	11	M.	7
Bryant. Guy's Museum, 1087[19]	6½	—	3
Guy's Museum, 1091	—	—	8
Guy's Museum 1091[29]	—	—	| 3
St. Bart.'s Museum 539.. ..	—	—	3
St. Bart.'s Museum 539A ..	8	M.	| 1
St. Bart.'s Museum 540A ..	11	M.	Molar
Middlesex Hospital Museum ..	—	—	| Molar
Birmingham University ..	—	—	4 or 5
Howse. Guy's Museum ..	25	M.	| 8
Spiller. Guy's Museum ..	14	F.	| 4
Howse. Guy's Museum ..	9	M.	| 1
Kirby. Odontological Society's Museum 421	—	—	3
Hopewell-Smith	17	F.	| 3
Jourdain	17	F.	7 and 6 |
Jourdain	13	F.	2 |
Jourdain	—	—	6 and 7 |
Earle	23	M.	3
Gensouli. Stanley's "Diseases of Bone"	13	F.	Canine
Bordinave. *Boston Med. and Surg.*, viii	Young	F.	| 3
Lyne. *Edin. Med and Surg. Journ.*, i	31	F.	3 and 2 |
Salter. *Guy's Hosp. Reports*, v	22	M.	| 8
Cock and Salter. *Guy's Hosp. Reports*, v	18	F.	| 1
Poland. *Guy's Hosp. Reports*, xv	26	F.	Molar |
Bryant. "Practice of Surgery," 1872	17	F.	3 |
Bryant. "Practice of Surgery," 1872	8	F.	
Fergusson. *Medical Times and Gazette*, 1864, p. 241	13	F.	1
Chiver. *Boston Med. and Surg.*, viii	11	M.	7
Thorndike. *Boston Med. and Surg.*, viii	10	F.	8
Thorndike. *Boston Med. and Surg.*, viii	40	M.	7 |

Case	Age	Sex	Region
Thorndike. *Boston Med. and Surg.*, viii	17	M.	$\overline{\lvert 7 \text{ or } 8}$
Stocks. *Brit. Med. Journ.* 1875, p. 43	18	F.	$\underline{3 \rvert}$
Jackson. *Brit. Med. Journ.*, 1877, p. 479	4	M.	$\underline{3 \rvert}$
Barnet	32	M.	$\overline{\lvert 8}$
Tomes and Nowell. *Dental Surgery*, 1906, p. 729	16	F.	$\overline{7}$
Andrew. *Glasgow Med. Journ.*, 1898, p. 127	11	F.	$\overline{\lvert 3}$
Lucas. *Birmingham Med. Review*, 1896, p. 173	21	M.	$\underline{\lvert 8}$
Jay. *Med. News, Philad.* ..	46	M.	$\underline{1 \rvert}$
Dolamore. *Brit. Dent. Journ.*, 1906	—	M.	Upper incisor.
Harris. *Brit. Dent. Journ.*, 1906	18	M.	? Supernumerary incisor.
Dolamore. *Brit. Dent. Journ.*, 1906	8	F.	$\overline{\lvert 4}$
Forget. *Dent. Review*, 1860 ..	30	F.	$\overline{8}$
Forget. *Dent. Review*, 1860 ..	9½	M.	$\overline{\lvert 5}$
American Dental Journal ..	18	F.	$\underline{\lvert 1 \text{ and } 2}$
Barlow	21	F.	$\overline{3 \rvert}$
Bingham	13	F.	$\overline{3}$
Cartwright. *Brit. Med. Journ.*, and *Cosmos*, xviii, p. 507	—	—	$\overline{\text{Supernumerary} \rvert}$
Ward Cousins. *Brit. Med. Journ.*, 1887, p. 295	2	—	Supplemental $\underline{\lvert c}$?
James, W. W. *Proc. Roy. Soc. Med.*, 1911.	20	M.	$\underline{3 \rvert}$
Fairbank, H. A. T. *Proc. Roy. Soc. Med.*, 1911, iv (Odonto. Sect.), p. 14	6	—	$\underline{\lvert 2}$
Royal College of Surgeons, 2197	Pig	—	$\overline{1 \rvert}$
Royal College of Surgeons, 2197	Pig	—	$\overline{\lvert 1}$
Royal College of Surgeons, 2197Aa	Sheep	—	$\overline{\lvert 1}$
Royal College of Surgeons, 2197Aa	Sheep	—	$\overline{1 \rvert}$

CATALOGUE OF SPECIMENS SHOWN IN THE MUSEUM.

Lent by the ROYAL DENTAL HOSPITAL.

40. Wax cast of dentigerous cyst. 2229

Lent by ROYAL COLLEGE OF SURGEONS, ENGLAND.

41. A dentigerous cyst formed around the retained first incisor in the lower jaw of a pig. An incisor tooth is wanting externally on each side. On the right side the crown of one of the retained teeth is firmly fixed in the bony wall of a cyst, which has a membranous lining, and was filled with caseous pus and fragments of food. The latter had obtained an entrance by an opening in the alveolar process situated near the middle line. A cyst on the left side is partially laid open, and its contents, similar to those which filled the right cyst, are exposed to view. 2197

(Purchased.) 1872.

42. The anterior part of the lower jaw of a sheep. On either side there is a dentigerous cyst which has widely expanded the bone and presents a separable wall of fibrous tissue lined with a stratified squamous-celled epithelium. Adherent to the inner side of each cyst is a tooth, which, judging from its size and form, is probably a permanent incisor. Neither tooth is implanted in the bone, but each is firmly attached by one of its flat surfaces to the cyst wall on that aspect of the latter which is nearest to the middle line. The larger cyst contained a thin pus from which *Staphylococcus pyogenes albus* and a bacillus (not identified) were isolated. 2197Aa

(Presented by A. G. R. Foulerton, 1901.)

43. The left side of the body of a lower jaw expanded into a large cyst to the inner wall of which a retained canine tooth is attached. The cyst was lined with a thick vascular membrane, composed of granulation and fibrous tissues and showing no trace of epithelium. (*Plate VII, fig.* 11.) 2195

DENTIGEROUS CYSTS.

FIG. 11.—The left half of a mandible distended by a dentigerous cyst. The canine tooth with which the cyst was associated is seen within the macerated specimen. Specimen 2195, Royal College of Surgeons Museum. From "The Science and Practice of Dental Surgery," edited by Norman Bennett. (See p. 42.)

PLATE VIII.

DENTIGEROUS CYSTS.

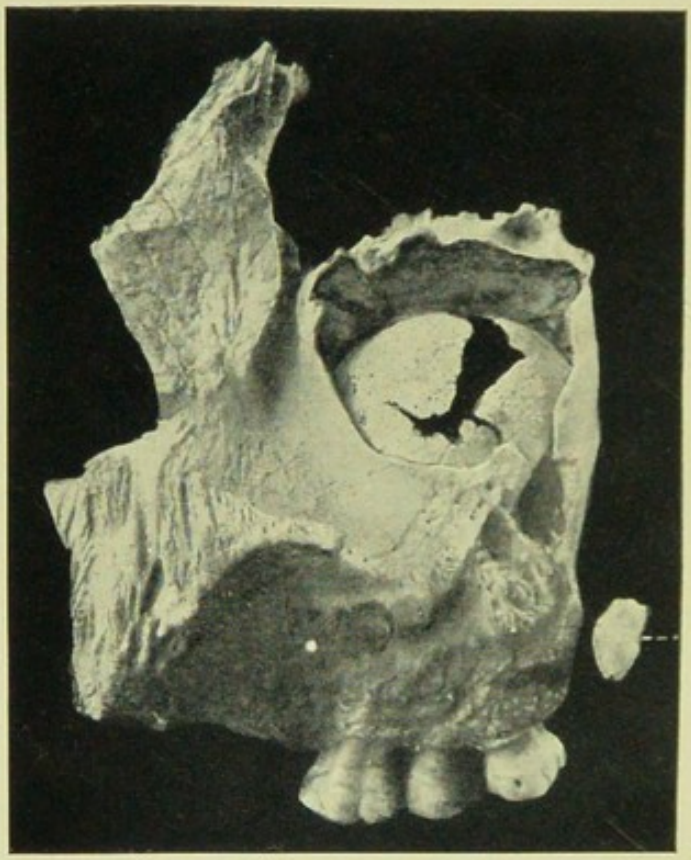

FIG. 12.—The right maxilla, showing a calcified cyst wall occupying the maxillary sinus. The tooth seen at the side of the specimen is described by Christopher Heath as a supernumerary, and as being found within the cyst. (Heath, "Diseases and Injuries of the Jaws." Fourth edition, p. 188.) Specimen 2197F, Royal College of Surgeons Museum. From "The Science and Practice of Dental Surgery," edited by Norman Bennett. (See p. 43.)

From a girl, aged 13. It had been observed for six months before operation. There was some enlargement of the right side and the teeth were very irregular. No opening in the cyst could be detected although there was a constant offensive discharge from its surface. The disease being taken for a solid tumour the affected half of the jaw was excised by the late Mr. Fearn, of Derby. The patient recovered. (See *Brit. Med. Journ.*, 1864, ii, p. 241, and Heath, "Injuries and Diseases of Jaw," 1872, 2nd edition, p. 165.)

(Presented by Christopher Heath, 1868.)

44. The half of a dentigerous cyst about an inch in its largest diameter removed from the lower jaw. It was filled with an albuminous fluid and contains a well-formed bicuspid tooth. The lining of the cyst consists of a thick layer of fibrous tissue with granulation tissue on its inner surface. No epithelial lining could be found. (*Plate IX, fig.* 13.) 2196

Five months before the operation the patient, a boy, aged 14, received a blow on right side of lower jaw, the gum bled profusely, and the jaw from that time gradually swelled. The tumour was considered at first to be an exostosis. The patient recovered. (Presented by Thomas Wormald, 1850.)

(This case was recorded in the *Lancet*, 1850, i, p. 756.)

45. A right superior maxilla, showing the calcified wall of a cyst which in great part fills the antrum. The antral cavity does not appear dilated, except, perhaps, to a slight extent posteriorly. The cyst walls are continuous with those of the antrum below and on the outer side, but above are separated by a considerable interval from the roof of the cavity. They are exceedingly delicate, and perforated by minute apertures. The alveolus of the second premolar opens into the floor of the cyst. The origin of the cyst is uncertain; perhaps it was inflammatory, and connected with the fang of the second premolar. (*Plate VIII, fig.* 12.) 2197F

(Presented by Mr. Samuel Cartwright, 1888.)

Lent by St. Thomas's Hospital.

46. Dentigerous cyst. Mus. Cat. No. 2563a.

From Royal Free Hospital Museum.

Lent by Mr. E. W. Roughton.

47. Dentigerous cyst from mandible of boy, aged 11, the cyst containing a second molar. Mus. Cat. No. 182.

Lent by Guy's Hospital Museum.

48. Tooth removed from cyst in the upper jaw of a child aged 6½, also a piece of the antrum covering the cyst. Mr. Bryant, July 14, 1868. 1087[19]

49. Cystic tumour of the mandible with inverted wisdom tooth. 1091

Lent by St. Bartholomew's Hospital.

50. Portion of a bony cyst which was removed from the external and lateral part of a lower jaw. The cyst is lined by a thick and soft membrane which has been in part separated from it. The cavity of the cyst was filled by a glairy fluid, and at the bottom of it a canine tooth of the second set was adherent to the lining membrane. Upon the exterior of the cyst are some branches of the facial nerve which were removed with it. At the bottom of the bottle is the tooth which was contained in the cyst. I. 119. 539

51. A dentigerous cyst. A part only of the cyst wall has been preserved; but attached to its inner surface may be seen a permanent central incisor. A portion of the bone and of the cyst wall attached to it is suspended in the upper part of the bottle. 1884. 539A.

From a boy, aged 8.

52. Part of a bony cyst formed by expansion of the walls of the lower jaw of a sheep. The cyst was full of fluid, and an incisor tooth is loosely attached to its walls. I. 119A. 540

53. A cyst removed by operation from the right inferior maxilla of a boy, aged 11. The cyst contained a molar tooth, suspended in the bottle above the cyst. The latter contained also a papillary growth. The tooth was attached to the cyst wall by its smooth fangless base; its crown is well developed. Microscopically the papillary growth consists of a short connective tissue, in part myxomatous, lined by atypical stratified columnar epithelium. In parts the growth resembles in structure the multilocular cystic tumours of the lower jaw. (*Plate IX, fig.* 14.) 540a

DENTIGEROUS CYSTS.

FIG. 13.—Section of a dentigerous cyst, showing a thick capsule. The attachment of the capsule to the neck of the tooth is clearly shown. Specimen 2196, Royal College of Surgeons Museum. (See p. 43.)

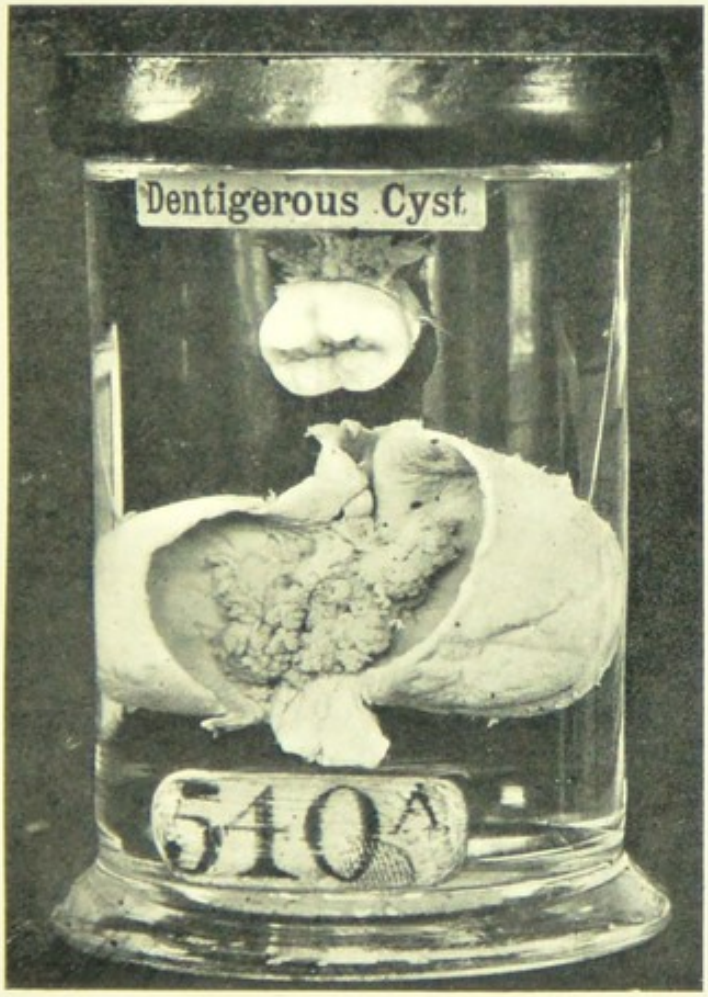

FIG. 14.—Dentigerous cyst which contained the molar suspended above. The cyst lining shows a papilliferous growth. Specimen 540A, St. Bartholomew's Museum. (See pp. 43 and 44.)

PLATE X.

DENTIGEROUS CYSTS.

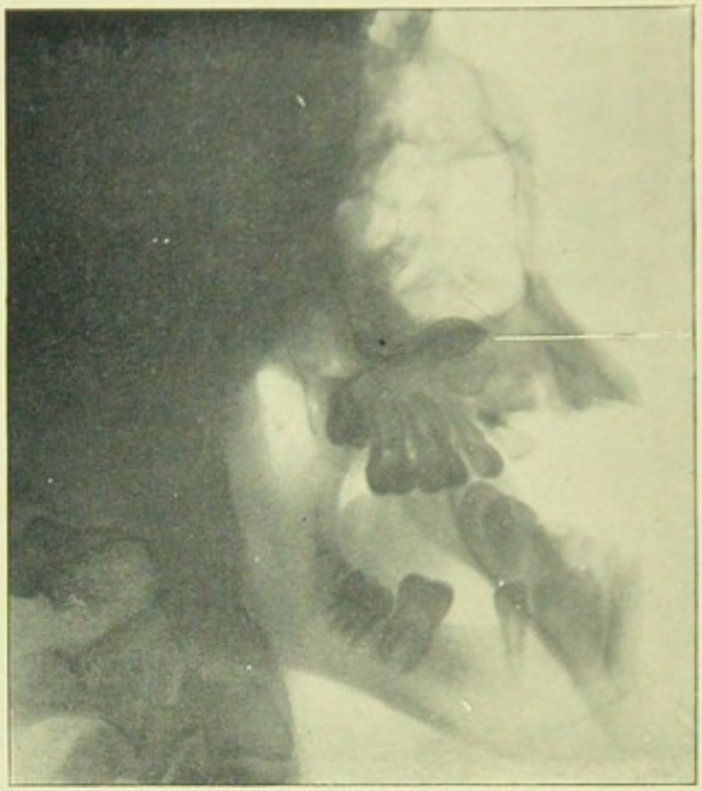

FIG. 15.—Radiograph of dentigerous cyst. C indicates the canine associated with the cyst, the cavity of which is seen above the tooth. From paper by W. W. James. (See p. 46.)

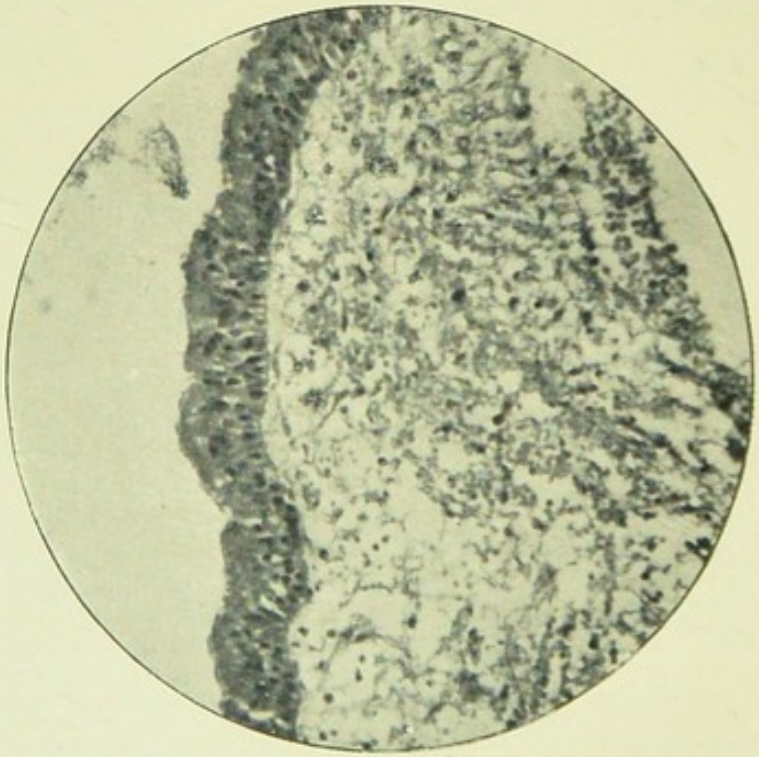

FIG. 16.—Microscopical section of cyst wall from dentigerous cyst. From paper referred to above.

Clinical History.—The growth had been noticed two months before the operation. It extended from the second molar tooth to within $\frac{1}{2}$ in. of the angle of the jaw, and extended by the ramus to within $\frac{3}{4}$ in. of the zygoma. The cyst was very dense and crepitant to touch anteriorly. The teeth were good and healthy.

At the operation it was found that the cyst lay in the substance of the jaw, expanding the latter, which formed a thin shell of bone on the outside, while the inner wall of the cyst was covered by buccal mucous membrane. The cyst shelled out easily, leaving a smooth cavity.

See *Histological Records*, i, 540a.

Presented by Stephen Paget, Esq., F.R.C.S.

54. Two microscopical slides of above.

Lent by the Middlesex Hospital Museum.

55. Dentigerous cyst connected with a left mandibular molar, showing the cyst wall and tooth *in situ*.

Lent by Mr. William Hern.

56. A series of four models, illustrating a case of multiple dentigerous cysts. Three cysts occurred, two in the maxilla and one in the mandible. Model (1) of the maxilla shows the cavities of the cysts in which are seen the teeth causing the trouble; the lateral on the right side and a supernumerary on the left. The cysts were opened and explored, February, 1893. The right lateral was removed in 1895, on account of its faulty position; Mr. Hern had hoped it might possibly erupt. (*Trans. Odonto. Soc.*, xxvi, p. 91.)

Lent by the University of Birmingham.

57. Specimen of dentigerous cyst containing a premolar.

Lent by Guy's Hospital Museum (Dental Section).

58. Model of a dentigerous cyst formed around a third left mandibular molar. Operation performed by Sir Henry Howse.

Patient, man, aged 25. (F. Newland-Pedley.)

59. A canine tooth and skiagram from a case of dentigerous cyst. Female, aged 19.

Patient had noticed swelling of the mandible for two years. Suppuration ensued, leaving a sinus between the left lateral and the premolar teeth. (E. B. Dowsett.)

60. Model and teeth from case of dentigerous cyst connected with the lower left first premolar.

Patient was a girl, aged 14. Both the premolars were removed on that side of the jaw, and the first shows the follicle adherent. (Mr. J. E. Spiller.)

61. Models of case of dentigerous cyst. (Sir H. Howse.)

Patient, a boy, aged 9, having a dentigerous cyst connected with the upper left central incisor. The swelling was incised and the fluid evacuated, but the tooth was not removed until five years later.

Lent by Odontological Society of Great Britain.

62. Wax model of dentigerous cyst from the mandible; the canine lies horizontally in the floor of the cyst. (H. T. Kirby.) 421

Lent by Mr. A. Hopewell-Smith.

63. Microscopical section of the wall of a dentigerous cyst.

64. A dentigerous cyst from a girl, aged 17. All the teeth were present except the left maxillary canine. A large fluctuating swelling was present, bulging in the palate and above the teeth in the sulcus on the left side. Removed by Mr. J. Bland-Sutton.

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Bolles, W. P. "Dentigerous Cysts," *Missouri Dental Journal*, 1871.

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James, W. W. "A Dentigerous Cyst with Cellular Contents," *Proc. Roy. Soc. Med.* (Odonto. Sect.), May, 1911, iv, p. 85. (*Plates X and XI, figs.* 15, 16, 17, *and* 18.)

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Wedl. "Pathologie der Zähne," 1870.

DENTIGEROUS CYSTS.

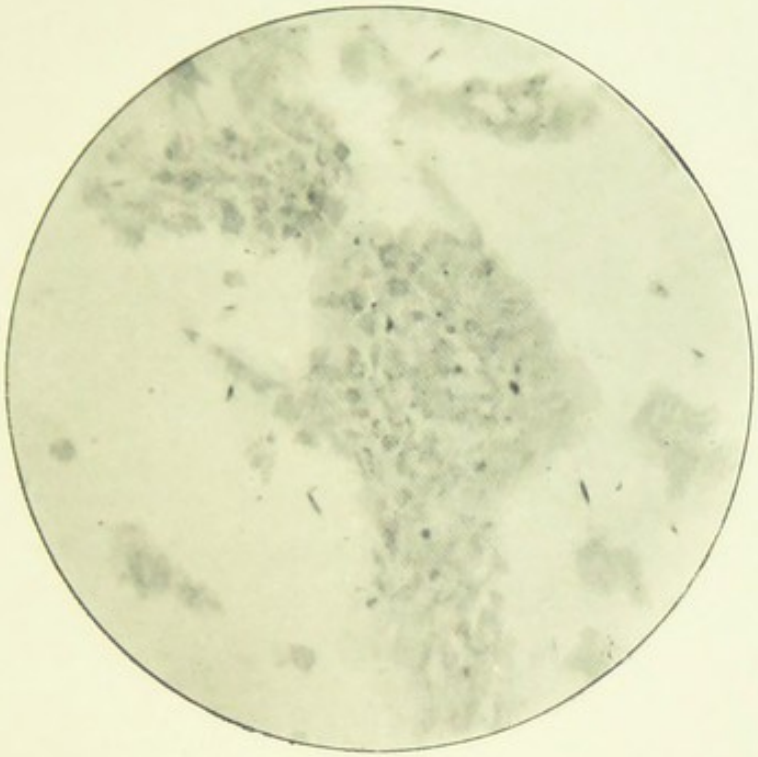

FIG. 17.—Microscopical preparation, showing cells contained in cystic fluid. Low magnification. From paper by W. W. James. (See p. 46.)

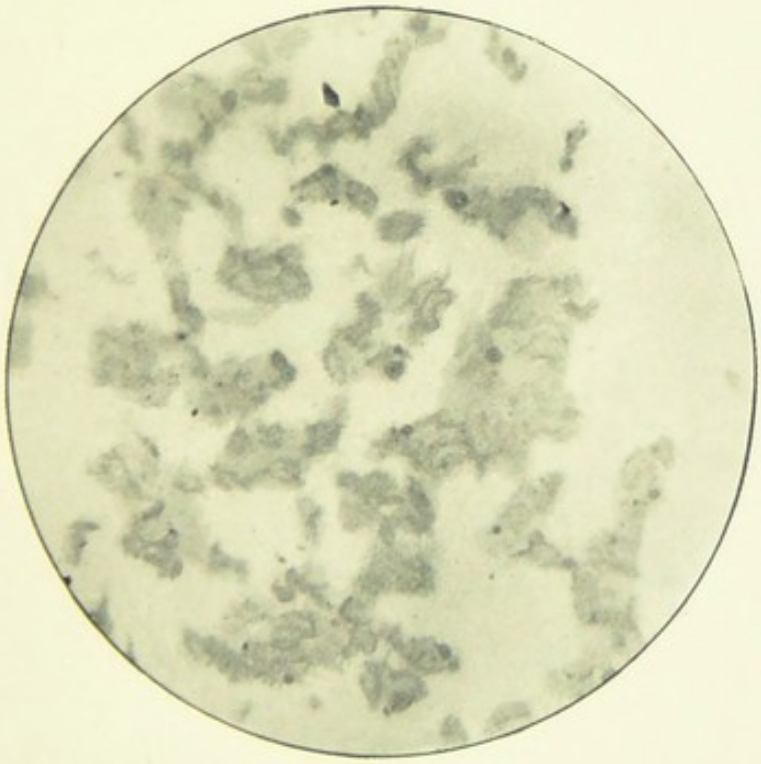

FIG. 18.—Higher magnification of cells, from the same specimen as above. The cell nuclei can be seen distinctly.

DENTAL CYSTS.

DENTAL CYSTS.

DENTAL cysts are innocent simple cystic tumours arising, as the result of irritation, from the dental epithelium about the root of a tooth which has undergone eruption.

Groups of epithelial cells, paradental epithelial remnants or glands of Serres, are often to be found round about the roots of the teeth, and are probably persistent portions of the enamel organ or the tooth-band. As the result of irritation these cells multiply and displace the neighbouring tissues; by far the commonest source of irritation is an infected root. The epithelial cells proliferate, whilst those in the interior of the mass degenerate, losing their outline and their nuclei, and finally become fluid. Epithelial root tumour is the name which has been given to the tumour before it becomes cystic.

With expansion of the cyst two processes occur in the surrounding tissues; one, formation of an adventitious capsule; the other, progressive absorption. A dental cyst may be of any size (from a few micro-millimetres to 6 in. in diameter). The walls are composed of one or more layers of epithelial cells, lining the adventitious capsule. The contents, according to the analysis given by Mr. J. G. Turner, consisted of serum-albumin, serum-globulin, water, and cholesterin crystals, and cells in various stages of degeneration.

No definite cause for the formation of these odontomes is known, but their origin is supposed to be due to the

toxic products of an infected root stimulating the paradental epithelial remnants to proliferate. The central degeneration is attributed to a lack of blood supply within the tumour, and to the nature of the cells.

Dental cysts so far have only been recorded in human beings, and are of common occurrence. They occur equally in either sex and either jaw. They have only been recorded in connection with the permanent set of teeth. They have been recorded as occurring at all ages between nine and fifty-six years, and do not favour any particular period. Several cysts may occur in the same patient simultaneously, but usually only one is present.

Dental cysts do not cause any pain, and the patient only recognizes a slowly increasing swelling. The rate of growth varies, a swelling the size of a walnut having been recognized by the patient, for three months in one case, for seven years in another.

On inspection the tumour presents a regular rounded outline, no other alteration from the normal appearance of the tissue is observable, except perhaps for the presence of an infected root and that in the case of large cysts the colour may be darker. On palpation no alteration in temperature is noticeable, nor is there tenderness. In the early stages the swelling feels hard, bony, and is clearly defined. A little later the bony wall is thin and elastic enough to bend under digital pressure. Later still fluctuation can be obtained.

In the maxilla the cyst often projects into the bony cavity of the antrum of Highmore, displacing the mucous membrane in front of it.

Dental cysts are apt to become inflamed and to suppurate, especially when large or near the surface. After discharging, the cyst may reform, or a sinus result.

Dental cysts may be confused at an early stage with

exostoses of the jaws, but may be recognized by the usual presence of a septic root, by being single, and by not being nodular. In the later stages they simulate dentigerous cysts or multilocular cystic tumours, but in both these conditions a tooth is usually missing from the series. From an abscess, cysts are diagnosed by the absence of inflammation, but a cyst may become inflamed, when the diagnosis depends chiefly on the globular outline, the presence of an appreciable cavity, the long history, and the histological characters of the lining membrane. From a myeloid sarcoma which has not perforated the mucous membrane it may be distinguished by its truly globular outline.

To prevent the formation of dental cysts, septic roots should be promptly treated. Dental cysts should be excised, whole if possible; all the epithelial lining must be removed or destroyed.

In 1816, Delpech ascribed dental cysts to a development of the dental pulp, or its vasculo-nervous supply.

In 1840, Forget attributed dental cysts to pathological conditions of the teeth.

In 1853, J. A. Giraldes described what appear to be dental cysts as "dilatation of the whole of the mucous glands of the antrum."

In 1860-73, Magitôt described many dental cysts, under the name of "Periosteal cysts," as a secretion of fluid between the root of a tooth and the periosteum, whilst the pulp cavity is blocked.

In 1885, Malassez demonstrated the presence of paradental epithelium remnants, and attributed to them the origin of dental cysts, and described the growth of these tumours.

CATALOGUE OF SPECIMENS SHOWN IN THE MUSEUM.

Lent by ROYAL DENTAL HOSPITAL.

65. A dental cyst removed by Andrew Clark, Esq. (J. G. Turner.) 7341

66. A dental cyst connected with an upper molar. (A. Hopewell-Smith.)

67. Two dental cysts. (J. G. Turner.)

68. Microscopical section of the wall of a dental cyst. (J. G. Turner.) 92

Lent by ST. THOMAS'S HOSPITAL.

69. Cyst in jaw of sheep. 2563

Lent by MIDDLESEX HOSPITAL.

70. Cyst attached to a mandibular molar.

Lent by GUY'S HOSPITAL MUSEUM.

71. Cystiform expansion of bone of upper jaw. (Mr. Key.) 1087

Lent by GUY'S HOSPITAL MUSEUM (Dental Section).

72. Model of a maxilla showing a swelling on the outer side of the left alveolus from a patient aged 45. The tumour increased gradually and was feared to be malignant. On incision through the mouth semi-solid cystic fluid was evacuated, and the cyst was found to be connected with the left lateral incisor. (F. Newland-Pedley.) 9s

73. Model of a maxilla showing a dental cyst connected with the first left maxillary premolar. The tooth was removed and the cyst dissected out by Mr. Symonds. 323s

74. Model showing a dental cyst situated in the right side of the mandible, connected with the roots of the first molar.

75. Model of maxilla from a patient with a swelling, caused by a dental cyst connected with the second left maxillary premolar.

76. Mandibular cyst situated between the first premolar and the third molar of the left side.

DENTAL CYSTS.

FIG. 19.—A dental cyst *in situ*, from a case of Mr. James. Tooth and cyst removed by Mr. R. H. Heath. From "The Science and Practice of Dental Surgery," edited by Norman Bennett. (See p. 54.)

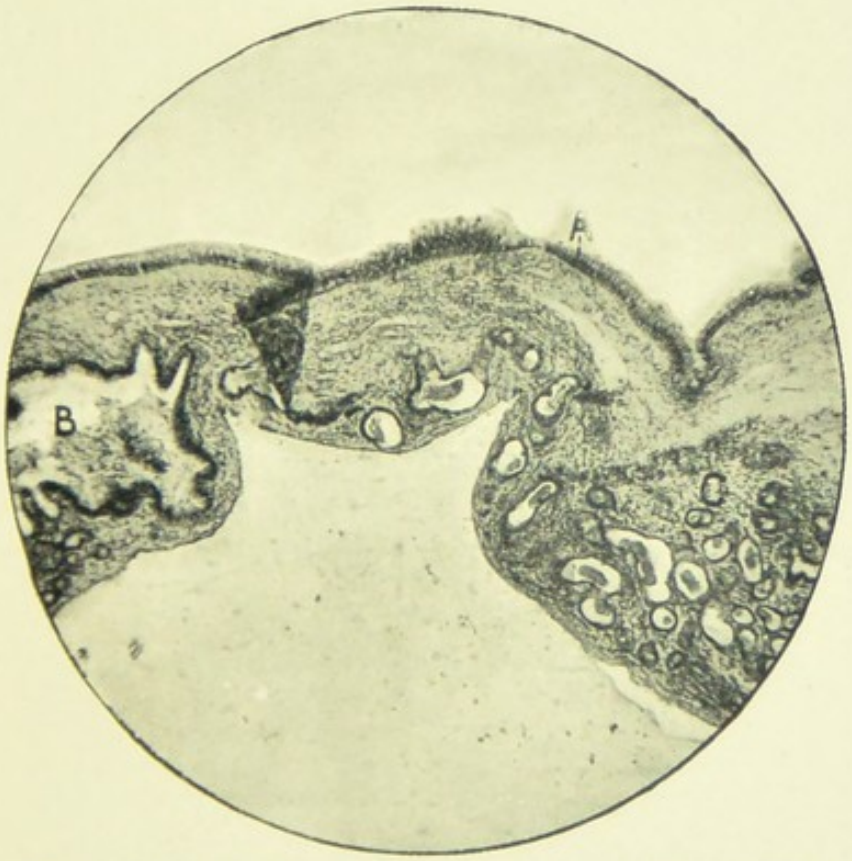

FIG. 20.—Section of wall of dental cyst. × 43. B, large irregular acinus; C, smaller acini and tubules. From Paper by J. G. Turner, *Brit. Dent. Journ.*, 1898. (See p. 54.)

PLATE XIII.

DENTAL CYSTS.

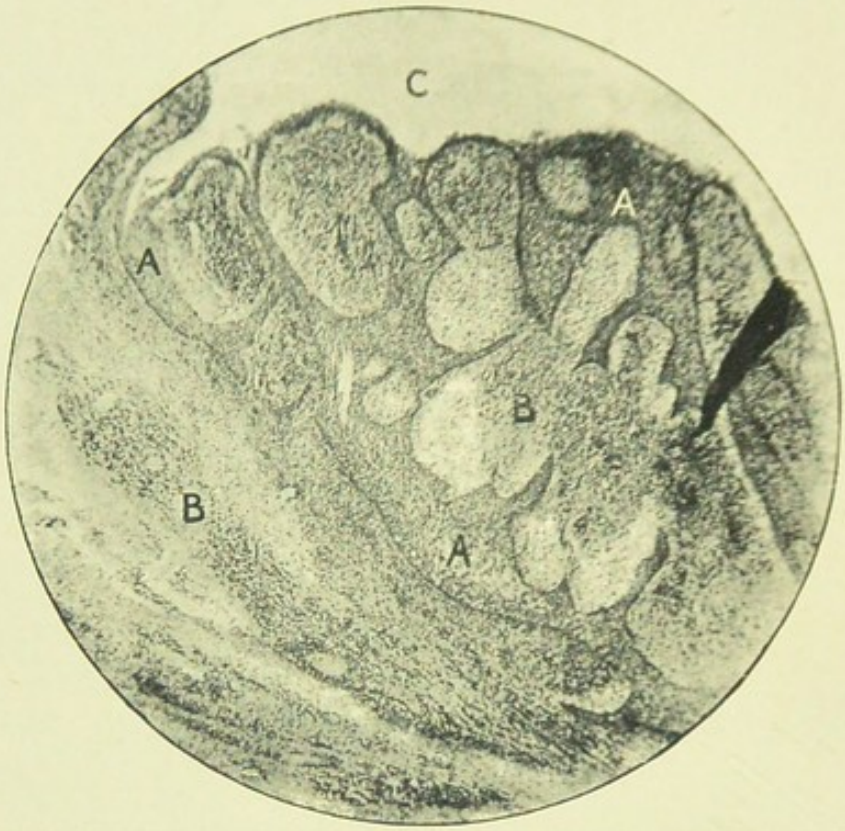

FIG. 21.—Section of part of an epithelial root tumour. × 30. A, trabeculæ of epithelial reticulum, central cells d-generating; B, mesoblastic tissue; C is placed in central cleft. From Paper by J. G. Turner, *Brit. Dent. Journ.*, 1898.

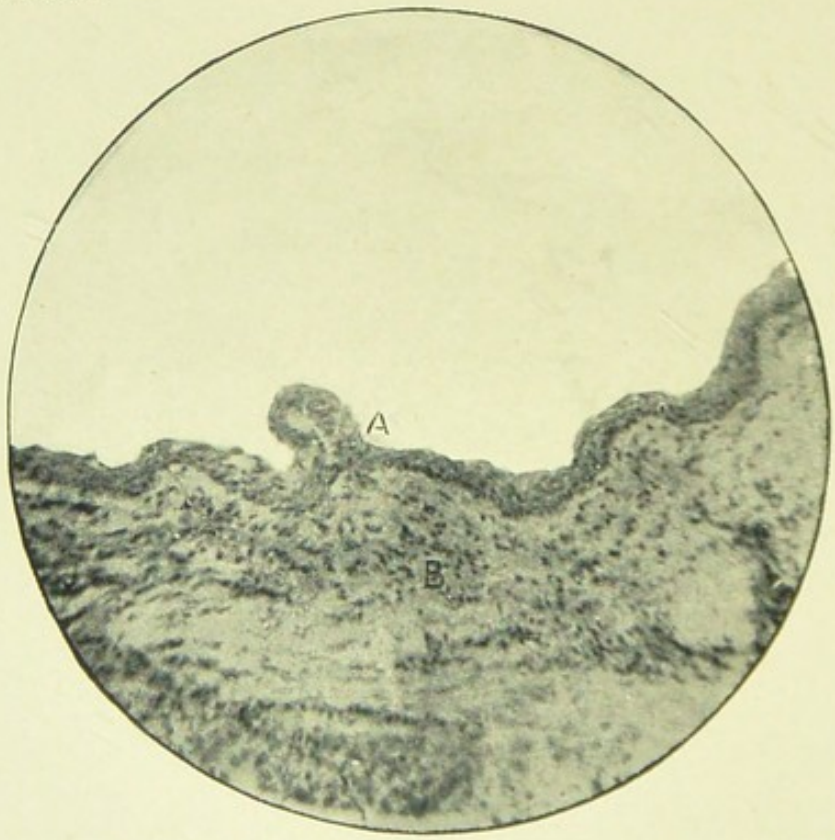

FIG. 22.—Section of wall of large dental cyst. × 110. A, thin regular lining of epithelium; B, connective tissue capsule. From Paper by J. G. Turner, *Brit. Dent. Journ.*, 1898.

Lent by National Dental Hospital.

77. Dental cyst connected with maxillary premolar.

78. Dental cyst connected with maxillary premolar.

Lent by St. George's Hospital.

79. Skull showing a large cyst connected with the mandible on the right side.

The patient, a woman, aged 45. There was a history of eighteen years. No pain, growth was gradual, but the last six months more rapid, for it was then the size of a hen's egg. The cyst was divided by septa and contained 4 ounces of a transparent gelatinous fluid. There were spots resembling secondary deposits in the lungs. (Catalogue, No. 392, p. 112.)

Lent by Guy's Hospital Museum (Dental Section).

80. A dental cyst, removed from left maxilla of a woman, and microscopical section, showing the cyst wall in the process of breaking down. (J. Lewin Payne.)

Lent by Royal College of Surgeons, England.

81. Three specimens of decayed teeth with cysts attached to their roots. Two of the cysts are small, one being remarkable for the length of its pedicle. The third is rather more than half an inch in diameter, and was partly torn across in extraction. The contents of the cysts were found, on microscopic examination, to consist of degeneration pus; their walls were formed of fibrous and granulation tissue, and they had no epithelial lining. (See Heath, "On Diseases and Injuries of the Jaw," 2nd Edition, pp. 160, 161, and *Brit. Med. Journ.*, 1883, i, p. 5). 2161

(Presented by Mr. Christopher Heath, 1868.)

82. A slice of a dense spheroidal formation of fibrous tissue about 4 inches in chief diameter, from the maxillary sinus of a horse. In its centre there is a cavity about 1¼ inches in diameter, which was filled with a soft, cheese-like material, in which microscopic examination showed an abundant growth of streptothrix, the species of which did not admit of determination. The formation arose, probably, in a suppurating cyst connected with the fang of a carious tooth, the contents of the cyst becoming infected from the mouth. 2197G

Trans. Path. Soc., li, p. 51. (Presented by Mr. J. Bland-Sutton, 1900.)

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DENTAL CYSTS.

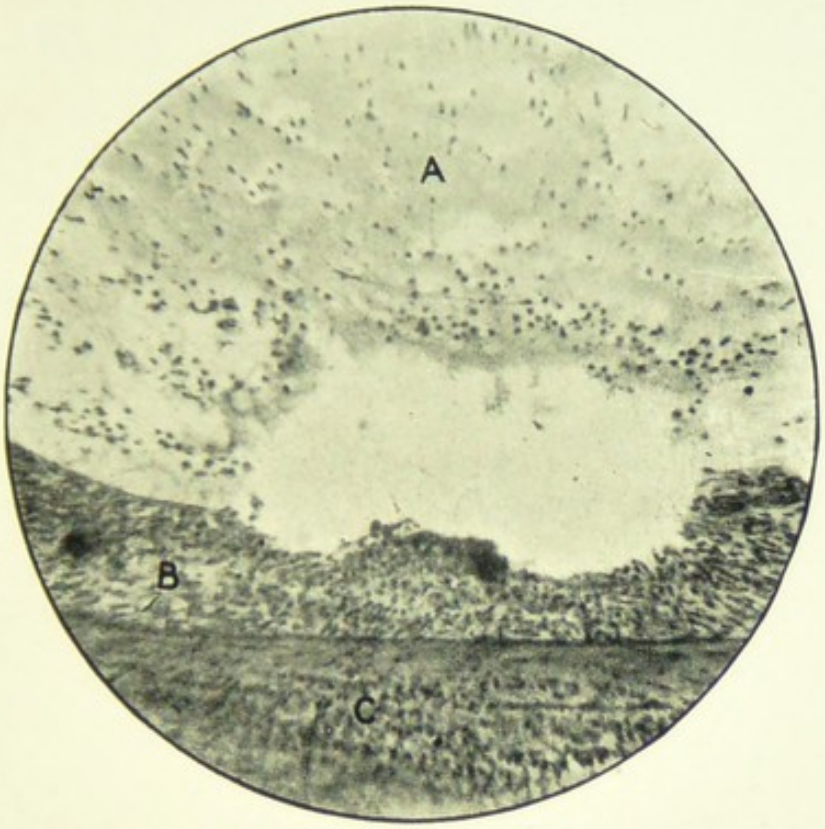

FIG. 23.—Portion of a small cyst. × 100. A, semi-solid contents showing nuclei and indistinct outline of cells; B, epithelial cells degenerating to form A; C, connective tissue capsule. From Paper by J. G. Turner, *Brit. Dent. Journ.*, 1898.

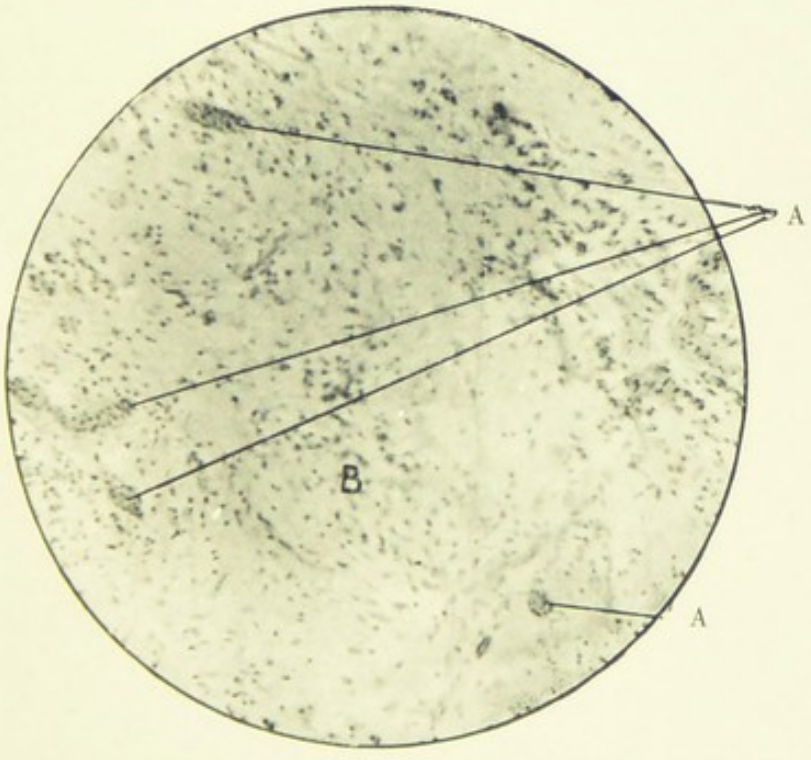

FIG. 24.—Section of thickened alveolar dental ligament from near apex of tooth. × 100. A, masses and cylinders of epithelium; B, inflammatory tissue. From Paper by J. G. Turner, *Brit. Dent. Journ.*, 1898.

COMPOSITE ODONTOMES.

1.—COMPLEX COMPOSITE ODONTOMES.

2.—COMPOUND COMPOSITE ODONTOMES.

3.—GEMINATED COMPOSITE ODONTOMES.

4.—GESTANT COMPOSITE ODONTOMES.

5.—ENAMEL NODULES.

6.—DILATED COMPOSITE ODONTOMES.

COMPOSITE ODONTOMES.

GENERAL DESCRIPTION OF COMPOSITE ODONTOMES.

Composite odontomes are calcified tooth tumours, consisting of a disordered conglomeration of enamel, dentine, and cementum.

This group includes all the calcified odontomes with the exception of cementomes. They originate by perversion in growth of a part or the whole of a tooth germ or germs, the aberration occurring prior to calcification of the affected part. Both the enamel organ and the dentine papilla are involved during the process of development, and abnormality of all the dental tissues may result. Some composite odontomes originate after the commencement of calcification, when one portion of the tumour will bear a resemblance to part of a normal tooth; some involve the whole tooth germ, whilst in others two or more tooth germs are implicated.

The arrangement of the dental structures shows a change from the normal in the relative positions of the tissues. Dentine and enamel are irregularly distributed, and cementum is often entirely absent. Enamel, if present, may be arranged as upon a normal tooth, or may be irregularly distributed. From the nature of its development the enamel must be regarded as superficial to the dentine even where the enamel organ has been so folded as to form enamel deeply situated within the mass. In like manner the dentine may be arranged as in a

normal tooth, or the structure may be confused and contain some of the various forms of secondary dentine. Cementum, when present, may be normal in thickness and character, or abundant and irregular. If abundant, it is commonly very vascular, having many lacunæ with few canaliculi.

The nature of the soft tissues surrounding these tumours has been described in one case,* when a capsule of a fibro-cellular structure was present.

The tumours belonging to this group differ greatly. They vary in size from that of a minute tooth to a tumour measuring several inches in diameter. In shape the ordinary outline of the tooth may be followed, but commonly the form is irregular, with little or no resemblance to a tooth. The pulp cavity is often folded. More than one pulp cavity may exist.

It is not easy to recognize the nature of these tumours until the odontome shows itself at the surface of the gum. The trouble may be mistaken for necrosis, or other affection of the jaw. Before undertaking an operation such as excision of the jaw, an exploratory incision should be made to ascertain the true character of the disease. A radiograph should be taken in suspected cases.

These tumours need only be removed when giving rise to symptoms, or on account of their position.

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* *Brit. Dent. Journ.* 1902, p. 546.

COMPLEX COMPOSITE ODONTOMES.

COMPLEX COMPOSITE ODONTOMES.

Complex composite odontomes are those composite odontomes the tissues of which are irregularly intermingled and which have no definite shape.

They usually consist of irregular nodulated masses of dental tissues, varying in size from that of a small nodule, weighing a few grains, to a mass of 10 ounces or more. They bear no external resemblance to a tooth. The surface is seldom uniform in character and may present rough, smooth, porous and deeply pitted areas, while frequently little beads of enamel project from the surface. Dentinal tubes radiate from numerous small canals which contain the pulp tissue, a single pulp chamber being rarely found.

Radial sections of these tumours often show alternate layers of enamel and dentine. These layers appear in the form of finger-like processes which are more or less parallel to one another, or radiate from a central area. In the central area the tissues are irregular and confused. Tangential sections show holes and spaces which are lined by enamel surrounded by dentine. The proportion of enamel as compared with the dentine is relatively greater than normal.

The microscopical character of this group of tumours varies. Many sections show alternate layers of enamel and dentine, in others the structure is more complex, being in parts like plici or folded dentine, whilst elsewhere like osteo-dentine. Here and there spaces exist, some being circular, others quite irregular; most of these

spaces are lined with enamel more or less perfectly calcified, and irregular patches of enamel, usually deeply pigmented, may be also observed scattered about the section. Both vascular canals and interglobular spaces are plentiful. This irregular arrangement may be assigned to the fact that the product of calcification of a pulp is not always fine-tubed dentine; when odontoblasts coat the surface the tissue produced will be fine-tubed dentine, but any other calcification of the dental papilla which takes place will assume the form of a secondary dentine. The loose manner in which the structures are arranged makes the tissue exceedingly friable. Cementum is rarely found, but when present it is irregular, scattered, coarse, and wanting in normal structure. The nature of the soft tissues surrounding calcified odontomes has been investigated in two cases, both of which come into this group. A capsule of fibro-cellular structure was found in each instance.

Complex composite odontomes are usually found in the molar region, whereas it is of interest to note that geminated composite odontomes are more common in the front of the mouth. Of twenty-eight complex composite odontomes of which particulars are stated, twenty-three were found behind the premolar region. Of thirty-nine cases nineteen were in males, twelve in females, and in the remainder the sex was not recorded. The average age was 20, the eldest being 41, and the youngest 5.

During growth these odontomes usually give no sign of any abnormal condition, though they are said to cause sensations of uneasiness, tenderness, and neuralgic pains. Growth may go on for several years before the tumour is recognized, and eventually like teeth may pass through a stage of "eruption." The surface may present mulberry-

like, stalactitic, or cauliflower-like excrescences. When inflammation supervenes, a fœtid discharge from fistulæ may follow, loosening the odontome, which may then drop out. Before removal they are frequently mistaken for sequestra.

SUMMARY OF CASES RECORDED.

Case	Age	Sex	Region	Weight	Measurements
Dolamore. *Brit. Dent. Journ.*, 1902, p. 539	22	M.	$\overline{8 \text{ or } 7}\vert$	24·5 grm.	4·2 × 2 8 × 1·6 cm.
Fothergill	13	F.	$\vert\underline{3}$	—	—
Payne. *Brit. Dent. Journ.*, 1904, p. 401	14	M.	$\vert\overline{7}$	21·5 gr.	15·2 × 10 × 12 mm.
Amoore. *Brit. Dent. Journ.*, 1904, p. 185	21	M.	$\vert\overline{7}$ $\vert\overline{8}$?	— —	2·5 × 10 × 15 mm. Nodule removed two years later.
Jackson. *Trans. Odonto. Soc.*, 1894-95, xxvii, p. 175	19	M.	$\underline{5 \text{ or } 4}\vert$	—	—
Mummery. *Trans. Odonto. Soc.*, 1888-89, xxi, pp. 113 and 146	14	F.	$\vert\underline{7}$	—	$\frac{1}{2}$ in. long.
Jones, L. R. *Manchester Odonto. Soc.*	20	M.	$\underline{876}\vert$	—	—
Richards, F. W. *Trans. Odonto. Soc.*, 1897-98, xxx, p. 75	23	F.	$\vert\overline{7 \text{ and } 8}$	—	1 in. × $\frac{11}{16}$ × $\frac{11}{16}$
Russell Barrett. *Trans. Odonto. Soc.*, 1897-98, xxx, p. 21	23	M.	$\overline{8 \text{ or } 7}\vert$	102½ gr.	$\frac{7}{8}$ × $\frac{3}{4}$ × $\frac{11}{16}$ in.
Jordan Lloyd. *Trans. Odonto. Soc.*, 1887-88, xx, p. 90	21	M.	$\underline{7}\vert$	247 gr.	1⅛ × 1¼ × 1 in.
M. Forget. *Cosmos*, vii, p. 231	5 (20 at opr.)	M.	$\vert\overline{7 \text{ and } 8}$	—	Size of turkey's egg.
Must. *Brit. Journ. of Dent. Sci.*, 1899, p. 155	24	M.	$\overline{7}\vert$	—	1¼ × 1¼ in.
Andrews	17	—	$\underline{7 \text{ or } 6}\vert$	—	1½ × 1¼ in.
Goodwillie (New York)	child (23 at opr.)	F.	$\overline{7, 6 \text{ or } 5}\vert$	—	—
Smale. *Dent. Cosmos*, 1872, xiv, p. 665	14	M.	$\vert\overline{\quad}$	850 gr.	—

Case	Age	Sex	Region	Weight	Measurements
R. Baume. *Missouri Dent. Journ.*, 1874	—	—	molar |	—	—
Heath. *Trans. Clin. Soc.*, xv, p. 10	18	F.	molar |	315 gr.	$1\frac{1}{2} \times 1 \times 1\frac{1}{4}$ in.
Annandale. *Edin. Med. & Surg. Journ.*, 1873	17	F.	| molar	300 gr.	$1\frac{1}{2} \times 1\frac{1}{2}$ in.
Cotterill. *Trans. Odonto. Soc.*, Nov., 1900	9 (21 at opr.)	F.	| 6-8	180 gr.	—
J. Garretson	21	M.	| 4 and 5	—	—
Payne	21	F.	4 and 3 |	—	—
M. Oudet	25	M.	5 and 4 |	—	—
Arkövy	41	M.	8 |	—	2·8 cm. × 2·5 cm.
Glassington. *Trans. Odonto. Soc.*, 1901-02, xxxiv, p. 145	42	F.	| 8	—	—
Oram. *Brit. Dent. Journ.*, 1911, p. 1006. (*Plate XV, figs.* 25, 26, 27, 28)	30	M.	8 |	5·33 grm.	24 × 17 × 24 mm.

Catalogue of Specimens shown in the Museum.

Lent by the Royal College of Surgeons, England.

83. One half of an odontome from the lower jaw. The whole mass measures an inch and a half antero-posteriorly, an inch transversely, and an inch and a quarter from above downwards; it weighed 315 grains. Its surface is roughened by stalactitic excrescences. Its section presents a complicated marbled appearance, due to the admixture of dentine, osteo-dentine, and a small proportion of enamel. The excrescences on the surface, as well as the greater part of the interior, are made up of folds of dentine, which surround flattened pulp-chambers. Enamel is present on some of the excrescences and dips down, following the convolutions of the dentine. The tumour was removed from a young lady, aged 18, who in childhood was rickety. The first teeth came late, and rapidly decayed. Nothing abnormal was noticed about the second dentition. Eight months before the operation pain and uneasiness were experienced; these symptoms led to the extraction of several teeth and subsequently to an effort to remove the supposed encysted tooth, a procedure which set up inflammation and suppuration

COMPLEX COMPOSITE ODONTOMES.

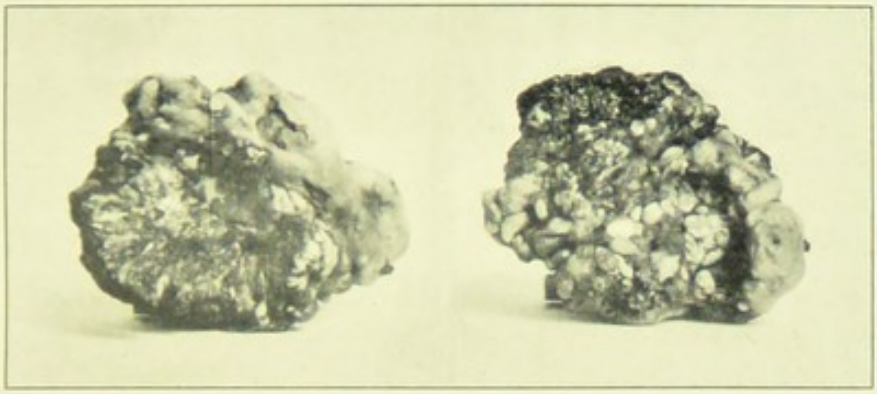

FIG. 25.—Superior surface. FIG. 26.—Inferior surface.

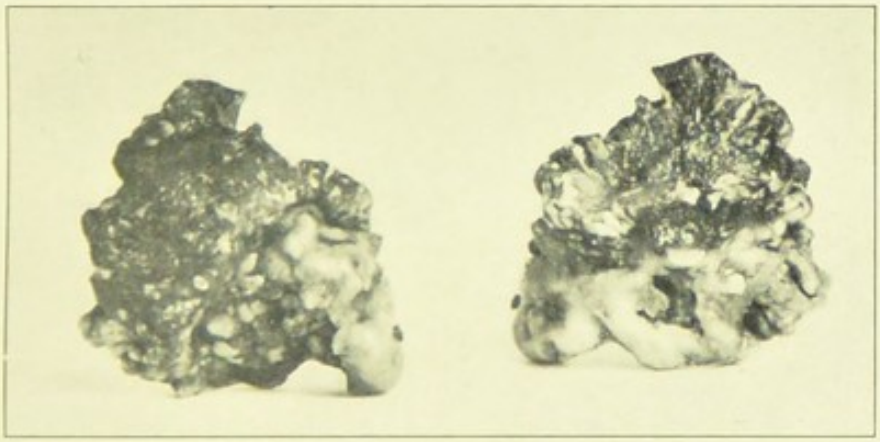

FIG. 27.—Lingual. FIG. 28.—Distal and buccal.

Complex Composite Odontome recorded by C. H. Oram, *Brit. Dent. Journ.*
(See p. 66.)

of the jaw. Ultimately the odontoma became exposed, but until removed it was believed to be a sequestrum. 2172

(See account by donor and Mr. C. S. Tomes, *Trans. Clin. Soc.*, 1882, xv, p. 10, presented by Christopher Heath.)
(See specimen lent by University College Hospital, No. 5,843.)

84. One half of an odontome from the upper jaw. It is irregular in shape, measuring an inch and a quarter in length, and an inch and three-sixteenths in width. When entire it weighed 297 grains. It is composed of an irregular mingling of osteo-dentine, cementum and traces of enamel (composite odontome). Its section has a radiating appearance. 2172A

From a male, aged 21, who presented himself with a hard swelling in the right alveolar process of the upper jaw. Behind the first molar tooth a rough structure projected through the gum, looking like a piece of necrosed bone. A small amount of purulent fœtid matter escaped from around it. The second molar tooth on this side was absent. The tumour was exposed, and removed with an elevator. (See *Lancet*, Jan. 14, 1888, p. 64. Presented by Jordan Lloyd, 1888.)

(See specimen lent by Odontological Society, No. 429.)

85. A composite odontome removed by operation from an upper jaw. It measures 1½ inches in its chief diameter, and its surface is coarsely nodulated. A few deposits of enamel may be recognized on one aspect of the preparation. 2172Aa

From a girl, aged 12. The tumour was deeply buried in the alveolus of the upper jaw in the situation of the molar teeth upon that side. It was first noticed to "erupt" through the gum two months previously, but there was no suppuration around it. No difficulty was experienced in its removal. Stores, 1896

86. A composite odontome, nearly an inch in chief diameter, which was removed by operation from the lower jaw. One portion of the tumour is fairly smooth and rounded, but the chief part is irregularly tuberculated. Weight of odontome 180 grains. 2172Ab

From a girl, aged 9, who presented a swelling on the left side of the lower jaw in the situation of the six-year-old molar. Suppuration occurred, and, by means of a probe, the odontoma was felt and removed under an anæsthetic. (Presented by Mr. C. Vincent Cotterell, 1901, *Trans. Odonto. Soc.*, xxxii, p. 31.)

Lent by University College Hospital.

87. Half a composite odontome, the sawn surface having been polished. "The whole surface of the odontoma is nodulated and roughened by stalactitic excrescences,

and there is at no point any form recalling the character of a tooth-crown. The surface of the section presents a complicated marbled pattern, due to the admixture of several dental tissues." In its largest diameter the tumour measures nearly 4 cm.

5843

Microscopical Structure.—The tumour consists of dentine, osteo-dentine, and enamel.

From a woman, aged 18, who came under the care of Mr. Heath in 1881 on account of a considerable swelling of the right side of the lower jaw, which was believed to be due partly to a central tumour and partly to inflammation resulting from previous treatment. In two months the inflammatory swelling had subsided, but there was still considerable enlargement of the lower jaw, with a sinus opening externally. The tumour could be seen from the mouth, partly covered with granulations, and was at first thought to be a sequestrum. It was removed with an elevator. (Heath, "Injuries and Diseases of the Jaw," 1894, p. 218.)

The other portion of this specimen is in the Royal College of Surgeons' Museum, No. 2,172.

Lent by National Dental Hospital.

88. Cast of composite odontome and model of mandible with tumour *in situ*. The tumour was occupying the position of the right second and third molars.

Presented by Mr. Must.

89. Composite odontome, maintaining in some degree the form of a tooth.

90. Composite odontome. Similar specimen.

Lent by Mr. J. H. Gibbs.

91. Composite odontome in fragments. Model × 10 of original specimen. (*Plate XVI, figs.* 29 *and* 30.)

92. Microscopical section of same. (*Plate XVI, fig.* 31.)

Lent by Mr. A. Hopewell-Smith.

93. A model and specimen.

Patient, male, aged 22. The odontome began to erupt nine years before it was extracted; very little growth for four years. Patient received a blow on the mouth which dislocated left maxillary central incisor and the two right incisors; the odontome then began to erupt slowly, and to travel in a more forward direction. Family history showed no special abnormalities of the teeth.

Lent by Odontological Society of Great Britain.

94. Composite odontome. (C. W. Glassington.) *Trans. Odonto. Soc.*, 1901-02, xxxiv, p. 145. 435

COMPLEX COMPOSITE ODONTOMES.

FIG. 29.

FIG. 30.

Complex composite odontome described by J. H. Gibbs, *Brit. Dent. Journ.*, 1907, p. 348. (See p. 68.)

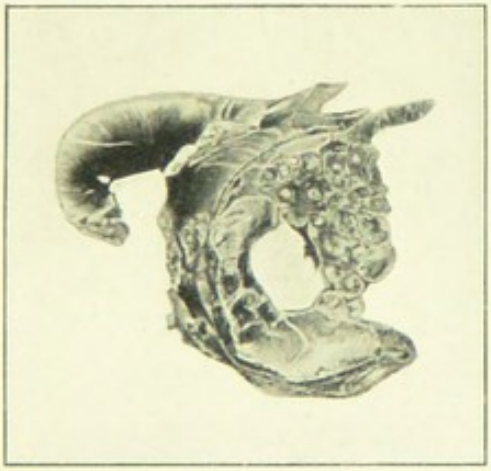

FIG. 31.—Microscopical section of the above magnified 1½ times. (See p. 68.)

PLATE XVII.

COMPLEX COMPOSITE ODONTOMES.

FIG. 32.—Complex composite odontome, described by J. Lewin Payne, *Brit. Dent. Journ.*, 1904, p. 402. (See p. 69.)

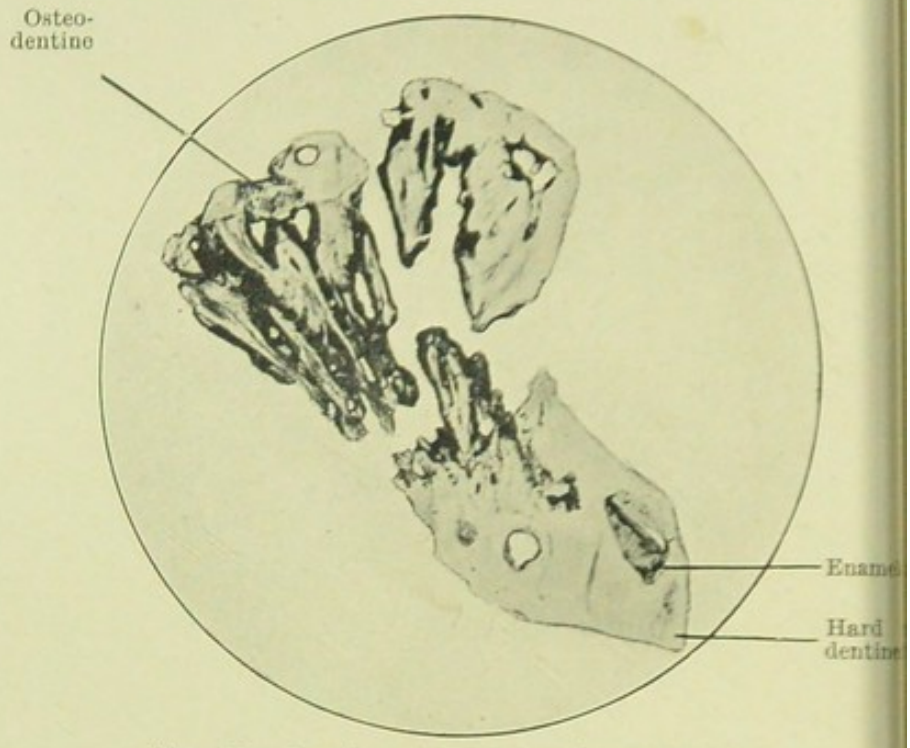

FIG. 33.—Section of specimen shown in fig. 32.

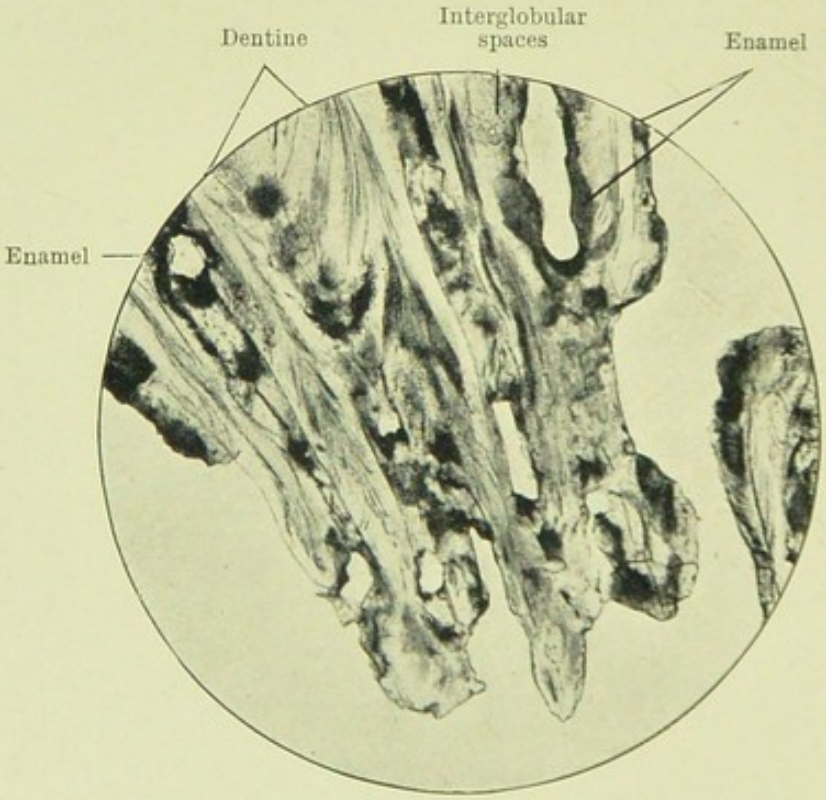

FIG. 34.—Higher magnification of part of section shown above.

95. Radicular odontome occupying the position of the right mandibular lateral incisor. The crown of the tooth is flattened, and the root consists of a smooth bulbous mass. Weight 2·7 grammes. Measurements: antero-posterior 1·2 cm., lateral 1·6 cm., vertical 1·9 cm.

96. Plaster model of an odontome and portion of the odontome (Jordan Lloyd). *Trans. Odonto. Soc.*, 1887-88, xxx, p. 90. 429

Composite odontome, from jaw of labourer, aged 21. It occupied the position of the right second and third maxillary molars; weight 247 grains. One half the specimen was presented to the Royal College of Surgeons' Museum, and the other half to the Odontological Society.

97. A section of enormous odontome removed from the left side of mandible of a Kaffir boy, aged 14 (Morton Smale). *Trans. Odonto. Soc.* 437

(See Royal Dental Hospital Museum, No. 2,394.)

Lent by Guy's Hospital Museum.

98. Composite odontome with microscopical section and micro-photographs. (*Plate XVII, figs.* 32, 33, *and* 34.) 6L

The specimen was found in the mouth of a boy, aged 14, in the position usually taken by the second left mandibular molar. It measures 15·2 mm. in the antero-posterior direction, 10 mm. in the labio-lingual and 12 mm. in the vertical. The upper surface is rough, and pitted with depressions which give it a cauliflower-like appearance; the narrow portion, forming its base, is comparatively smooth and was covered by the gum when in the mouth. Its weight is 21·5 grains.

The microscopical section shows alternate layers of enamel and dentine, which run for the most part in a vertical direction; here and there irregular cavities occur, and these are lined with enamel; interglobular spaces and osteo-dentine are also found in the section, but no trace of cementum has been observed (J. Lewin Payne, *Brit. Dent. Journ.*, June, 1904).

99. Composite odontome removed from the upper incisor region. (Mr. E. B. Dowsett.) 20L

100. A composite odontome connected with an upper central incisor—no history. (Mr. F. W. Tabois). 8L

101. Small composite odontome removed from upper incisor region. 14L

102. This specimen was originally described in the Hospital Reports for 1836 as an exostosis, but Mr. Bland-Sutton, who has had an opportunity of investigating this tumour, has no hesitation in believing that it originated in one or more tooth follicles, and is an odontome. On microscopic examination he states: "Sections show large numbers of lacunæ and canaliculi, arranged in a very regular manner. I could not detect dentine, and it is impossible, without mutilating the specimen, to be sure no teeth are embedded in it." Mr. Bland-Sutton classifies it with the composite odontomes.

Abstract of Account in Guy's Hospital Reports.

A bony tumour spontaneously detached from the orbit. When recent it measured 11 inches in greater circumference, and 9 inches in its less, and weighed nearly 15 ounces. The external surface is nodulated, and the section shows several small cavities. Its density is that of ivory, and when examined by the microscope found to consist of true bone, the lacunæ being large, but canaliculi not so delicately formed as in true bone. The surface shows no point where any attachment had ever been.

History of Case.—Thomas M., aged 36 when the tumour came away. Twenty-three years before a little pimple appeared under his left eye, close to his nose, and since this it gradually increased, until at the expiration of six years the eye became destroyed. It went on increasing for eleven years more, when it became somewhat loose, and at the same time suppuration occurred in the surrounding soft parts.

Operations were recommended but never performed, when, at the end of six years, and twenty-three years from the commencement of the growth, the whole tumour fell from the face.

The patient returned to the hospital in February, 1865, and was in good health. (Mr. Hilton, *Guy's Hospital Reports*, Ser. i, i, p. 495.) 1666[a]

From the Manchester Dental Hospital.
Lent by Mr. W. H. Jones.

103. Photograph of a composite odontome.

Lent by L'École Dentaire, Paris.

104. A composite odontome.

Lent by Mr. W. H. Dolamore.

105. A model of the mandible containing the composite odontome described below. (*Plate XVIII, fig.* 35.)

COMPLEX COMPOSITE ODONTOMES.

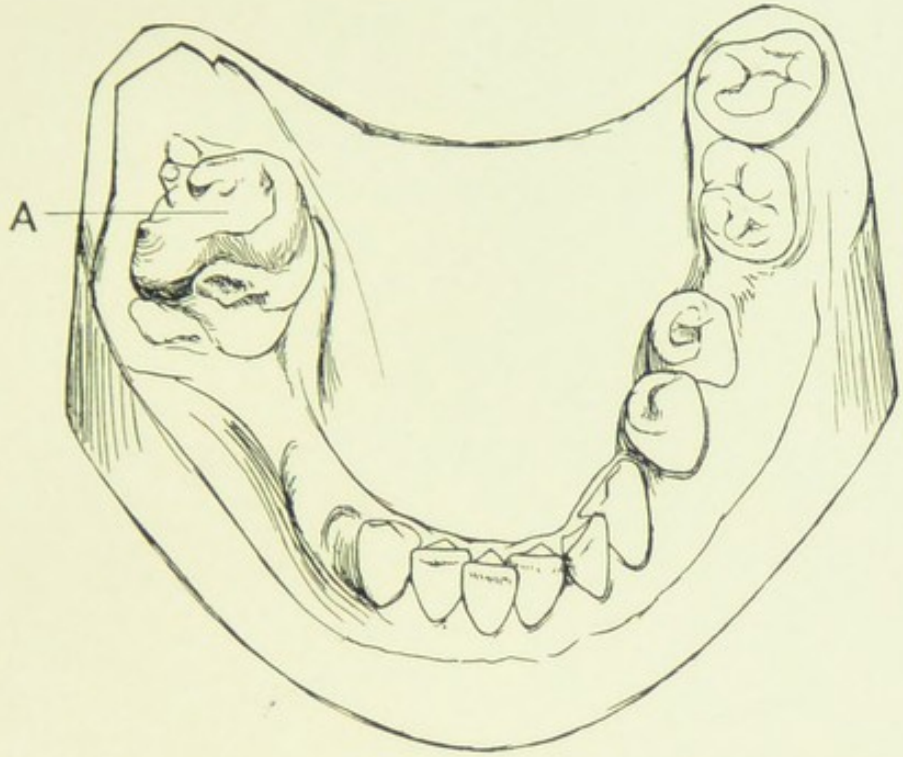

FIG. 35.—Model showing complex composite odontome *in situ*, described by W. H. Dolamore and A. Hopewell-Smith, *Brit. Dent. Journ.*, 1902, p. 539. (See p. 70.)

FIG. 36.—Complex composite odontome, from same case, with portions of the capsule adherent to it and the wisdom tooth placed *in situ*. (See p. 71.)

PLATE XIX.

COMPLEX COMPOSITE ODONTOMES.

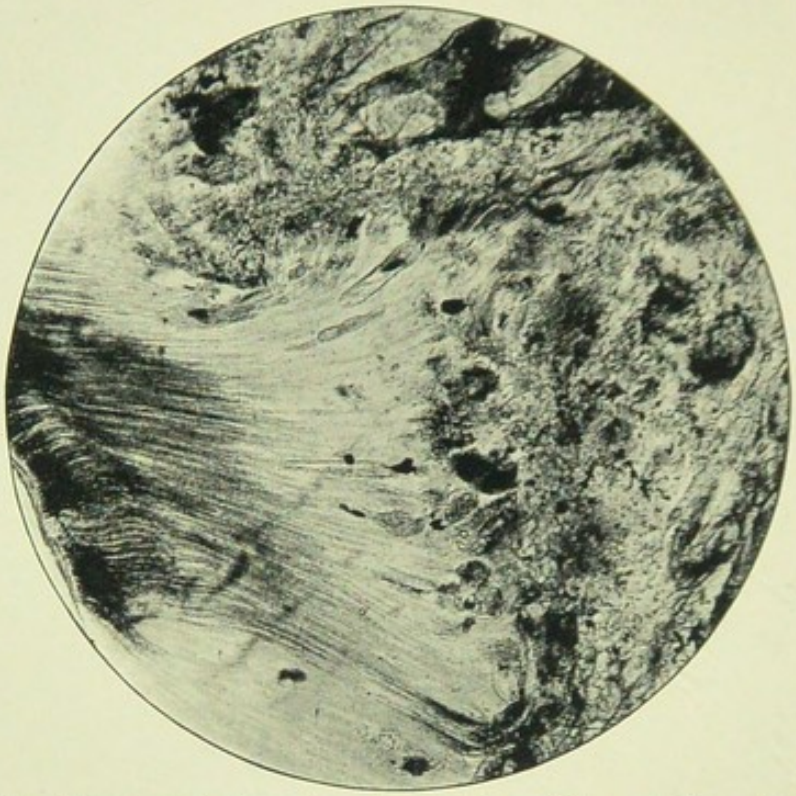

FIG. 37.—Microscopical section of a portion of the periphery of odontome shown in fig. 36. × 5.

FIG. 38.—Same as preceding, cut from another part of the periphery. × 45.

PLATE XX.

COMPLEX COMPOSITE ODONTOMES.

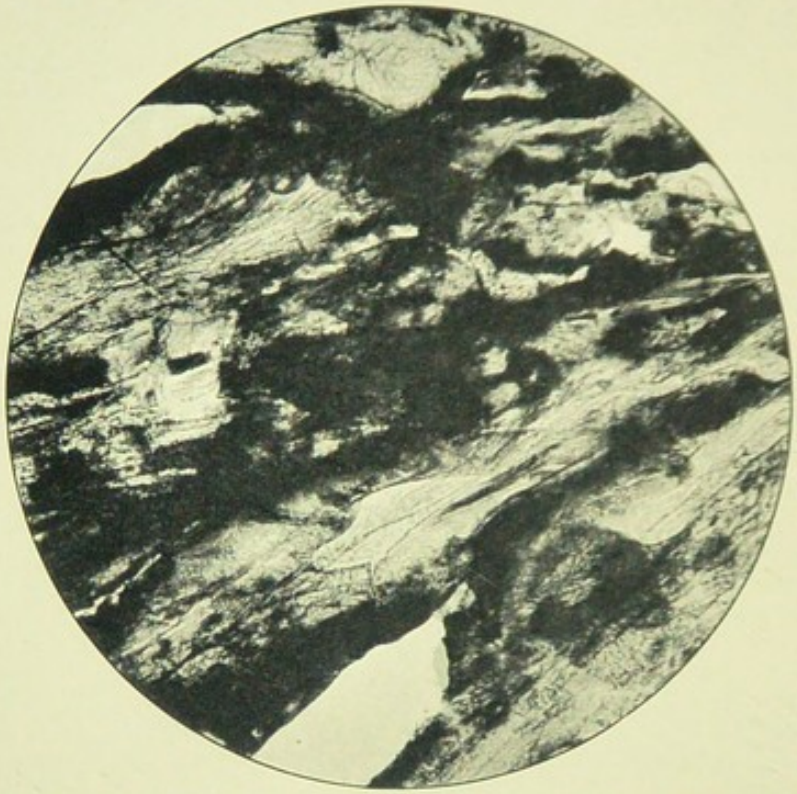

FIG. 39.—Microscopical section of odontome shown in fig. 36, showing enamel and amorphous dentine.

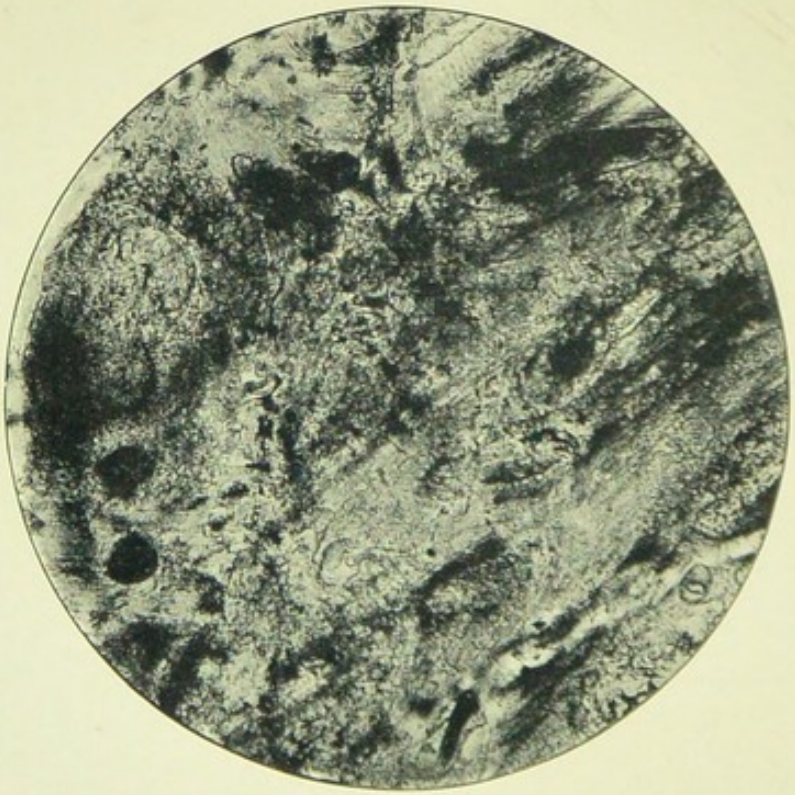

FIG. 40.—Section showing the amorphous, irregular character of the dentine comprising the greater part of the body of the odontome. × 45.

106. A composite odontome with portions of the capsule adherent to it, removed from the mandible of a man, aged 22. It is one of the largest recorded in this situation, weighing 24·5 grammes and measuring 4·2 cm. × 2·8 cm. × 1·6 cm.; although small compared with some removed from the maxilla. (*Plate XVIII, fig.* 36.)

History.—Patient had suffered pain for about three years when he went to the London Hospital, and also from swellings which "came and went."

On the right side of the mandible the teeth were absent behind the first premolar, but a roughened hard surface occupied a position which normally would be posterior to the first molar. A probe could be passed to a great depth at the anterior surface of the tumour, and in a slanting direction downwards and backwards at the posterior margin of the exposed surface. The surrounding gum was inflamed and a slight amount of pus was present. The mandible was markedly bulged on both surfaces as far back as the angle.

The odontome was removed with a curved elevator and on examination showed the imprint of a molar tooth to the lower and outer posterior portion. The tooth was removed.

107. *The microscopical sections, lent and described by Mr. A. Hopewell-Smith.*

The periphery is a fine-tubed dentine, arranged in a centripetal manner, irregular islands of enamel in the centre; the greater part of the growth is probably merely dentine matrix full of irregular interglobular spaces and canals, "no cementum as such exists."

"An interesting feature of this tumour is the presence of its fibrous capsule," which is fully described in the accounts given by Mr. Hopewell-Smith, of the section. (*Journ. Brit. Dent. Assoc.*, 1902, p. 539.) (*Plates XIX, XX, XXI, XXII, figs.* 37, 38, 39, 40, 41, 42 *and* 43.)

Lent by Mr. Russell Barrett.

108. Composite odontome, with models, microscopical section and photographs, from a patient, aged 23, who went to the Royal Dental Hospital, suffering from severe pain of three weeks' duration. The face on the right side was much swollen, and there was much trismus. There was great expansion of the mandible behind the first molar; the second premolar, and the second and third molars were missing.

On examination an odontome was discovered behind the first molar, presenting a gritty surface resembling necrosed bone; the anterior and external borders could be defined with a probe. It was removed with an elevator, part of the capsule remaining attached to the tumour. At a later date the crown of a molar

tooth was seen at the bottom of the cavity and it was thought this tooth would possibly be of service, and so it was retained.

Description of Odontome.—A rough, nodulated, irregular cube; *size*, $\frac{7}{8}$ inch antero-posterior position × $\frac{3}{4}$ inch above down × $\frac{11}{16}$ inch across; *weight*, 102½ grains. On anterior surface a well-marked groove corresponding with root of the first lower molar, and on under surface absorption corresponding to the erupting tooth. The capsule microscopically is fibro-cellular. The *growth* shows hard dentine, osteo-dentine, and enamel. The enamel is distributed in a most peculiar manner, as it forms a lining to numerous tubes which permeate the growth (*Trans. Odonto. Soc.*, xxx, p. 21).

Lent by Mr. T. Coysh.

109. Plaster model of a composite odontome from a case described by Dr. Paul and Mr. J. A. Woods.

110. Microscopical section and micro-photograph of a composite odontome.

(The case was recorded by Mr. Heath.)

Lent by Herr E. Holschauer, of Krotoschin.

111. This odontome occurred in a girl, aged 17½. For some time she had suffered from pain and considerable swelling in the left side of the mandible. Suppuration occurred, and a fistula was produced with an opening beneath the body of the jaw. There were no teeth to be seen behind the first left premolar, except a rough surface, which was thought at first to be a root. Unsuccessful attempts were made to remove the tumour, and eventually it was extracted by the aid of a hammer and chisel. The measurement in its longest diameter was 39 mm., and in the shortest 25 mm. Its weight was ·714 oz.

Lent by the Royal Dental Hospital.

112. A large odontome, and a model of the lower jaw after the removal, removed from the jaw of a Kaffir boy. The mass has had one section taken from it (micro slide 259), and four photos and lantern slides of this prepared (lantern slides Nos. 498, 499, 500 and 501). (Morton Smale.) 2394

113. A model of an odontome radiculare, an overgrowth of the root portion of the tooth. (Morton Smale). 2397

114. Odontome radiculare. 2396

COMPLEX COMPOSITE ODONTOMES.

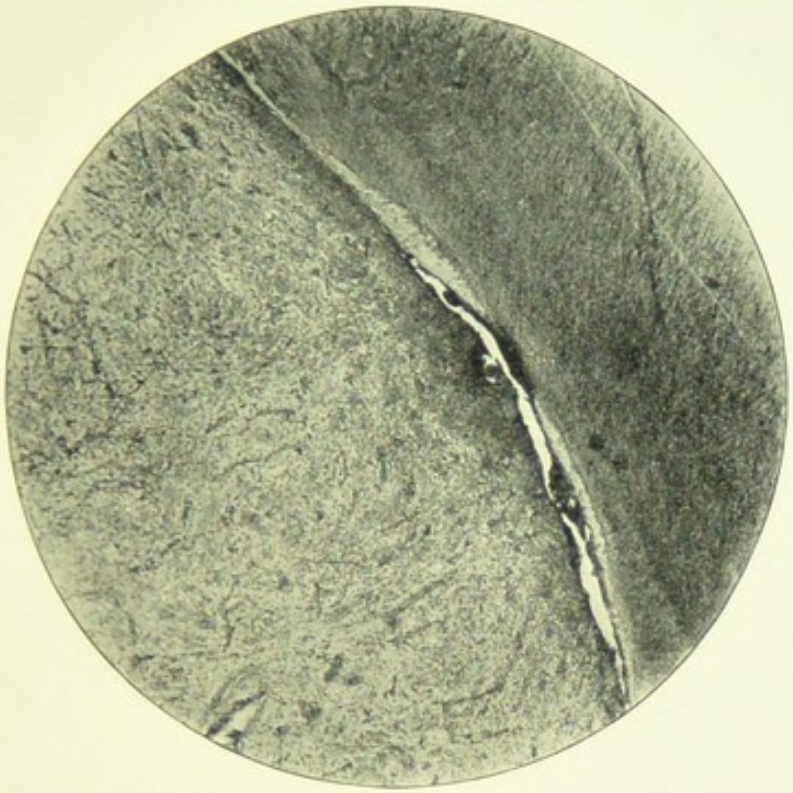

FIG. 41.—Microscopical section of the capsule of the odontome *in situ*. The upper part of the photograph shows the dentine and the lower the fibrous tissue. × 45. (Odontome shown in fig. 36.)

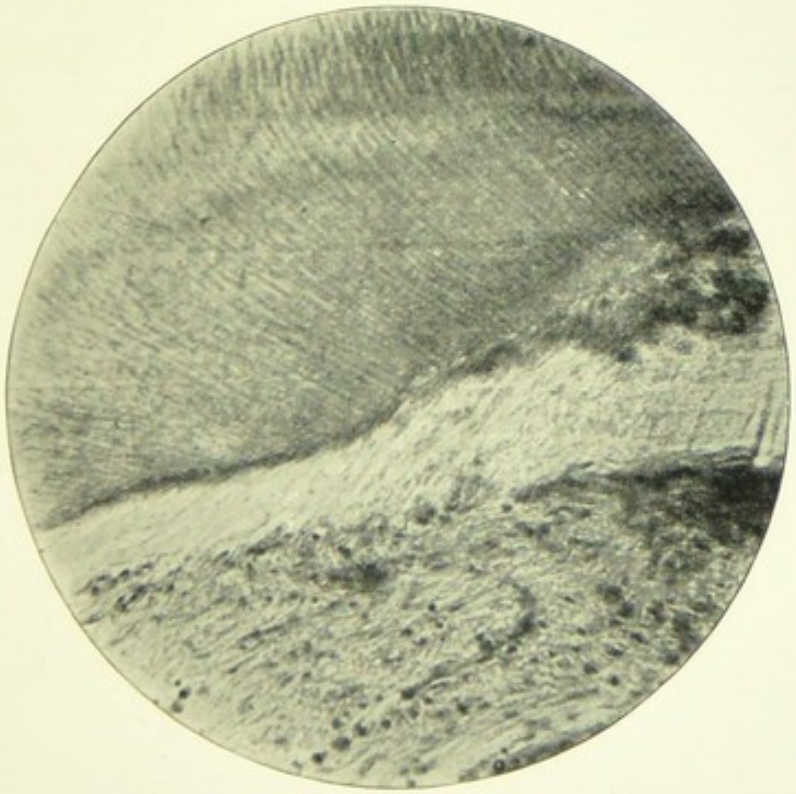

FIG. 42.—Same as preceding. × 240.

PLATE XXII.

COMPLEX COMPOSITE ODONTOMES.

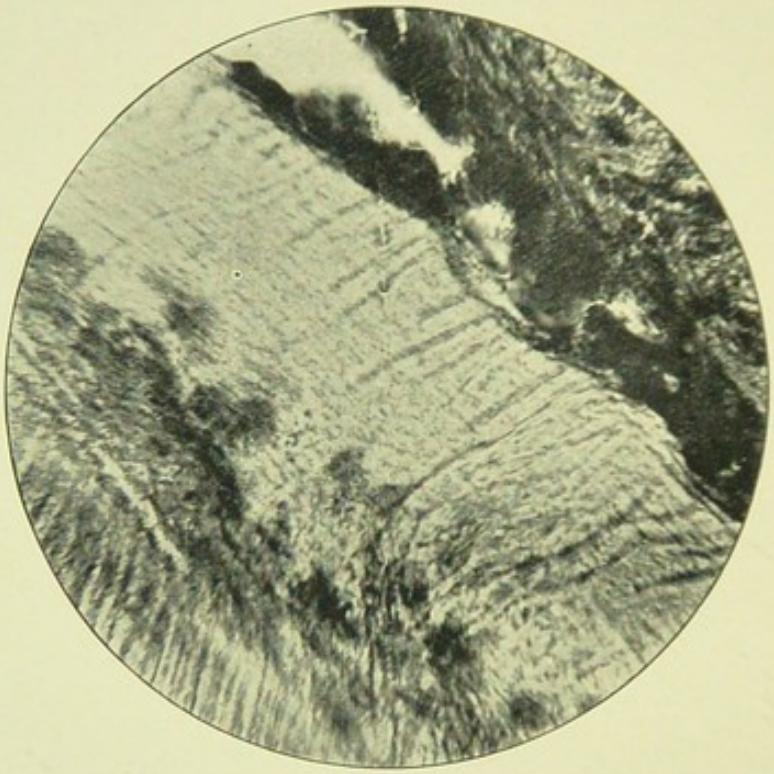

FIG 43.—Same as preceding. × 600.

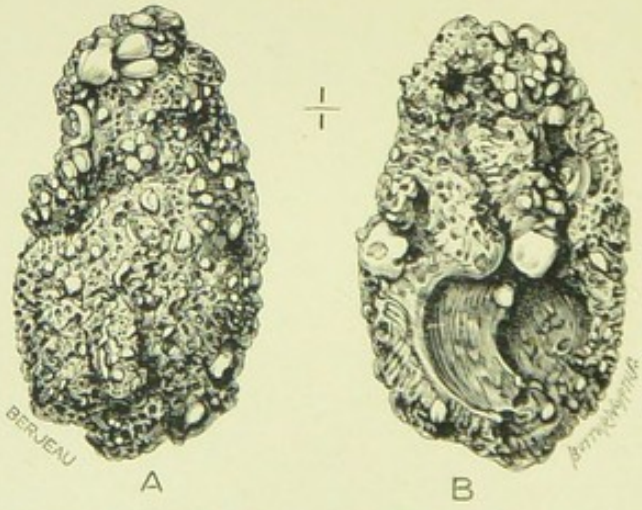

FIG. 44.—Complex composite odontome showing numerous denticles. From "Tumours, Innocent and Malignant," J. Bland-Sutton.

This specimen may be regarded as showing a relationship between this group, compound composite odontomes, and geminated composite odontomes. (See p. 73.)

Lent by Mr. J. A. Woods.

115. Composite odontome, together with a drawing of the specimen, from the maxilla.

The tumour was loosened by necrosis. (Professor Rushton Parker.)

116. Model of an odontome and drawing.

History contained in *Trans. Path. Soc.*, xxxii, p. 240 (Professor Rushton Parker.)

117. Composite odontome (half the tumour.) (Professor Paul.)

Lent by Middlesex Hospital.

118. The specimen was from an infirmary patient, but no history of the case could be obtained. Numerous denticles are to be seen situated in a bony mass. (*Plate XXII, fig.* 44.)

Presented by Mr. J. Bland-Sutton.

COMPOUND COMPOSITE ODONTOMES.

Also called—

Compound Follicular Odontomes.

COMPOUND COMPOSITE ODONTOMES.

COMPOUND composite odontomes are tumours containing several separate calcified masses of dental tissue.

These tumours contain separate denticles. The denticles vary in number (from 3 to 500 in the cases recorded); in size, from a pin's head to a filbert nut; in shape, from a supernumerary tooth to an irregular mass; and in structure, from a well-formed tooth to particles of cementum, dentine, or enamel, which are usually of irregular and imperfect formation. These denticles may be loose in a cyst, or embedded in the tissues, and are sometimes solidly fused together by cementum.*

They have been supposed to originate:—

(1) By non-eruption of several supernumerary teeth.

(2) By deformity of several of the ordinary tooth germs.

(3) By non-union of the denticles of a compound tooth.

(4) By irregular growth and sporadic calcification of one tooth germ.

(5) By production and calcification of many aberrant tooth germs.

(6) By sporadic calcification of a thickened capsule about a tooth germ or germs.

Compound composite odontomes have been recorded in man and some of the herbivora. They appear in youth

---

* Little groups of three supernumerary denticles sometimes erupt together, and may be mentioned here, as possibly having a similar origin.

and early adult age, in either sex, and in either jaw. They produce slow-growing, painless swellings rounded in outline, usually with a bony capsule. One or more teeth are often unerupted or absent. Inflammation is a frequent complication.

The diagnosis from other odontomes has rarely been made before operation.

The treatment is complete removal.

Summary of Cases recorded.

	Age	Sex	Region	Calcified Particles
Tellander	12	F.	$\frac{3456}{\ }$	28
Mathias	25	M.	$\frac{21\,\vert\,12}{\ }$	28
Moon	20		$\frac{\ }{3456}$	28
Thomas	Adult	F.	$\frac{\ }{3}$	9
Windle and Humphreys	10	M.	$\frac{32}{\ }$	44
De Ronalds	9	M.	$\frac{\ }{3}$	50
Curtis	21	F.	$\frac{\ }{\overline{123}}$	7
Bland-Sutton	11	F.	Right antrum	500
Nat. Dent. Hospital Museum	—	—	—	7
Cryer	—	—	—	35
Johnson	8½	M.	$\frac{1}{\ }$	6
Ward Cousins	11	M.	$\frac{\ }{7}$	109
Logan	(a horse)		$\frac{2\,\vert\,2}{\ }$	100
Bland-Sutton	(thar)		Maxillæ	300
Bland-Sutton	(a horse)		$\frac{\ }{\ }$ molar	Numerous

COMPOUND COMPOSITE ODONTOMES.

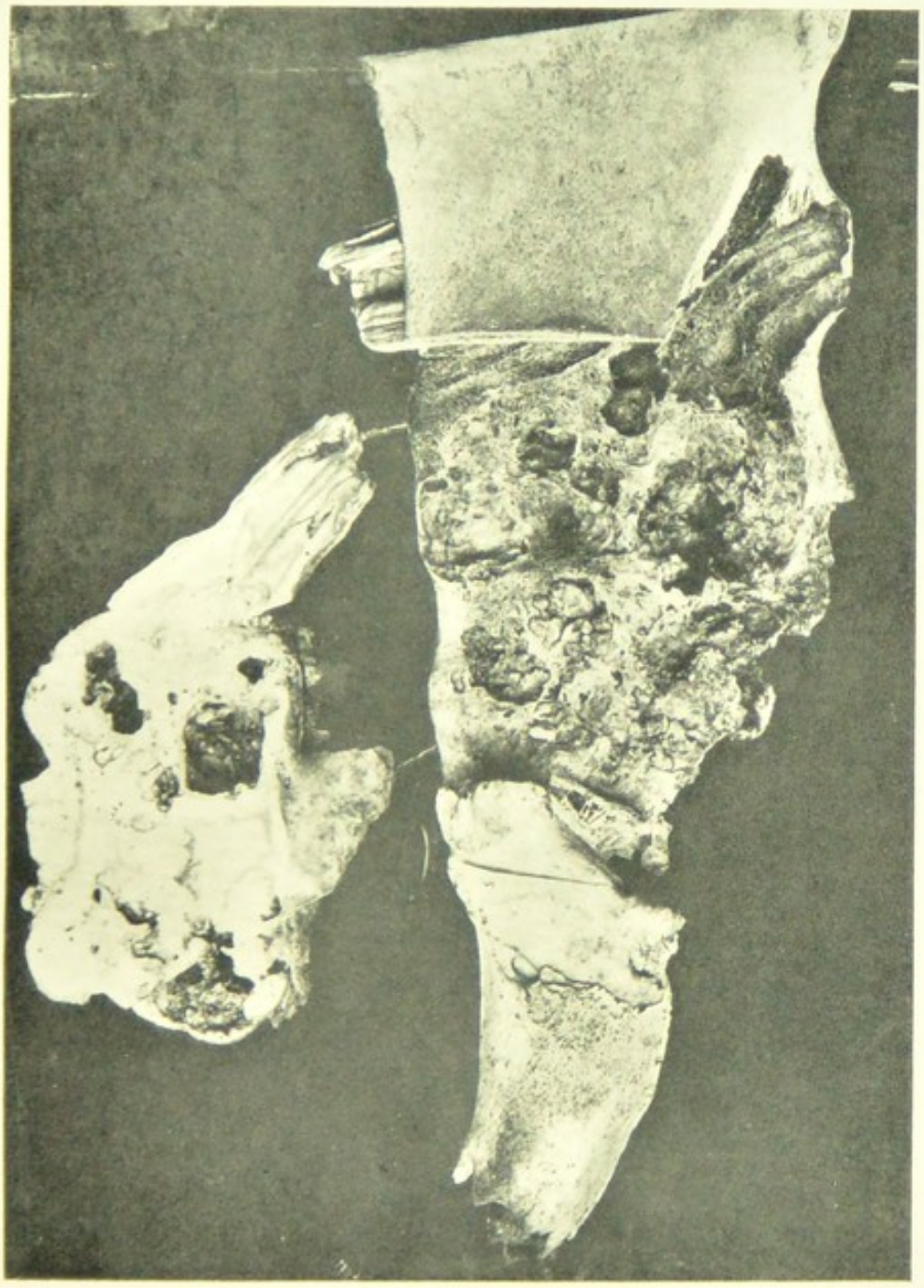

FIG. 45.—Compound composite odontome in mandible of a horse. Specimen 2172B. Royal College of Surgeons' Museum. (See p. 79.)

PLATE XXIV.

COMPOUND COMPOSITE ODONTOMES.

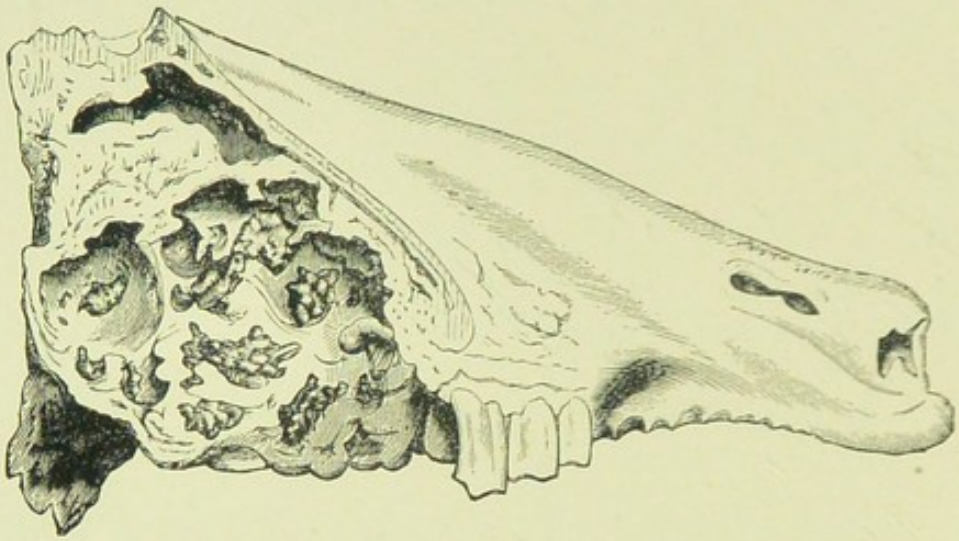

FIG. 46.—Compound composite odontome from right maxilla of a thar. Specimen 2197C, Royal College of Surgeons' Museum. (See p. 79.)

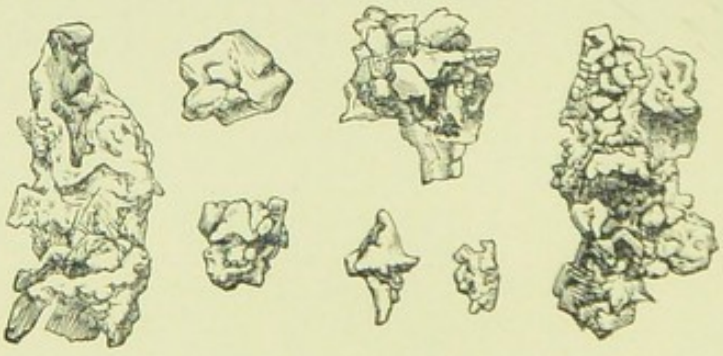

FIG. 47.—Denticles from specimen illustrated above. 2197E, Royal College of Surgeons' Museum. (See p. 79.)

Catalogue of Specimens shown in the Museum.

Lent by Royal College of Surgeons of England.

119. Part of the left half of the lower jaw of a horse. By removal of the outer wall a large cavity is laid bare, which encloses a large odontome of irregular shape. An examination of the section of this shows that it is made up of at least three tooth germs. The circumference is composed of cementum showing microscopically the encapsuled lacunæ which are peculiar to the cementum of the horse's tooth. The bulk of the tumour probably consists of the same structure (cementum). An irregular mass like a deformed tooth lay in front of the large odontome. The last molar is normal, but the one in front of it (absent from specimen) was small and ill-developed. The incisors and rudimentary canines were normal. The walls of the cavity are studded with irregular masses of dental tissue, which consist mainly of cementum, some of true bone, and a few contain dentinal tubules. (*Plate XXIII, fig.* 45.) 2172B

See *Trans. Odonto. Soc.*, November, 1887, p. 56. (Presented by Mr. J. Bland-Sutton.)

120. Part of the right superior maxilla of a thar (Himalayan goat), expanded by a cyst with dense walls lined with fibrous tissue. It opened by an aperture an inch and a quarter in length at the middle of the alveolar border. The interior was occupied with denticles, fragments of cementum, and numerous pieces of bone of various shapes and sizes. Several fragments of cementum are still attached to the interior of the cyst. (*Plate XXIV, fig.* 46.) 2197C

121. The outer wall of a similar cyst, which occupied the left maxillary bone. 2197D

122. Denticles and numerous irregular fragments of bone which occupied the cysts preserved in the two preceding specimens. These in all amounted to 300 in number. The cysts were described by the donor as examples of compound follicular odontomes. The goat was 12 years old. (*Plate XXIV, fig.* 47.) 2197E

(Presented with two preceding specimens, by Mr. J. Bland-Sutton.) See *Trans. Odonto. Soc.*, 1888, p. 185.

123. A certain number of about 500 irregular pieces of bone, which were removed from a tumour of the antrum, the tumour being regarded by the donor as having arisen in a tooth follicle, and the bone as having been produced in the fibrous tissue of the follicle. Microscopic examination shows that the particles consist of true osseous substance. 2197Ea

From a girl aged 11, admitted into Middlesex Hospital under the care of Mr. Bland-Sutton. For two years a swelling of the right cheek had been noticed, which eventually by its increase produced great disfigurement. The swelling caused considerable bulging of the facial portion of the maxilla; the nasal, orbital and palatal plates of the maxilla were unaffected. The teeth were correct in number, regular in relation and normal in shape. At the operation the muco-periosteum was raised from over the expanded facial plate of the maxilla, the thin bone removed, and the capsule of the tumour exposed. On attempting to enucleate the mass it was found so soft as to break up on manipulation, it was therefore extracted, a mass of soft vascular tissue containing a large quantity of irregular pieces of bone. When the cavity was thoroughly evacuated a delicate osseous shell remained, representing expanded wall of antrum. The cavity was drained and patient discharged convalescent within ten days.

(Presented by Mr. J. Bland-Sutton, 1902.) *Trans. Odonto. Soc.*, xxxiv, No. 4, p. 96.

Lent by National Dental Hospital.

124. Seven denticles from a compound follicular odontome.

Lent by Odontological Society.

125. Compound follicular odontome. 424

Mr. Tellander's Case.

History of Case.—At the age of 12 a hard, painless swelling occurred, which caused disfigurement but no pain. Inflammation round temporary molar brought her to Mr. Tellander, of Stockholm, in December, 1861. Patient was then aged 24. The tooth was extracted, but the trouble persisted.

Mr. Tellander then decided to remove the pieces of loose bone, which he thought were causing the enlargement of the maxilla, but after removing a few of those hard particles he came upon a cluster of minute teeth. The cavity was emptied and the contents are shown on this card. Probably some teeth were lost, but no less than twenty-eight teeth or cusps are preserved. There are nine single teeth, each one perfect in itself, having a conical root, with a conical crown tipped with enamel. Six masses are built up of adherent single teeth. Thus one is composed of three united cusps, two others have two cusps each, and the fourth is but an irregular mass of dental tissue, and the fifth consists of three similar masses united by membranes. In the sixth mass no less than nine cusps may be traced. The teeth present the usual characteristics of supernumerary teeth.—*Trans. Odonto. Soc.*, 1862, iii, p. 282.

PLATE XXV.

COMPOUND COMPOSITE ODONTOMES.

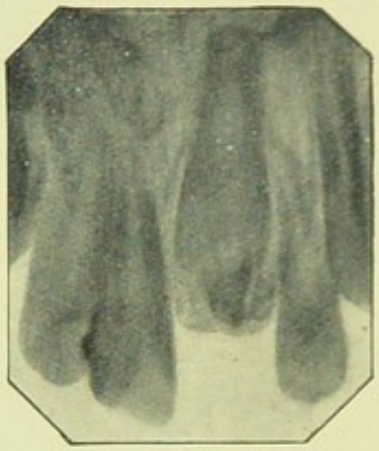

FIG. 48.—Radiograph of a case of compound composite odontome.
(See p. 81.)

FIG. 49.—Denticles removed from case illustrated above. (See p. 81.)

126. The hard contents of a compound follicular odontome. The patient was a Hindoo, aged 25. (C. S. Tomes.) See *Trans. Odonto. Soc.*, 1862, iii, p. 366. 425

Lent by Dr. T. Ward Cousins.

127. Compound follicular odontome (with photograph taken before treatment). Denticles and bone from a patient with a compound follicular odontome. At a first operation about ninety denticles were removed; at a subsequent operation sixteen masses of bone and of tooth tissue, and at a third operation three large sequestra.

The patient, a boy, aged 11, was sent as a case of osteo-sarcoma, but as this diagnosis was not confirmed with certainty by Dr. Ward Cousins, he decided not to excise the jaw. There was marked expansion and thickening of the mandible, some necrosis of bone in the region of angle with suppuration, and "the bone was full of dental tissues like plums in a cake."

The patient is now 23 years of age, his face is somewhat larger on the right side, with a scar at the angle of the mandible, the body of which is very hard and thickened on this side. He is able to masticate on both sides of his mouth, but in the position of the right second and third molars a tooth mass is seen surrounded by thickened gum.

A model of the jaw shows the present condition of the patient from whom the above was removed. (Model taken at the request of the Committee, by Mr. H. A. E. Canning, Southsea.)—*Brit. Med. Journ.*, 1906.

Lent by Dr. M. H. Cryer. The Pennsylvania University.

128. Denticles, some single, and some fused together into irregular masses, removed from the maxilla; there were thirty-five originally, but some have been lost. The central incisor was high in the palate lying horizontally, but descended into its normal position after the operation had been performed.

Dental Cosmos, xl, p. 281.

129. Case recorded by Mr. A. A. H. Johnson.

A boy aged 8½ years with right upper central incisor unerupted and a swelling of the alveolus where the tooth should have been, and which swelling when opened was found to contain six denticles in one or two cysts. (*Plate XXV, figs.* 48 *and* 49.)

Proc. Roy. Soc. Med. (Odonto. Sect.), iv, p. 42. (Museum Royal College of Surgeons, D.165.1.)

Other References.

Windle and Humphreys. *Journ. Anat. and Phys.*, 1887, xxi, p. 667.

Hildebrand. *Zeitsch. für Chir.* Bd. xxi, p. 282.

De Ronalds. *N. Y. Med. Journ.*, 1894, p. 612. *Dent. Record*, 1895, xv, pp. 74-80.

Logan. *Journ. Comp. Med. and Surg., N.Y.*, 1887.

Heath. "Diseases and Injuries of the Jaws."

Moon. *Trans. Odonto. Soc.*, 1876, p. 226.

Curtis. *Dental Record*, 1897, p. 483, from *Dom. Dent. Journ.*

Thomas. *Dental Cosmos*, xxv, p. 81.

Sims. *Trans. Odonto. Soc.*, 1885, p. 35. *Dental Record*, 1890, p. 74. (See Windle and Humphreys above.)

GEMINATED COMPOSITE ODONTOMES.

GEMINATED COMPOSITE ODONTOMES.

GEMINATED composite odontomes are those composite odontomes in which two or more malformed teeth are fused together, and are the result of organic union of tooth germs during development.

This section contains many tooth tumours which are closely allied to simple gemination of teeth, and it is often difficult to determine to which of the two groups an abnormality belongs. The presence of malformation other than mere fusion must be regarded as the line of demarcation. In some cases the odontome consists of a conglomeration of denticles and as many as nine distinct enamel-covered eminences have been observed in one specimen. In many of the specimens each component denticle contains a separate pulp chamber.

The incisors are most commonly affected, although the condition also occurs in the premolar and molar regions. The union may extend through crowns and roots, or may affect only a part of each tooth. Where the coronal portions alone are united a common pulp chamber will most frequently be found; where the roots alone blend, the pulp canals are usually distinct, but where crowns and roots are united the pulp cavities may, or may not, be in common.

Some of the tooth tumours formerly called "odontomes coronaires" should be placed in this section.

SUMMARY OF THE CASES RECORDED.

Case	Age	Sex	Region
Whatford. *Trans. Odonto. Soc.*, 1895-96, p. 170	—	—	Large mass between $\frac{1 \text{ and } 2}{}$
Gibbs. (Unpublished)	24	M.	—
Goodman (Guy's Museum). *Brit. Dent. Journ.*, 1894, p. 28. (*Plate XXVI, fig.* 50.)	15	F.	$\frac{2 \text{ and } 1}{}$
Rilot. *Trans. Odonto. Soc.*, 1890-91, p. 84	30	—	Lower incisor.
Hanley. *Trans. Odonto. Soc.*, 1894-95, p. 178	—	—	Upper molar.
Albert. *Trans. Odonto. Soc.*, 1897-98, p. 2	12	—	$\frac{a}{a}$
Clarke, *Trans. Odonto. Soc.*, 1899-1900	—	—	$\overline{2}$ |
Moon, *Trans. Odonto. Soc.*, 1876-77, p. 228	—	M.	Lower third molar.
Moon, *Trans. Odonto. Soc.*, 1876-77, p. 230	—	—	Upper central incisor.
Aston Key. Recorded by Bryant	20	F.	In horizontal ramus of mandible.
Smale. Recorded by Storer Bennett	35	F.	$\overline{8}$ |
J. Tomes	16	F.	$\overline{7}$ | ?
Weil	—	M.	$\frac{1}{1}$ & supernumerary.
Hutchinson (for Bale)	—	—	$\overline{1}$ | $\overline{1}$
Moon. *Trans. Odonto. Soc.*, 1878-79, p. 29	38	F.	|$\overline{8}$
Spencer, *Trans. Odonto. Soc.* vi, 1867-68, p. 73	—	—	$\overline{4 \text{ or } 5}$. Lower bicuspid with two crowns to one root.
Hutchinson (for Farnham). *Trans. Odonto. Soc.*, xii, 1879-80, p. 31	—	—	8
Rodway. *Trans. Odonto. Soc.*, iv, 1871-72, p. 127	—	—	$\frac{2}{2}$
J. F. Colyer, *Brit. Dent. Journ.*, 1896, p. 35	—	—	7
Storer Bennett (for Balding). *Trans. Odonto. Soc.*, 1887-88, p. 302	—	—	Upper incisor.
Storer Bennett (for Pearce). *Trans. Odonto. Soc.*, 1887-88, p. 302	20	M.	$\overline{5 \text{ and } 4}$ |
Margetson. *Trans. Odonto. Soc.*, 1864-65, p. 37	28	—	$\overline{1}$ |
Parker. *Trans. Pathol. Soc.*, xxxii, p. 240	19	F.	| $\overline{7}$
Royal Dental Hospital Museum, 2360A	—	—	$\overline{8}$

PLATE XXVI.

GEMINATED COMPOSITE ODONTOMES.

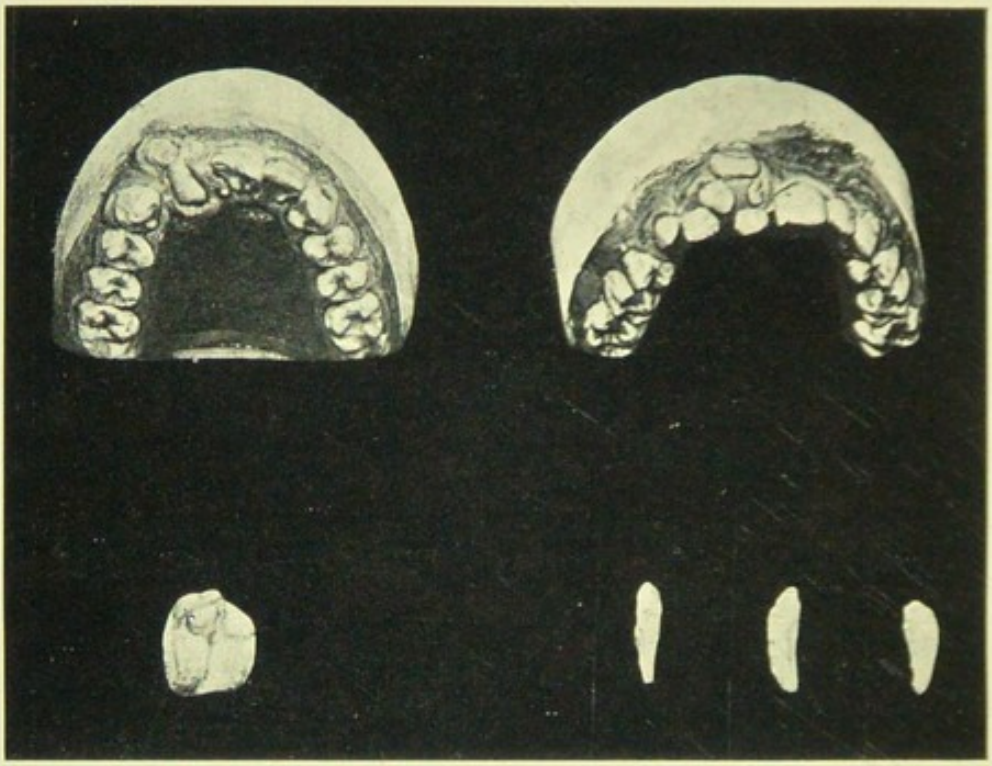

FIG. 50.—Models of case showing geminated composite odontome. (See p. 88)

FIG. 51.—Models showing three separate denticles. Illustrated for comparison with fig. 50.

FIG. 52.—Geminated composite odontome removed from right maxilla. Specimen 2172c, Royal College of Surgeons' Museum. Fron *Dental Record*. (See p. 87.)

Bland Sutton. *Trans. Odonto. Soc.*, 1883-84, xvi, p. 91, and Museum of Royal Col. Surg.	—	—	Malformation of an elephant's tusk, which is double.
Bland-Sutton. *Trans. Odonto. Soc.*, 1883-84, xvi, p. 94; and 1884-85, xvii, p. 46	—	—	Incisor teeth of a marmot.
Bland-Sutton. *Trans. Odonto. Soc.*, 1884-85, xvii, p. 184	—	—	Odontome growing around the tusk of an elephant.

CATALOGUE OF SPECIMENS SHOWN IN THE MUSEUM.

Lent by the ROYAL COLLEGE OF SURGEONS, ENGLAND.

130. Three small distinct dentary bodies which are grouped together. 2172D

(Presented by Mr. Albert)

131. An irregular supernumerary tooth, which (as may be seen in cast) was situated in front of the right first bicuspid of the upper jaw, the lateral incisor and canine being displaced by it. The crown is very irregular, and is made up of nine enamel-covered cusps, as though a group of supernumerary teeth had become confluent. It has no fangs. Tooth may be regarded as a composite odontome. It was removed from a lad, aged 19. (*Plate XXVI, fig.* 52.) 2172C

See *Dental Record*, 1889, ix, p. 435. (Presented by Mr. J. Bland-Sutton.)

132. An "odontome coronaire," which grew from the back of the right lower wisdom tooth, shown in the next specimen. It is, probably, composed of dentine, and on its flat upper surface are numerous white papillæ of enamel. The margin is eroded by absorption, from contact with the granulations that surround it; in the uppermost and deepest erosion is a minute ring-like shell of enamel, from which the dentine has been absorbed. 2168

(For a magnified drawing of this specimen, see *Guy's Hospital Reports*, Third Series, 1858, iv, Plate I, fig. 4).

133. A section of the wisdom tooth from which the odontome 2168 grew. The pulp cavity of the mass communicated with that of the posterior fang through the channel into which a bristle has been passed. 2169

From a man, aged about 35. The tumour caused great pain, and lay embedded in the mucous membrane, scarcely projecting above the surface, and surrounded by irritable bleeding

granulations. A few months after it was removed a thin plate of dentine, bearing nodules of enamel, sprang up in its place. The tooth itself setting up alveolar periostitis, had to be removed. (Presented by S. J. A. Salter, 1881.) (This specimen is figured in *Guy's Hospital Reports*, Third Series, 1859, v., p. 331); also full account in 1858, p. 279, and 1859, p. 329).

Lent by Mr. J. G. Turner.

134. Composite odontome resembling the form of three fused irregular teeth.

Lent by Mr. James Coltman.

135. Anterior portion of the mandible of a heifer, showing an odontome occupying the position of the right second incisor; it appears to consist of three denticles.

Lent by Guy's Hospital Museum (Dental Section).

136. Composite odontome and model of maxillæ. The tumour occurred in connection with the first right upper premolar and shows the blending of three denticles, one of them representing fairly accurately a premolar tooth. (Mr. F. Newland-Pedley.) 9L

137. An upper central incisor showing an outgrowth of dentine on the root of the tooth close to its neck. L18

138. Plaster models of composite odontome and model of the mouth. The tumour consists of three fused denticles situated in the region of the upper right central incisor. Enamel, dentine and cementum are present. (*Plate XXVI, fig.* 50.) 10L

139. An abnormal lower premolar tooth, which has some irregular pieces of dental tissue fused to the crown and root. 15L

Lent by Dr. M. H. Cryer.

140. A skull from which bone has been removed to show a composite odontome buried in the premaxillary region, and lying horizontally in the palate. Behind this is the left central incisor, whose eruption has apparently been arrested by the presence of the tumour. The odontome consists of no less than five denticles, composed of enamel, dentine and cementum. (*Plate XXVII, fig.* 53.)

GEMINATED COMPOSITE ODONTOMES.

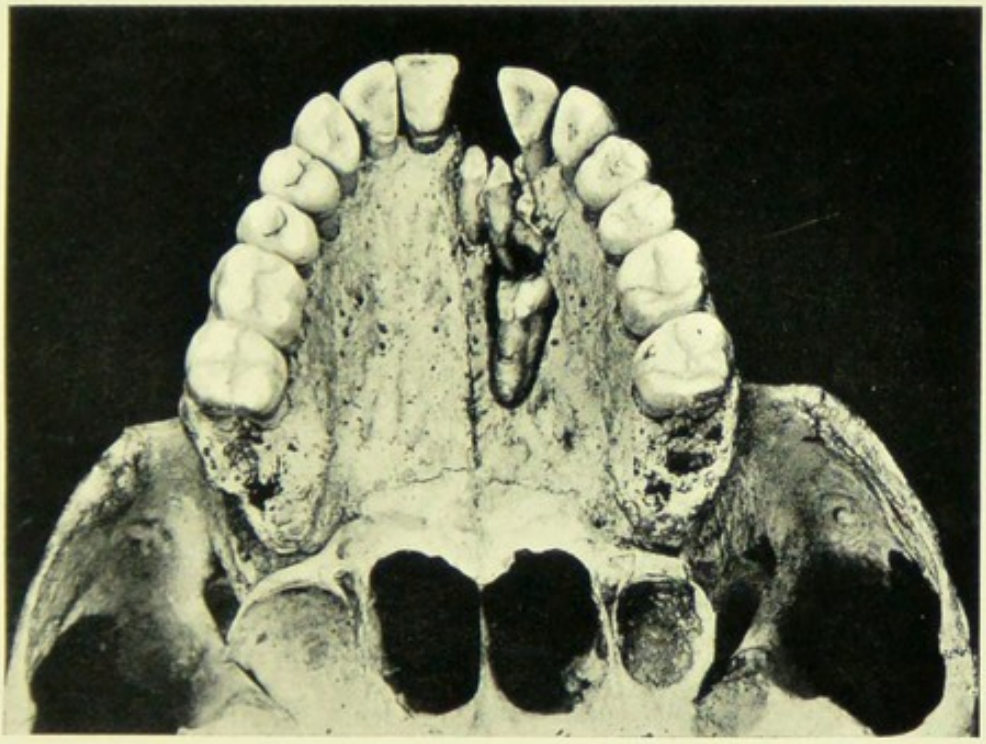

FIG. 53.—Portion of skull showing geminated composite odontome *in situ*. (See p. 88.)

Lent by Mr. C. S. Tomes.

141. Microscopical section and micro-photograph of a composite odontome arising in connection with the right maxillary central incisor.

142. A microscopical section and micro-photograph of a mandibular molar showing a globular mass of tooth tissue extending from the neck of the tooth.

Lent by Royal Dental Hospital.

143. A composite odontome, removed from the lower jaw of a man aged 28. (L. Balding.) 2360

History: For five months the patient was troubled with pain and swelling on the right side of his face in the lower molar region. In consequence of this he went to a dispensary, where they removed the carious first molar on that side. For a time he had relief, but after about two months the swelling and pain again recurred.

He went to Guy's Hospital, where they removed the wisdom tooth on that side. Again for a time he obtained relief, but as before, after about two months the swelling and pain returned. He was then told that they suspected the second molar had died, and an abscess was forming on the root. As he was unable to open his mouth to any extent without experiencing great pain, he was given gas, and extraction was attemped. He then came under observation at this hospital, having a large painful swelling over the right lower molar region; the second molar was only just erupting, while on its distal surface, and apparently joined to it, was what looked like the root of the wisdom tooth. On firm pressure being made on the crown, pus oozed up round the neck. The tooth was extracted with forceps with great difficulty. The patient was advised to use hot fomentations inside the mouth frequently, but about ten days later he appeared with an abscess pointing on the face opposite the anterior margin of the masseter muscle. This was opened, and a communication established externally with the socket of the tooth. The case was treated daily by syringing with 1-60 carbolic acid and packed with iodoform gauze. Four weeks later the sinus healed.

(i) Plaster model by Mr. Balding; (ii) microscopical section cut by Mr. Joseph; and (iii) the remaining half of the specimen. (See micro. slide No. 97 and lantern slide 494.)

144. Model of odontome radiculare and model of jaws. (Royal College of Surgeons' Museum Catalogue. 2170.) 2398A

The patient, a boy, aged 11, came to the National Dental Hospital on Tuesday, March 10, complaining of pain around the right upper central He said that the tooth was very tender to touch and occasionally there was considerable swelling round it, causing the lip to protrude. On examination, there was considerable inflammation, and behind the partially erupted central there was what appeared to be a conical supernumerary tooth. It was

decided to extract this; but on attempting to do so it was found that the teeth were geminated. The tip of the supernumerary tooth broke off. The whole mass was then removed. The patient was a healthy looking boy. He has never had any blow or fall affecting that region. Neither of his parents or any member of the family have had a similar condition, so far as can be ascertained. (A. Hopewell-Smith.)

Lent by St. Bartholomew's Hospital.

145. A section of a molar tooth, a small nodulated, hard, ivory-like, bony tumour, springs from the base of the crown and from one of the fangs. It consists of a mixture of dentine cementum and some enamel. 1820

Lent by Mr. J. Bland-Sutton.

146. An odontome not yet described.

Lent by Mr. W. H. Dolamore.

147. Irregular-shaped molar, composite odontome (?).

GESTANT COMPOSITE ODONTOMES.

Also called—

Odontoma internum.

GESTANT COMPOSITE ODONTOMES.

GESTANT composite odontomes are those in which a denticle is contained within, or surrounded by, the walls of a tooth. In connection with this it is interesting to refer to a paper by Dr. Joseph Arkövy,* in which he states that odontomes occurring inside the pulp cavity have been classified under several different heads. Thus they are regarded by Broca as belonging to his second group (*odontomes odontoplastiques*); whilst Magitôt includes them in his Class I as *odontomes bulbaires*. Ulrich (in 1851) first divided them, according to their structure, into *dentinoid* and *osteoid*, and then further distinguished them as *parietale* and *liberum*: Hohl, partly accepting these terms, divides them into *odontoma internum parietale* and *odontoma internum liberum*. According to Wedl, they belong to the new formations of hard tooth substance.

These odontomes have been said to be due to an abnormal folding of an enamel organ, producing a denticle inside the forming tooth. Heider and Wedl suggested that they were caused by the inversion of a portion of the odontoblast layer. In one instance, where the upper canine was involved the lateral incisor absent, it was thought that the incisor had developed within the canine, and that the enamel organ belonging to the

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* "Investigations into the Mode of Development of Odontoma Internum Liberum," *Journ. Brit. Dent. Assoc.*, 1883, p. 372.

former tooth had been pushed, as it were, into the dentine papilla of the latter. It is conceivable that a supernumerary denticle, either developing or complete, may be enveloped by a neighbouring enamel organ.

In many instances there is no very obvious external deformity of the affected tooth. It may be irregular in shape, enlarged generally or at one point.

The odontome usually erupts like an ordinary tooth, except that it is later than the corresponding teeth in the normal series. It seldom gives rise to any special sign or symptom. Most of the specimens came from the incisor region.

SUMMARY OF CASES RECORDED.

Case	Age	Sex	Region
Hutchinson. *Trans. Odonto. Soc.*, 1878-79, p. 163	14	—	$\lvert\underline{2}$ supernumerary.
C. S. Tomes. Tomes and Nowell (*Dental Surgery*), p. 227	—	—	Upper lateral incisor.
Wehner. Described by Baume. *Monthly Rev. Dent. Surg.*, 1874, p. 396	34—40	M.	$\underline{3}\rvert$
Davy. *Trans. Odonto. Soc.*, 1880-81, p. 37	—	M.	—
Davy. *Trans. Odonto. Soc.*, 1880-81, p. 37	—	F.	—
Tomes and Nowell. *Dental Surgery*, 1906, p. 29	16	F.	$\lvert\overline{7}$ —
Wynne Rouw. *Brit. Dent. Journ.*, 1889, p. 696	13	M.	Upper incisor.
Royal Dental Hospital Museum, 2335A	—	—	$\underline{8}\rvert$
Royal Dental Hospital Museum, 119	—	—	Molar.
J. F. Colyer. *Trans. Odonto. Soc.*, 1900, xxxviii, p. 249	16	M.	$\lvert\underline{2}$
Bland-Sutton. *Trans. Odonto. Soc.*, 1884-85, p. 45	—	—	Fossil molar of horse.
Ash, G. *Trans. Odonto. Soc.*, 1863-65, p. 39	—	—	Tooth of hippopotamus.

PLATE XXVIII.

GESTANT COMPOSITE ODONTOMES.

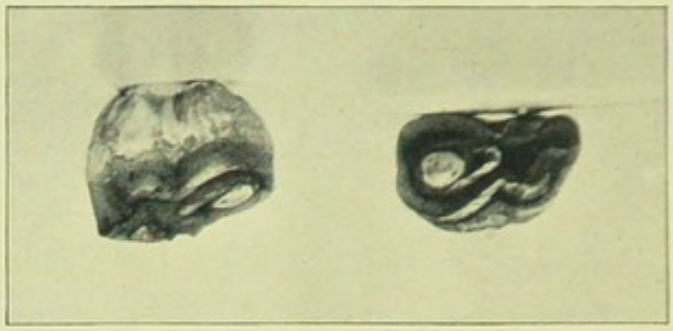

FIG. 54.—Two aspects of a gestant composite odontome in the position of a right upper third molar, showing an enamel-covered denticle within. (See p. 95.)

FIG. 55.—A gestant composite odontome with a portion of the wall removed to show the denticle within. (See p. 95.)

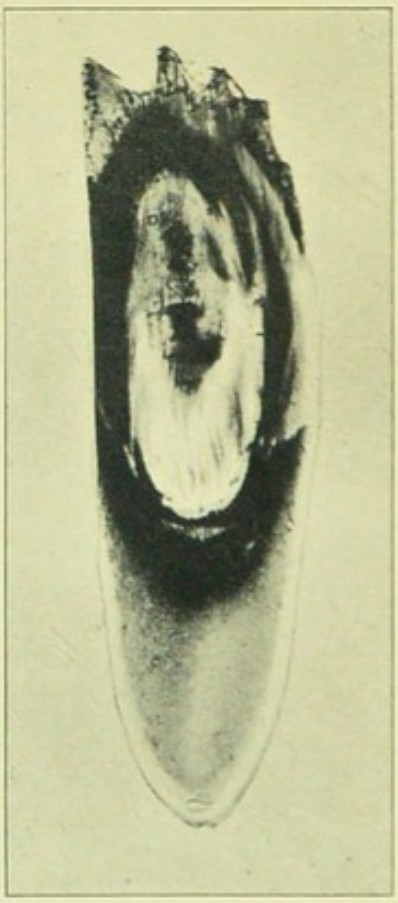

FIG. 56.—A section of a gestant composite odontome. (See p. 95.)

CATALOGUE OF SPECIMENS SHOWN IN THE MUSEUM.

Lent by ROYAL DENTAL HOSPITAL, LONDON.

148. Part of an upper jaw showing enamel nodule within the pulp cavity of the last molar. (*Plate XXVIII, fig.* 54.) 2335A

Lent by GUY'S HOSPITAL MUSEUM.

149. An odontome found in upper incisor region. The growth is apparently due to an aberration of the dental papilla, a portion of which has undergone secondary calcification, leaving a central core. (Mr. Wynne Rouw.) (*Plate XXVIII, fig.* 55.) L17

Lent by Mr. C. S. TOMES.

150. A microscopical section of a maxillary lateral incisor showing numerous depressions of enamel at the cutting edge. (*Plate XXVIII, fig.* 56.)

ENAMEL NODULES.

Also called—

Epithelial Pearls.

ENAMEL NODULES.

ENAMEL nodules are enamel-covered excrescences of dentine projecting from the normal outline of the dentine of a tooth, the nodule being separated from, or only slightly connected with the normal enamel. Salter in 1874 called these nodules "odontomes."

Apparently enamel nodules are formed during the growth of the tooth by either a part of the epithelial sheath of Hertwig, or possibly an independent piece of the tooth band, or coronal portion of the enamel organ, becoming displaced, assuming the enamel-forming function, and fusing with the tooth during its growth. They are calcified and cease to grow at about the same time as the enamel and dentine of the tooth to which they are attached. They vary in size from that of a small seed to a quarter of an inch in length. Two general types may be described; they occur as thin *ridges of enamel* running from the enamel margin on to the root, usually along the groove between two roots, and as *discrete nodules* upon the root, when they appear as white, shining, rounded or almost spherical nodules, hence the name "epithelial pearls"; these are firmly attached to the tooth and on section a core of dentine is always seen, and sometimes a prolongation from the pulp cavity is present.

Under the microscope the enamel is usually found to be granular and abnormally brown by transmitted light. The dentine is normal, and continuous with the dentine of the tooth. In the dentine subjacent to the nodule there exists either a group of irregular spaces or a prolongation from the pulp cavity. This prolongation

seldom enters the nodule, except in the case of a large specimen. Marked irregularities in the calcification of the tooth are frequently found associated with an enamel nodule.

The cause of this aberration is unknown. It has been suggested that it is due to :—

(*a*) Gemination with a supernumerary tooth.

(*b*) Budding from a tooth germ.

(*c*) Mechanical interference during growth.

(*d*) Development of an extra cusp.

Enamel nodules are, perhaps, the commonest of the odontomes; statistics are unreliable as the nodules are usually small, often overlooked and seldom recorded; they are almost exclusively confined to upper molars, and are most often found projecting from the surface, between the roots and close to the gum margin. They are usually single, but several may occur on one tooth.

Enamel nodules cause no symptoms, give no signs, are rarely diagnosed whilst the tooth is *in situ*, and require no treatment.

CATALOGUE OF SPECIMENS SHOWN IN THE MUSEUM.

Lent by Mr. T. A. COYSH.

151. Enamel nodule on an upper molar.

From DENTAL HOSPITAL OF IRELAND.

Lent by Mr. A. W. W. BAKER.

152. Enamel nodule.
153. Enamel nodule.
154. Two enamel nodules.
155. Enamel nodule attached to crown of supernumerary.
156. Enamel nodule on crown of four-rooted maxillary molar.
157. Tongue of enamel on maxillary molar.

Lent by Mr. J. C. STOREY.

158. Tongue of enamel on four-rooted maxillary molar.

ENAMEL NODULES.

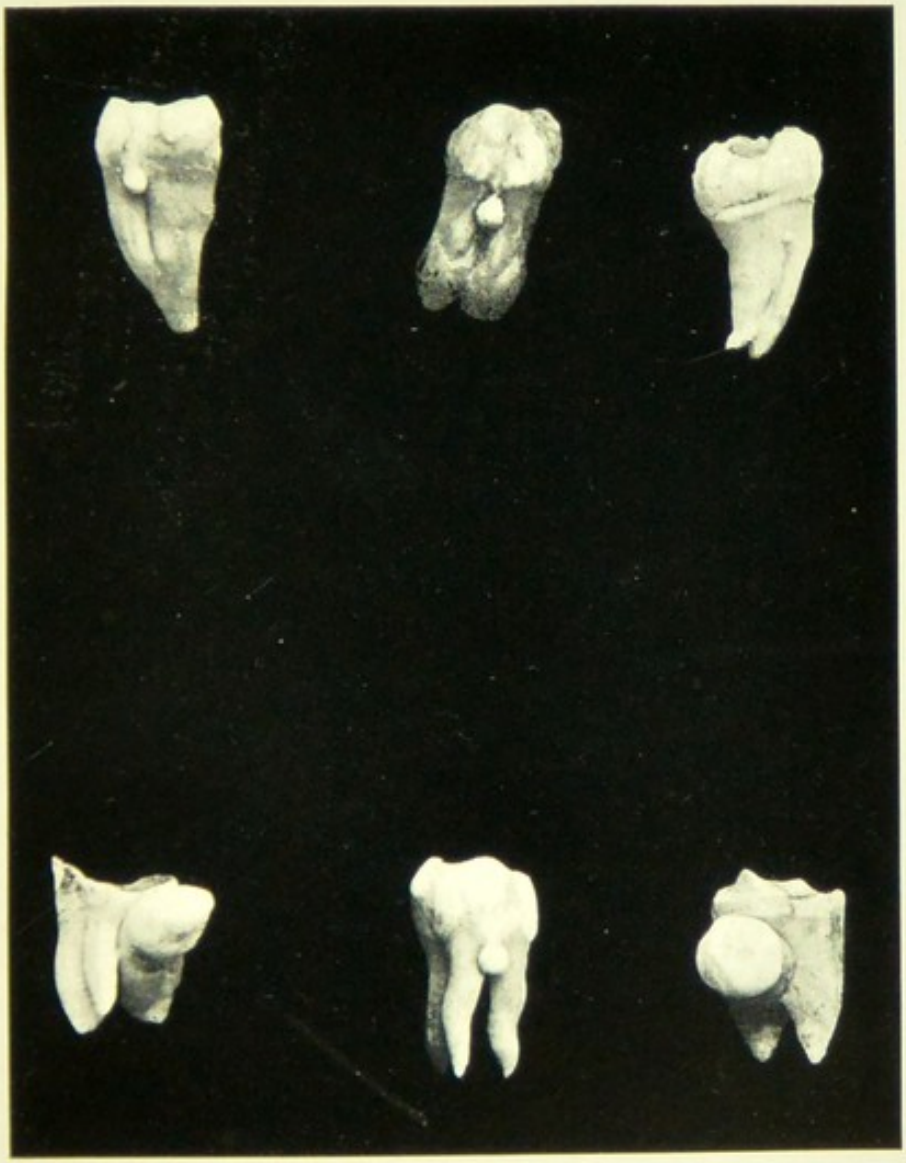

FIG. 57.—Six enamel nodules.

PLATE XXX.

ENAMEL NODULES.

FIG. 58.—Section of an enamel nodule. (See p. 101.)

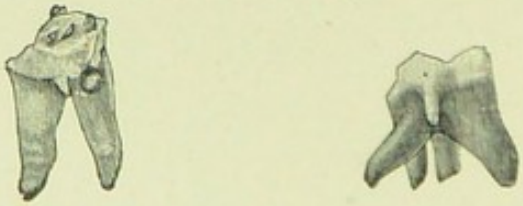

FIG 59.—Ridges or tongues of enamel. (From "Dental Surgery and Pathology," by J. F. Colyer.)

Lent by Royal Dental Hospital.

159. Four teeth with enamel nodules of different sizes. 2330

160 Four teeth with small tongues of enamel prolonged down the roots, and in three of them terminating in nodules. 2331

161. Four teeth with enamel nodules, so large as to be very akin to geminated supernumerary teeth. A section has been cut and it shows the cornu of the pulp extending into the nodule (plaster cast). 2332

162. Eight upper molars, from each side of the mouth, in which the enamel nodule is situated between the posterior and palatal roots. 2333

163. Seven upper molars with enamel nodules between the palatal and an accessory root. 2334

164. Five upper molars with enamel nodules in less usual positions. 2335

165. Two upper molars, one with two very small nodules, and the other with three large nodules. 2336

166. Three teeth with enamel nodules, of which sections have been cut (of one a plaster cast has been taken), to show the dentine core, and in one of them the prolongation from the pulp. The enamel shows no abnormal pigmentation. See micro. slides 150 and 241 and lantern slides, 297 and 296. 2337

Microscopical slides lent by Royal Dental Hospital.

167. A vertical section of the carious root of a molar. There is an enamel nodule within the substance of the tooth, probably in the cementum between the fused roots. (*Plate XXXI, fig.* 60.) 119

168. A horizontal section across the neck of an upper molar with an enamel nodule on the distal aspect. (*Plate XXX, fig.* 58.) 290

169. A horizontal microscopical section across the roots of an upper molar with an enamel nodule on the mesial aspect of the palatal root. 150

Lent by Odontological Society of Great Britain.

Series C.

170. Maxillary molars with enamel nodules. 525

171. Maxillary molars with two enamel nodules (L. Read). 526

172. Mandibular molar with nodule of enamel on posterior aspect of root. 527

173. Maxillary molar with enamel nodule springing from palatal root. 528

174. Maxillary molar. A large enamel nodule is situated between the palatal and supernumerary roots. A tongue of enamel projects from the crown towards the enamel nodule. (L. Read.) 529

175. Supernumerary tooth with nodule of enamel on labial aspect of root. 530

176. Maxillary molars with enamel nodules. 231

177. In this specimen there is an enamel nodule on the buccal aspect of the tooth and embraced by the posterior buccal and palatal roots there is an irregularly shaped piece of tooth tissue. 447

Lent by Guy's Hospital Museum (Dental Section).

178.
179.
180. } These three specimens are peculiar in that the nodule presents an irregular surface, is situated upon the crown of the tooth, and appears to be deficient in enamel. (*Plate XXXI, fig.* 61.)

181. A nodule between two roots of a four-rooted upper molar.

182. A large enamel nodule showing close relationship between enamel nodules and geminated supernumerary teeth.

183. A large enamel nodule showing close relationship between enamel nodules and geminated supernumerary teeth.

References.

Hopewell-Smith. *Dental Cosmos*, 1905, p. 54.
Amhlar. *Dental Cosmos*, xxxviii, p. 1013.
Dental Cosmos, xxxvii, p. 14.
Ottofy. *Dental Cosmos*, xxxvii, p. 931.
Bland-Sutton. *Trans. Odonto. Soc.*, 1884-85, xvii, p. 46.
Halle. *Monthly Rev. Dent. Surg.*, 1873-74, p. 548.
Cooper Forster. *Trans. Odonto. Soc.*, 1876-77, ix, p. 232.
Heider and Wedl. *Atlas.*
Harding. *Trans. Odonto. Soc.*, 1879-80, xii, p. 99.
Tomes. *Trans. Odonto. Soc.*, 1880-81, xiii, p. 77.
Marrett-Tims. *Trans. Odonto. Soc.*, 1895-96, xxviii, p. 167.
Walker. *Trans. Odonto. Soc.*, iii, p. 327.
Moon. *Trans. Odonto. Soc.*, 1876-77, ix, pp. 227 and 228.
Salter. *Dental Path. and Surgery*, 1874, p. 128.

ENAMEL NODULES.

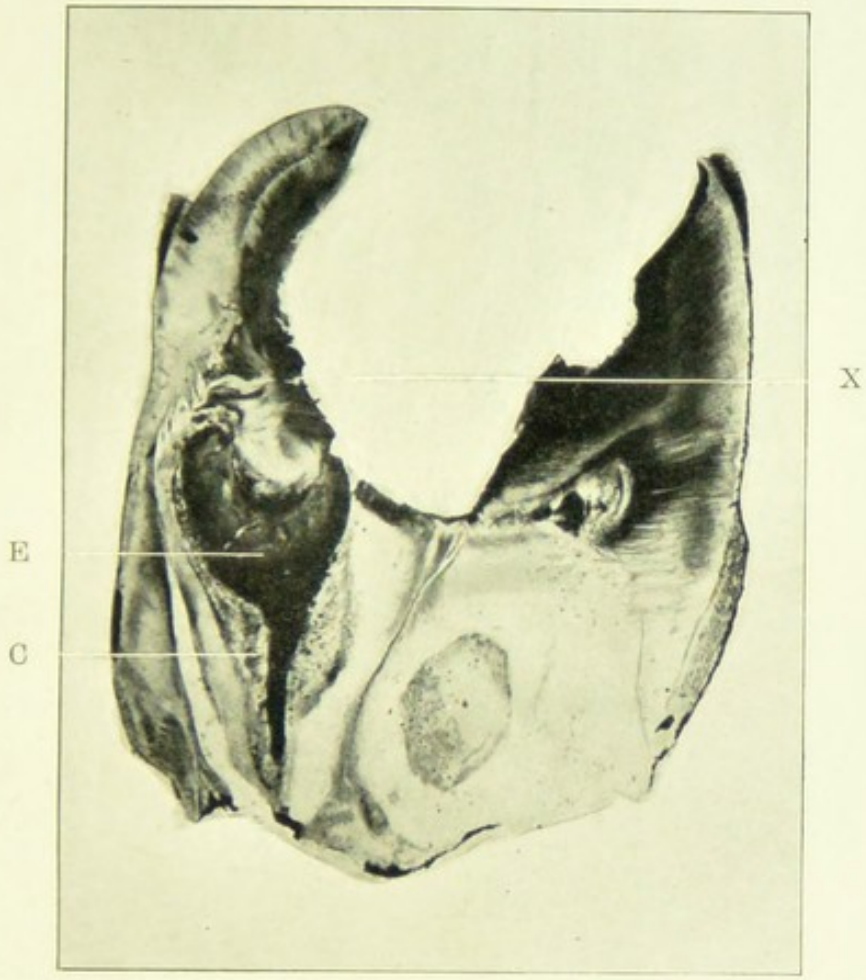

FIG. 60.—Section of enamel nodule partly surrounded by cementum. E, enamel; C, cementum; X, carious cavity. (See p. 101.)

FIG. 61.—Coronal excrescences. (See p. 102.)

DILATED COMPOSITE ODONTOMES.

May also be called—

Cavernous Composite Odontomes

DILATED COMPOSITE ODONTOMES.

DILATED composite odontomes are composite odontomes which have the form of a dilated tooth containing a hollow or depression. These odontomes have three salient characteristics: they are tooth-like, the circumference in some part shows an increase when compared with the normal tooth, and the walls are so arranged as to enfold a hollow or depression.

The name "cavernous composite odontomes" might be given to this group, but for the fact that the hollow or depression is at times partially or completely filled by secondary calcified tissue. The term "radicular odontomes" was formerly used for some of the specimens included in this group. These odontomes present a coronal portion covered by enamel and a radicular portion which is variable in appearance. The coronal portion externally may be almost normal, or it may be conical or globular. The radicular portion may be extremely stunted, when it rapidly diminishes in diameter, or it may be very large, when an increase in circumference is seen almost to its terminal edge, which forms the margin of a depression at the base. The terminal edge is often inverted. Between these two types intermediate forms are found, when the radicular portion may be globular, bulbous, or flattened.

The surface of these odontomes has a depression which may be wide open or presents an orifice communicating with a hollow. The hollow or depression may be partially or almost completely filled by an adventitious

vascular cementum-like tissue. The terminal part of the radicular portion presents openings communicating with the pulp; these may exist as a slit, or as foramina, either large or minute. They will be found at the rudimentary apex, or at one part of the margin of the depression at the base. On section part of the tumour may show a normal arrangement of the tissues; the dilated portion is seen to consist of walls, which are usually thin, enclosing the hollow or depression; on closer examination each wall is found to be composed of two layers of dentine enclosing a thin irregular sheet of pulp. Enamel or cementum may be found upon each dentine layer.

Microscopically the minute structure bears a close resemblance to that of the tissues found in complex composite odontomes.

The cause of these tumours is unknown. They do not give rise to symptoms which are peculiar to this type; when of considerable bulk they are frequently found impacted below the normal level of the teeth.

Removal is only necessary when secondary trouble arises in connection with them.

SUMMARY OF CASES.

	Age	Sex	Region
Salter. *Guy's Hosp. Reports*, 1876, 1st series, xxi. (*Plate XLI, fig.* 84)	11	M.	$\underline{\vert 1}$
Dykes, T. C. Royal Dent. Hosp. Museum. (*Plate XXXVI, fig.* 71)	Young adult	F.	Supernumerary between $\underline{1 \vert}$ and $\underline{\vert 1}$
Graves Morris. *Brit. Dent. Journ.*, 1913, p. 917. (*Plates XXXII, XXXIII, XXXIV, figs.* 62-68.)	12	M.	$\underline{3 \vert}$
Salisbury Sharp, described by J. F. Colyer. *Brit. Dent. Journ.*, 1896, p. 38. (*Plate XXXVII, figs.* 74 *and* 75)	—	—	$\underline{\vert M}$
W. Burt	Young	F.	Incisor region.

DILATED COMPOSITE ODONTOMES.

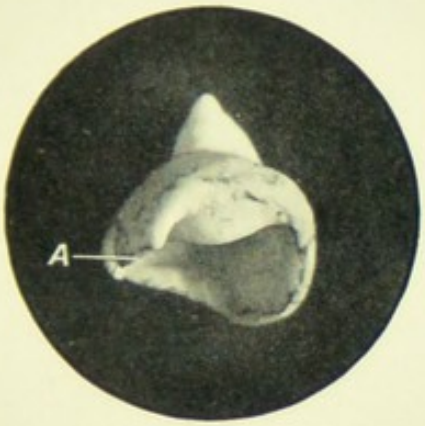

FIG. 62.—A dilated composite odontome of the fusiform type seen from below, showing a depression at the base.

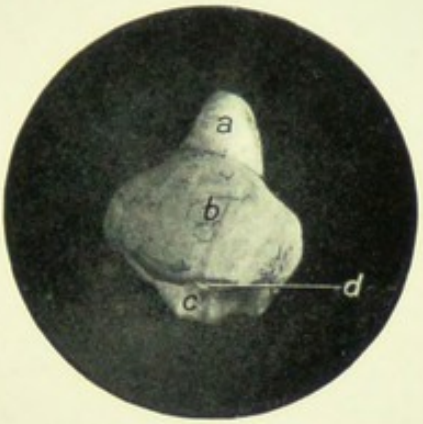

FIG. 63.—Side view of the same specimen.

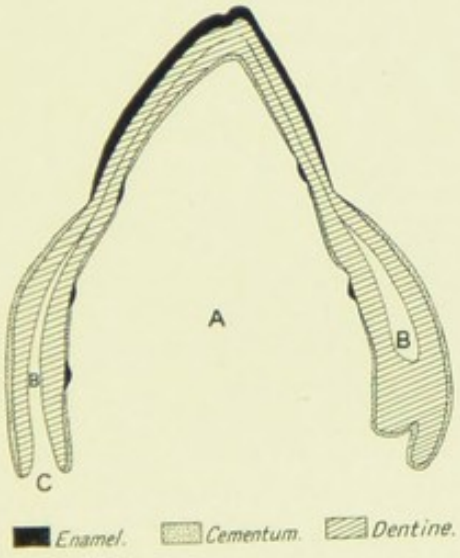

FIG. 64.—Diagram of vertical section of the same specimen. A, central hollow; B, pulp cavity; C, apical slit-like foramen.

Graves Morris, *Brit. Dent. Journ.*, 1913, p. 917. (See p. 106.)

PLATE XXXIII.

DILATED COMPOSITE ODONTOMES.

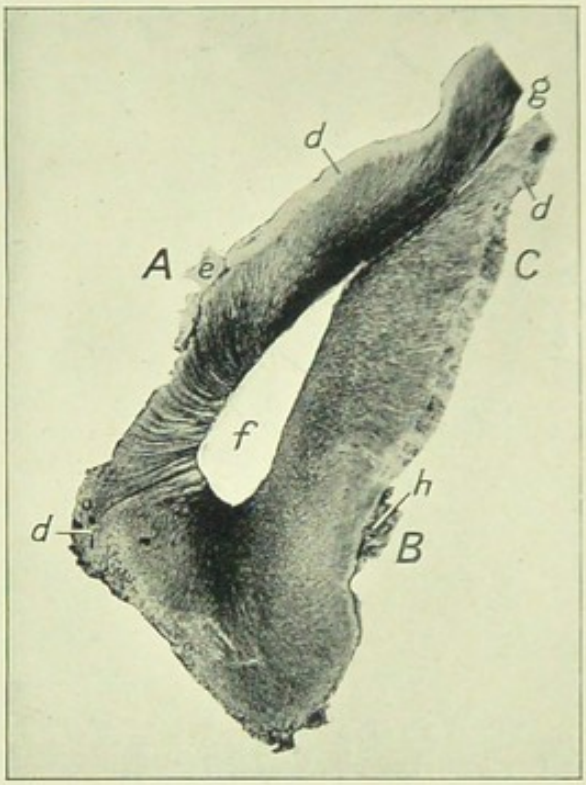

FIG. 65.—Longitudinal section from radicular portion. × 9.

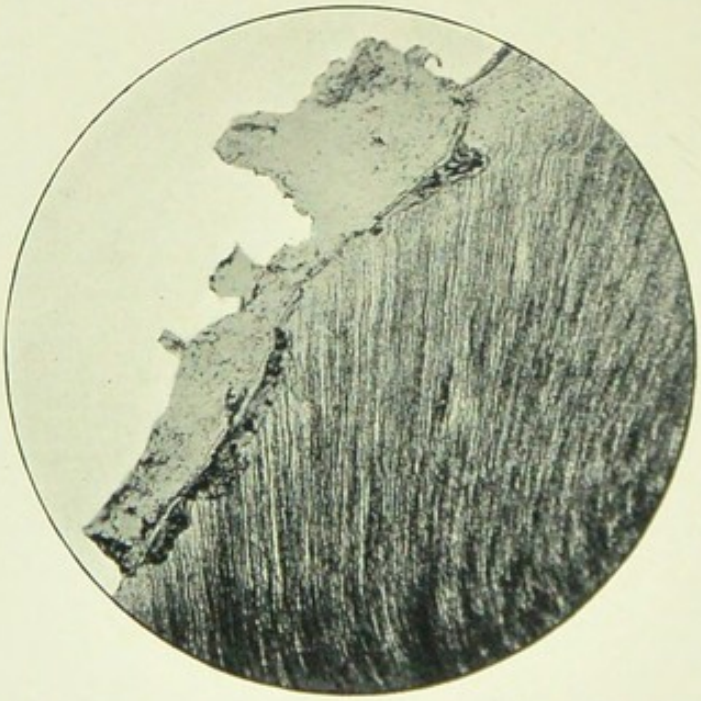

FIG. 66.—Microphotograph of portion marked A in fig. 65. × 44.

Graves Morris, *Brit. Dent. Journ.*, 1913, p. 917. (See p. 106.)

DILATED COMPOSITE ODONTOMES.

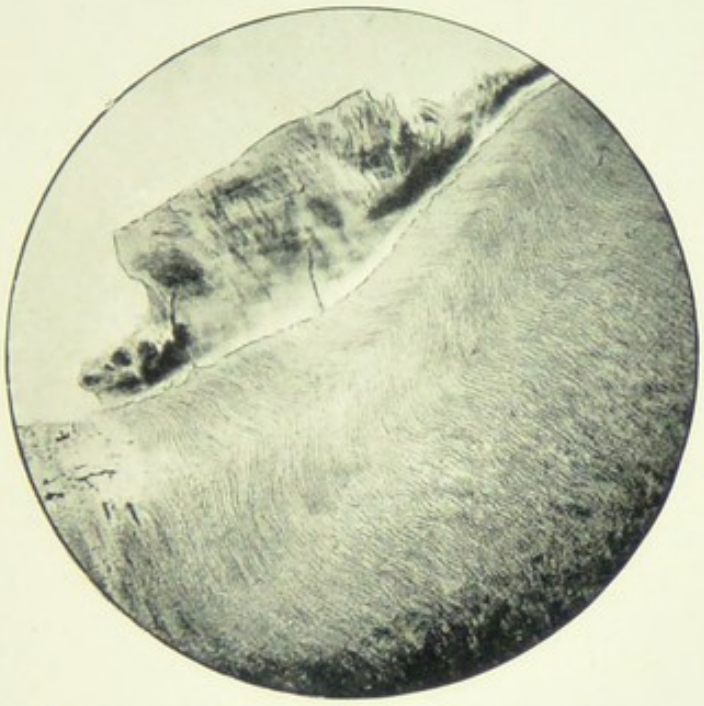

FIG. 67.—Microphotograph of portion marked B in fig. 65. × 44.

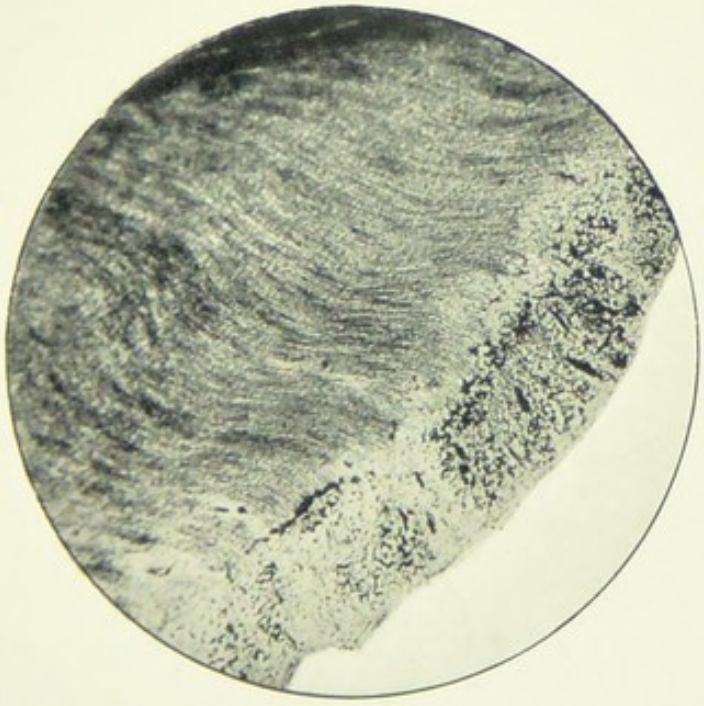

FIG. 68.—Microphotograph of portion marked C in fig. 65. × 44.

Graves Morris, *Brit. Dent. Journ.*, 1913, p. 917. (See p. 106.)

PLATE XXXV.

DILATED COMPOSITE ODONTOMES.

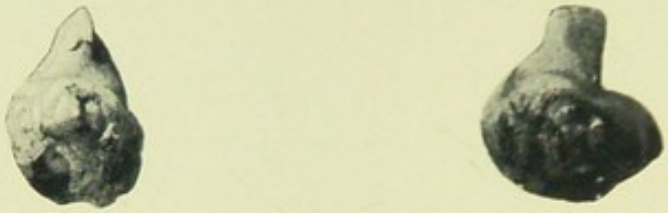

FIG. 69.—A dilated composite odontome of the fusiform type. W. H. Dolamore, *Brit. Dent. Journ.*, 1902. (See p. 107.)

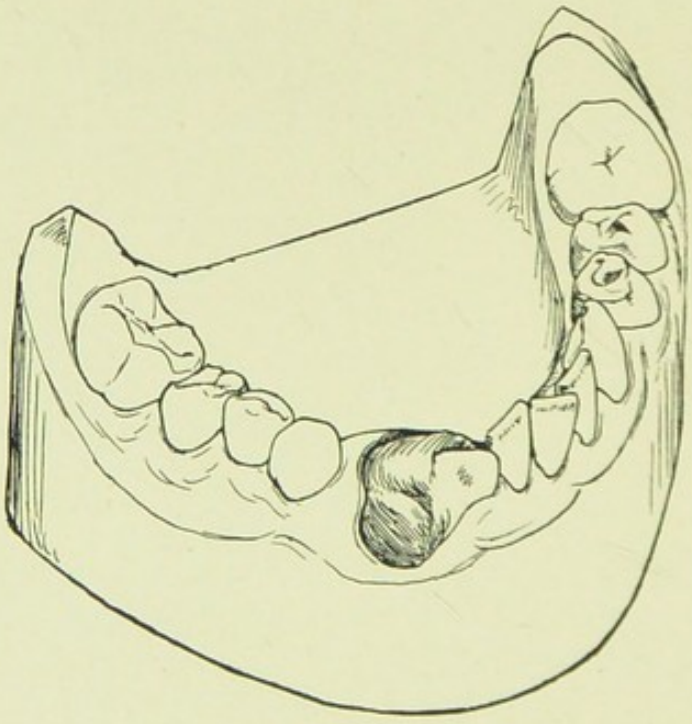

FIG. 70.—Model showing the same *in situ*.

	Age	Sex	Region
W. Burt	12	F.	Supernumerary in incisor region.
T. W. Thew. (*Plate XXXVIII, fig.* 77)	45	M.	$\underline{\lvert 8}$
Royal Dental Hospital Museum ..	Youth	M.	$\overline{5}\rvert$
J. F. Colyer. *Brit. Dent. Journ.*, 1896, p. 36. (*Plate XXXVIII, figs.* 78 *and* 79)	—	—	$\overline{7}$
J. F. Colyer. *Trans. Odonto. Soc.*, 1906, xxxviii, p. 255. (*Plate XL, figs.* 82 *and* 83)	—	—	$\overline{8}$
J. F. Colyer. *Trans. Odonto. Soc.*, 1906, xxxviii, p. 255. (*Plate XXXIX, figs* 80 *and* 81)	—	—	—
H. C. Visick. Guy's Hospital Museum	30	F.	$\underline{2}$
J. G. Turner	—	—	$\underline{\lvert 8}$
Royal College of Surgeons' Museum, 2169*a*	—	—	$\underline{2}\rvert$
Hopewell-Smith. *Trans. Odonto. Soc.*, 1905, xxxvii, p. 110	—	—	$\overline{8}$
H. T. Binns. *Brit. Dent. Journ.*, 1906, p. 876	19	M.	$\underline{\lvert 5}$
Greenwood. Guy's Hosp. Museum, L 6	21	F.	$\underline{2}\rvert$
Dolamore. *Brit. Dent. Journ.*, 1902, p. 542. (*Plate XXXV, figs.* 69 *and* 70)	14	F.	$\overline{2}\rvert$
Guy's Hospital Gazette, February, 1907	60	F.	Left mandible.
Hunterian Specimen, Royal College of Surgeons' Museum. Described by Salter. *Guy's Hospital Reports*, 1869	Described as a "hypertrophied dilated fang."		
Hare. *Trans. Odonto. Soc.*, 1863, iii, p. 335; 1871, iv, p. 81. (*Plate XLII, fig.* 88)	41	M	Upper molar.
Heider and Wedl. Atlas zur Pathologie der Zahne	—	—	—
Windle and Humphrey. *Journ. Anat. and Physiol.*, 1887	25	M	$\overline{7}\rvert$
Fujishina. *Dental Cosmos*, xlvii, p. 102, in a Japanese	31-32	M	$\lvert 7$
Gaddes. *Trans. Odonto. Soc.*, 1876-77, p. 53	—	—	$\underline{6}\rvert$
Markham. Described by Watson. *Brit. Dent. Journ.*, 1894, p. 667. (*Plate XLII, figs.* 86 *and* 87)	—	—	$\lvert 8$

	Age	Sex	Region
Bellaby. *Trans. Odonto. Soc.*, 1870-71, iii, New Series	—	—	6
Philadelphia Dental College. Described in Agnew's "Surgery," 1881, ii, p. 937	—	—	? Molar
J. G. Turner. (*Plate XLI, fig.* 85)	—	—	Molar
Mackley. Museum Odontological Society, No. 434 (present number D 168·2)	—	—	| 8
Royal Dental Hospital, 2360A. (*Plate XXXVII, fig.* 76)	—	—	—
Hopewell-Smith	30	—	Molar
T. Clarence, described by J. F. Colyer. *Brit. Dent. Journ.*, 1896, p. 36. (*Plate XXXVI, figs.* 72 *and* 73)	—	—	Molar

Specimens found in Lower Animals.

		Region
Bland-Sutton. *Trans. Odonto. Soc.*, 1884-85, xvii, p. 182	Agouti	| Incisor
Bland-Sutton. *Trans. Odonto. Soc.*, xvii, p. 48.	Marmot	| Incisor
Bland-Sutton. "Tumours, Innocent and Malignant," p. 239	Porcupine	
J. H. Gibbs. Unrecorded	Sus scrofa	Canines.
Bland-Sutton. *Trans. Odonto. Soc.*, 1884-85, xvii, p. 183	Elephant	Incisor
Bland-Sutton	Sus scrofa	Canine |
Fleming. *The Veterinarian*, xix, 1873. Quoted by Bland-Sutton. *Trans. Odonto. Soc.*, 1884-85, xvii.	Elephant	Molar

Catalogue of Specimens shown in the Museum.

Lent by Mr. James Coltman.

184. A remarkable specimen of right maxillary lateral incisor tooth with a model of the mouth after removal. The crown of the tooth is complete, but just below the neck, almost as if the tooth had been cut across, is a circular patch of enamel with a central depression; the root which joins the crown at a considerable angle at this point is flattened antero-posteriorly, probably a dilacerated tooth.

DILATED COMPOSITE ODONTOMES.

FIG. 71.—A dilated composite odontome of the fusiform type. The Royal Dental Hospital Museum. (See p. 106.)

FIG. 72.—Dilated composite odontome of the fusiform type. T. Clarence, *Brit. Dent. Journ.*, 1896. (See p. 108.)

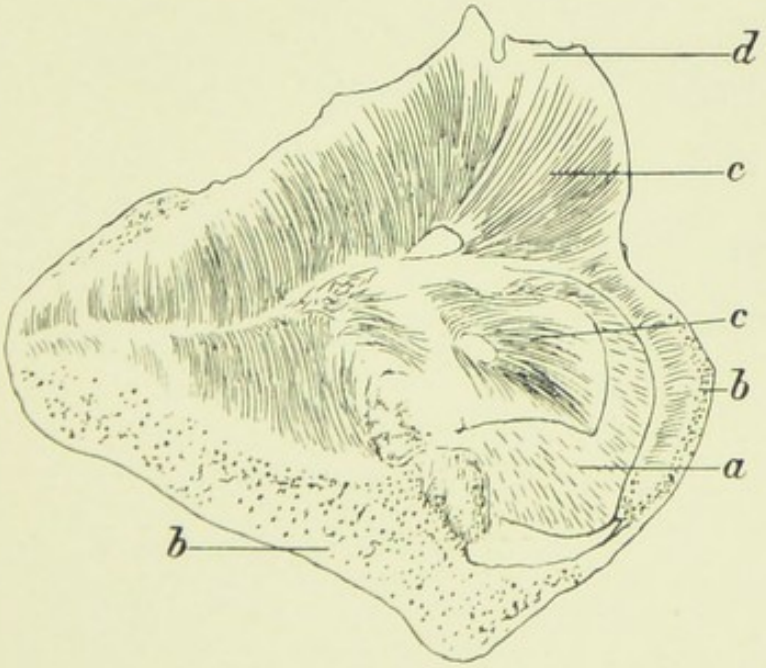

FIG. 73.—Section of specimen shown in fig. 72.

PLATE XXXVII.

DILATED COMPOSITE ODONTOMES.

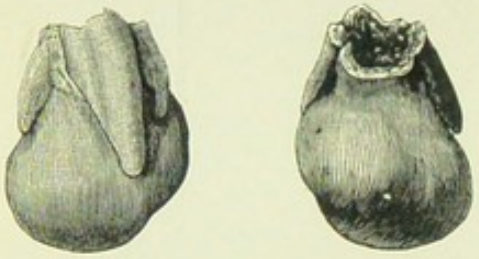

FIG. 74. - A dilated composite odontome of the fusiform type. Salisbury Sharp. *Brit. Dent. Journ.*, 1896. (See p. 106.)

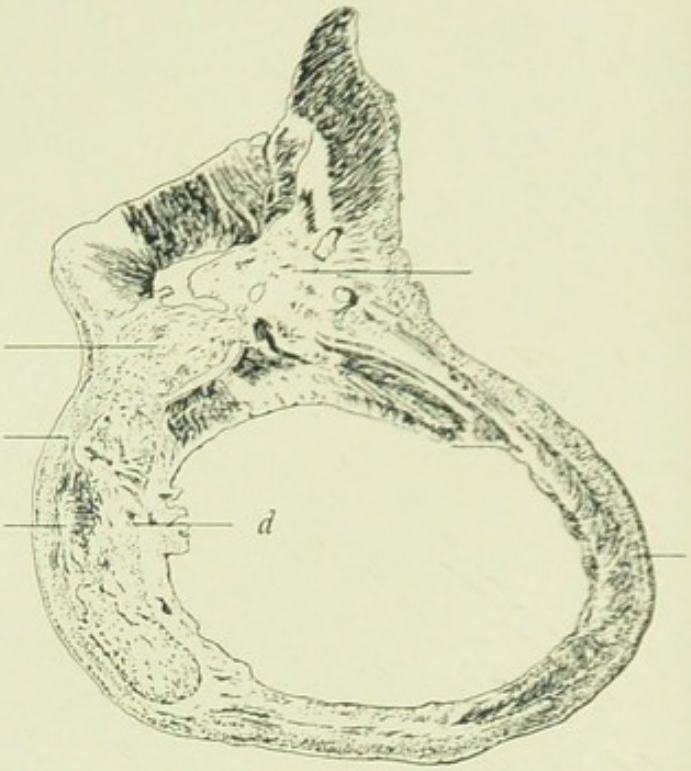

FIG. 75.—Section of specimen shown in fig. 74.

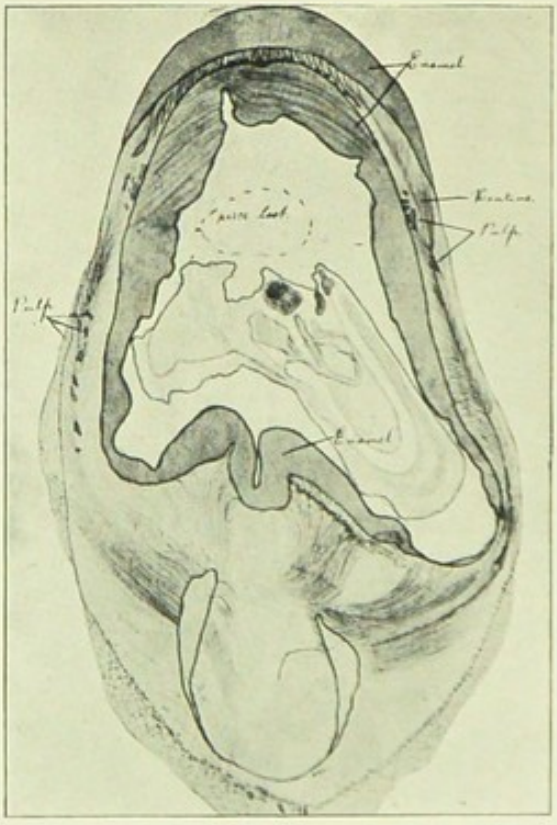

FIG. 76.—Section of a dilated composite odontome of the fusiform type. The Royal Dental Hospital Museum. (See p. 108.)

DILATED COMPOSITE ODONTOMES.

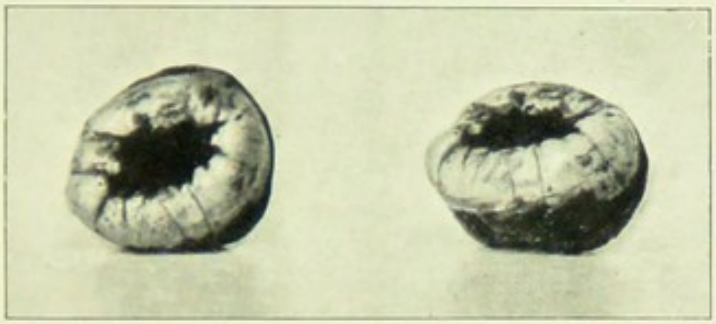

FIG. 77.—A dilated composite odontome of the coronary type. T. W. Thew. (See p. 107.)

FIG. 78.—Dilated composite odontome of the coronary type. J. F. Colyer, *Brit. Dent. Journ.*, 1896. Roy. Coll. Surg. Museum. (See p. 107.)

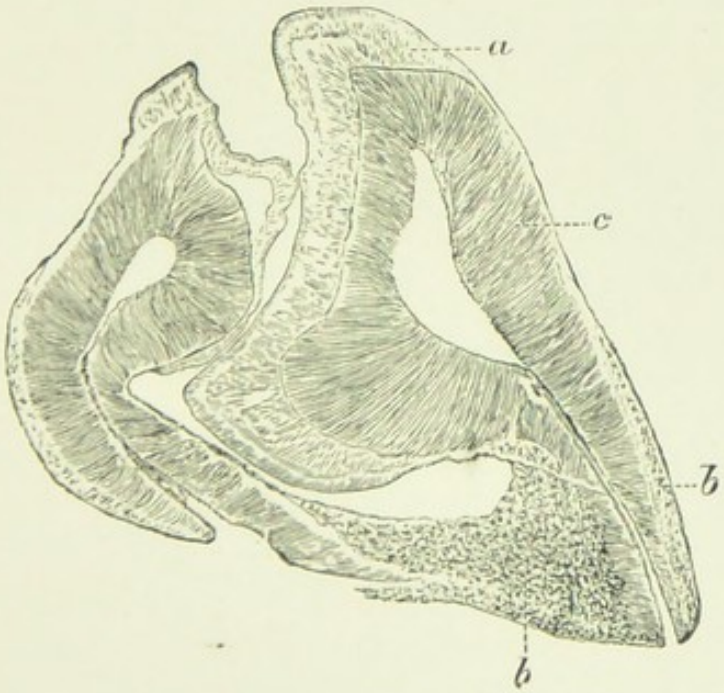

FIG. 79.—Section of specimen shown in fig. 78.

PLATE XXXIX.

DILATED COMPOSITE ODONTOMES.

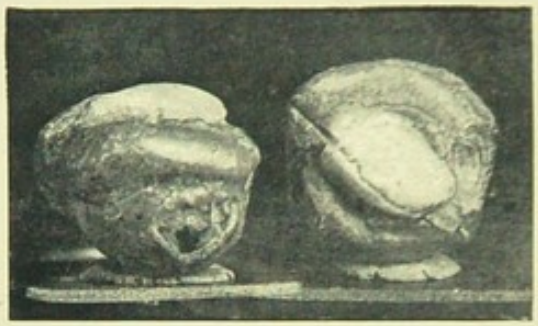

FIG. 80.—Dilated composite odontome of the coronary type. Roy. Coll. Surg. Museum. (See p. 107.)

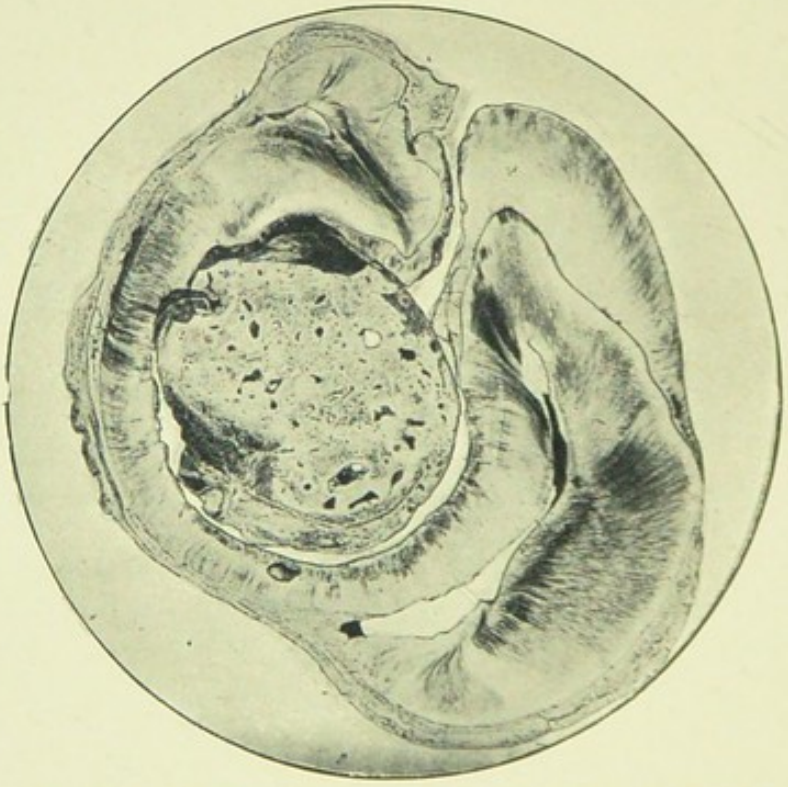

FIG. 81.—Section of specimen shown in fig. 80.

Lent by Mr. H. Wallis.

185. Specimen of a maxillary central incisor showing irregular formation of the crown, together with a microscopical section of the other central incisor which was of the same character.

Lent by Mr. W. Burt.

186. An odontome, exposed after removal of central incisors which overlapped it.

Patient was a young girl.

187. An odontome from a girl, aged 12, who had a sinus opening under left eye for eighteen months. . . . At one time there was considerable swelling, vision obscured, and nose displaced to one side. Operation by Dr. Wetherall at Weymouth Royal Hospital. Necrosed bone removed by gouges and odontome shelled out. Model (after operation) with a supernumerary tooth.

Lent by Odontological Society of Great Britain.

188. Plaster cast of a radicular odontome. (G. Watson.) 427

This odontome was removed by Mr. R. Markham, of Newcastle-on-Tyne, several years before being described by Mr. Watson in *Journ. Brit. Dent. Assoc.*, October, 1894. It was taken from the upper jaw of a patient who had suffered for years from severe neuralgia. The malformed tooth consists of the remains of the buccal and distal walls of the third left upper molar. The crown was fractured in removing the tooth. The root of the odontome is quadrate in shape, surface is rough and irregular and has projecting from it several prominent tubercles, and is penetrated by numerous foramina for the transmission of blood-vessels. Measures 1·9 × 9·16 × ·7157 inches. This tumour was described as a radicular osteo-dentoma. (*Plate XLII, figs.* 86 *and* 87.)

189. Plaster cast made by G. Duprey of a radicular odontome. 427A

190. Radicular odontome in connection with a maxillary molar. 428

Radicular odontome described by Mr. J. F. Colyer in *Jour. Brit. Dent. Assoc.*, 1896, pp. 38, 39. Removed by Dr. Salisbury Sharp. This abnormality consists in a globular swelling about the size of an acorn, involving one root of a four-rooted upper molar. On dividing it with a saw, the globular swelling was found to be hollow and lined with a tissue which presented distinct evidence of having been soft in character.

Microscopically.—The original pulp chamber is very nearly filled up with a form of secondary dentine, presenting but little structure beyond a few blood-vessels.

The globular swelling itself is bordered by a layer of cementum, and the lacunæ are more numerous on one side of the section. Internally to this cemental coating is a layer of hard tubed (?) dentine, but at one part of the section an irregular tissue containing large blood-vessels, lacunæ and a few dentinal tubes are observed, and this part of the section appears to be continuous with the secondary dentine contained in the original pulp chamber. (*Plate XXXVII, figs* 74 *and* 75.)

191. Radicular odontome in connection with a maxillary molar. See *Trans. Odonto. Soc.*, 1863, iii, p. 335, and iv, p. 81. 426

Radicular odontome presented by Mr. Hare, of Limerick, to the Odontological Society, and described by Mr. C. S. Tomes. The tooth, a molar, was taken from the upper jaw of a countryman, aged 41, who for some years previously had suffered severe pain in the jaw; a sinus was present, tooth was removed, and the mass itself may be roughly described as built up of three coalescing flattened lobes not very distinctly marked: it is perforated by two irregular holes which lead to a large cavity in the centre. The tumour is not less than four times the bulk of the tooth to which it is attached, and the whole mass measures 45 mm. × 22 mm. (*Plate XLII, fig.* 88.)

192. Radicular odontome in connection with a left maxillary incisor. 432

193. Radicular odontome. No history. 433

194. Radicular odontome in connection with left maxillary third molar. (E. Mackley.) 434

Lent by Guy's Hospital Museum (Dental Section).

195. Radicular odontome and microscopical section of same. The tumour was connected with the right upper lateral incisor, which was removed on account of persistent pain. The canine remained unerupted until the odontome was removed. (Mr. P. Greenwood.) L 6

Lent by L'Ecole Dentaire, Paris.

196. Radicular odontome of a mandibular premolar. (19)

Lent by Mr. W. H. Dolamore.

197. Radicular odontome occupying the position of the right mandibular lateral incisor. The crown of the tooth is flattened, and the root consists of a smooth bulbous mass. Weight 2·7 grm. Measurements: antero-posterior 1·2 cm., lateral 1·6 cm., vertical 1·9 cm. (*Plate XXXV, figs.* 69 *and* 70.)

DILATED COMPOSITE ODONTOMES.

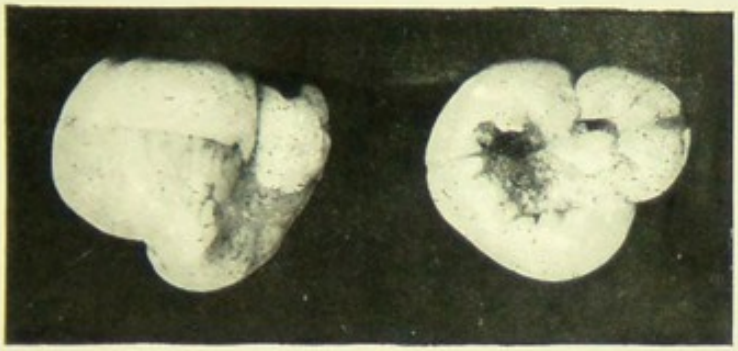

FIG. 82.—Dilated composite odontome of the coronary type. This specimen illustrates the gradation between this group and geminated composite odontomes. *Trans. Odonto. Soc.*, 1906. (See p. 107.)

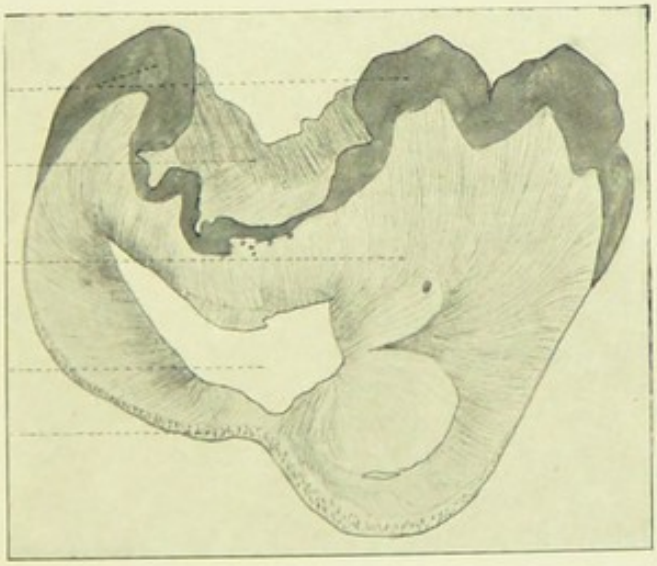

FIG. 83.—Section of specimen shown in fig. 82.

PLATE XLI.

DILATED COMPOSITE ODONTOMES.

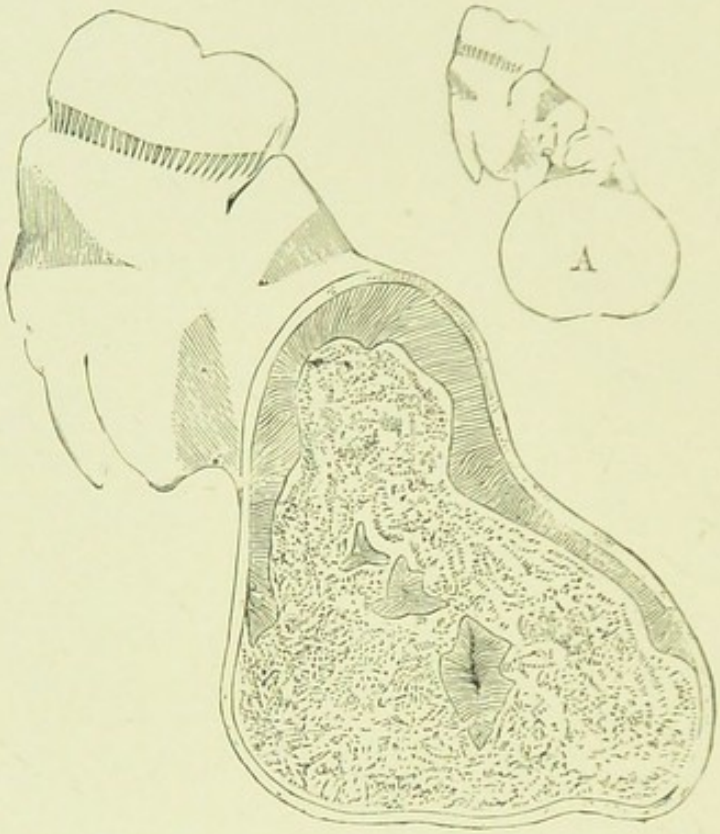

FIG. 84.—Dilated composite odontome of the radicular type. Hunterian specimen, Royal College of Surgeons Museum. Described by Salter, *Guy's Hospital Reports*, 1869. (See p. 106.)

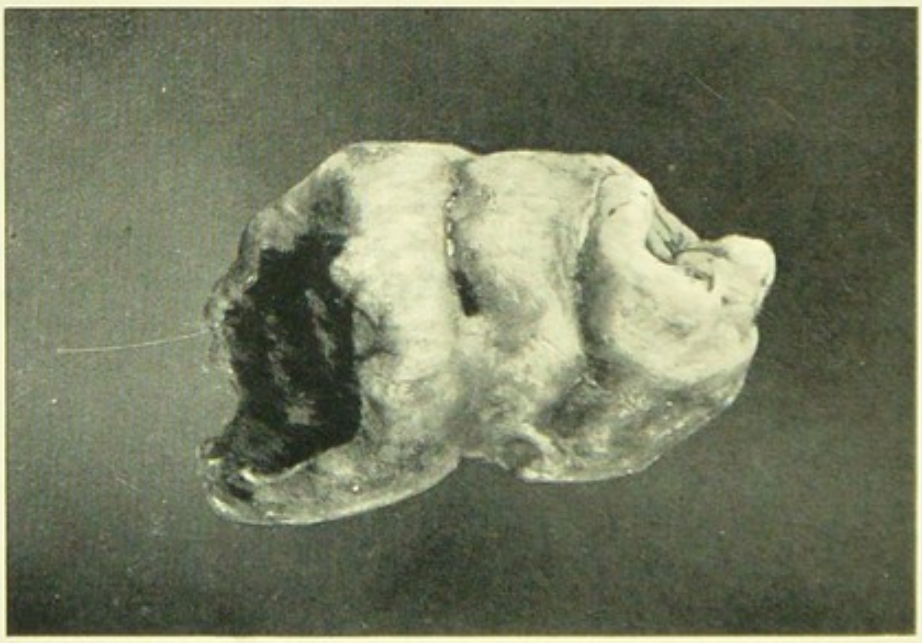

FIG. 85.—Dilated composite odontome of the radicular type, in the possession of J. G. Turner. (See p. 112.)

198. Microscopical section, described by Mr. A. Hopewell-Smith, shows the tissues inextricably confused. It is remarkable for the dense pigmentation of its enamel, but the lines of Schreger are altogether wanting. The greater bulk consists of fine-tubed dentine and an amorphous osseous substance with occasional large cavernous spaces. (*Journ. Brit. Dent. Assoc.*, 1902.)

Lent by Mr. A. Hopewell-Smith.

199. A radicular odontome from the molar region of the maxilla of a patient aged 30.

200. Microscopical section of last specimen.

201. Microscopical section of a radicular odontome. No history.

Lent by the Royal College of Surgeons of England.

202. Sections of a right upper lateral incisor tooth with a tumour-like overgrowth of the crown ("odontoma coronaire," Broca). The crown is rounded, and measures half an inch in diameter, but is very short. Upon its surface are two depressions, of which one is a quarter of an inch long and one-eighth deep, and from one part of it a fissure extends horizontally beneath its lower surface; the other is small and superficial. A thin layer of enamel is continued over the larger depression. The hypertrophied crown is covered with a thick layer of enamel. 2169A

(Presented by W. H. Key.)

203. A cast of the upper jaw, from which the preceding was taken. 2169B

Lent by The Royal Dental Hospital.

204. This tooth mass was found among the teeth extracted at this hospital, and no history is obtainable. A section was made (No. 251) and lantern slides (504) × 16, (505) × 20, (506) × 40, (507) × 20, which show it to be composed of dentine, enamel and cementum and a very vascular cementum in the central hollow. (*Plate XXXVII, fig.* 76.) 2360A

Lent by Mr. T. W. Thew.

205. From region of left maxillary third molar in a man about 45. Gave rise to no trouble. (*Plate XXXVIII, fig.* 77.)

Lent by the Odontological Society of Great Britain.

206. Odontome from the maxillary premolar region of a male, aged 30. The rounded side was directed towards the alveolar border, and the concave side upwards. The canine was deeply buried above the odontome. The outer part of the odontome is cementum, the concavity being lined with enamel. (H. Baldwin.) 430

207. Plaster model of an odontome removed from the left mandibular second and third molars of a female, aged 23. (F. W. Richards.) *Trans. Odonto. Soc.* 436

From the University of Pennsylvania.

Lent by Dr. M. H. Cryer.

208. A composite odontome. History unknown. The portion apparently covered by enamel, although very irregular, has the form of a crown of a tooth, the remaining portion is considerably expanded but hollow.

209. Microscopical section of a composite odontome (?)

Lent by Mr. J. G. Turner.

210. Skull with an odontome in the position of the upper third molar.

211. Radicular odontome, history unknown. The crown, a left mandibular molar, is complete, except on its inner surface, from which and from the lower surface a mass projects. It increases in diameter to its termination, which presents an irregular depression. This specimen appears to be figured by Mr. J. Bland-Sutton ("Tumours Innocent and Malignant," fig. 46E p. 60, 2nd edition). (*Plate XLI, fig.* 85.)

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DILATED COMPOSITE ODONTOMES.

FIG. 86.—Dilated composite odontome of the radicular type, removed by R. Markham. *Brit. Dent. Journ.*, 1894. (See p. 109.)

FIG. 87.—Section of specimen shown in fig. 86.

FIG. 88.—Dilated composite odontome of the radicular type removed by Hare, of Limerick. *Trans. Odonto. Soc.*, 1863. (See p. 110.)

CONNECTIVE TISSUE ODONTOMES.

1.—FIBROUS ODONTOMES.

2.—CEMENTOMES.

FIBROUS ODONTOMES.

PLATE XLIII.

FIBROUS ODONTOMES.

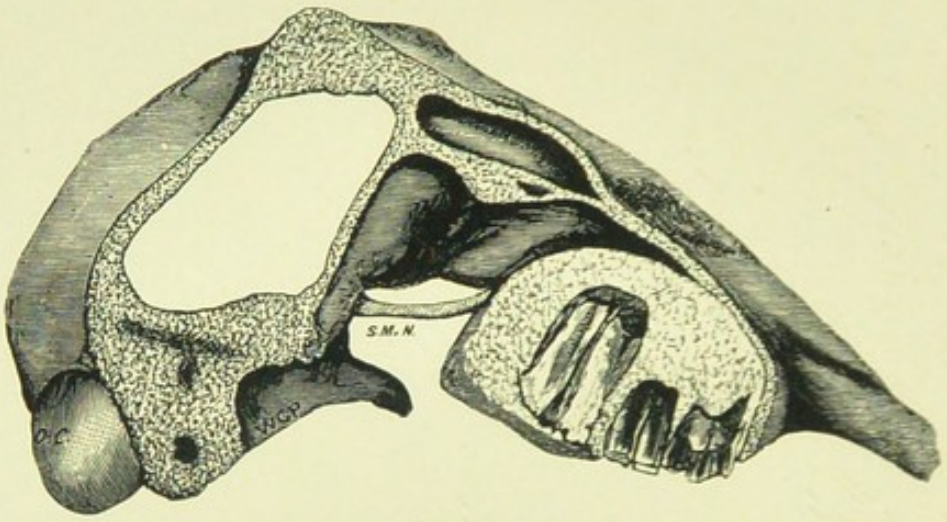

FIG. 89.—A fibrous odontome from a goat, described by J. Bland-Sutton. *Trans. Odonto. Soc.*, 1887. (See p. 117.)

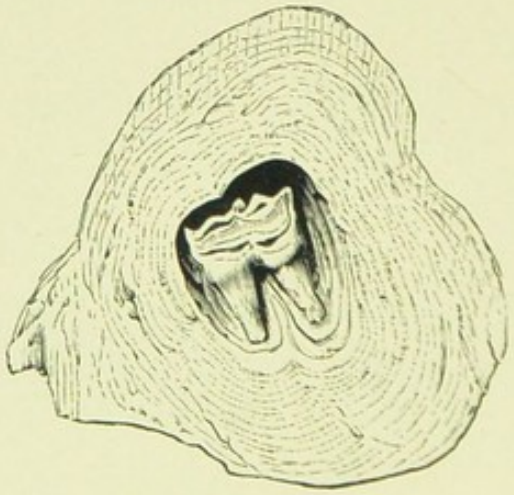

FIG. 90.—A fibrous odontome from a goat, described by J. Bland-Sutton. *Trans. Odonto. Soc.*, 1887. (See p. 118.)

FIBROUS ODONTOMES.

FIBROUS odontomes are odontomes consisting of an overgrowth of the fibrous tissue of a tooth sac.

They are composed of concentric layers of white fibrous connective tissue surrounding, or associated with, a tooth. Sporadic calcification may occur.

Although these growths are described as odontomes, it must be remembered they are probably a result of rickets.

These growths must be distinguished from fibromata, which occur as endosteal tumours or neuro-fibromata upon the inferior dental nerve. They must also be distinguished from those odontomes in which the adventitious capsule has become considerably thickened.

They have been described in man and lower animals (goats, bears, lions, and marsupials) and may be multiple and symmetrical. The hosts in all cases appear to have been the subjects of rickets.

They should be removed if giving rise to symptoms.

CATALOGUE OF SPECIMENS SHOWN IN THE MUSEUM.

Lent by the ROYAL COLLEGE OF SURGEONS OF ENGLAND.

212. The left half of the skull of a young goat. The maxilla is divided by a vertical section and exhibits in the region of the antrum a large rounded and distinctly circumscribed tumour, which has expanded the walls of the bone and formed a rounded projection externally. The centre of the tumour is occupied by a molar tooth and is surrounded by a thick layer of connective tissue. Microscopic examination of this tissue showed the usual appearances of the wall of a tooth follicle, and it would therefore appear that the tumour was occasioned by an overgrowth of this structure. (*Plate XLIII, fig.* 89.) 2197B

See *Journ. Anat. and Phys.*, xix, p. 438. (Presented by Mr. J. Bland-Sutton, 1886.)

Bibliography.

Bland-Sutton. *Trans. Odonto. Soc.*, 1887, p. 45 (*Plate XLIII, fig.* 90); p. 190 (*Plate XLIV, figs.* 91 *and* 92); 1888, p. 138.

Heath. "Disease and Injuries of the Jaws."

Broca. "Traités des Tumours," Paris, 1869.

Magitôt. "Anomalies du Système Dentaire."

Robin. *Mém. Soc. Biol.*, 1863, ser. iii, iv, p. 301.

Letenneur. Anat. Soc. of Paris, 1856.

Storer Bennett. *Trans. Odonto. Soc.*, 1892.

Jordan Lloyd. *Journ. Brit. Dent. Assoc.*, xiv, p. 564.

FIBROUS ODONTOMES.

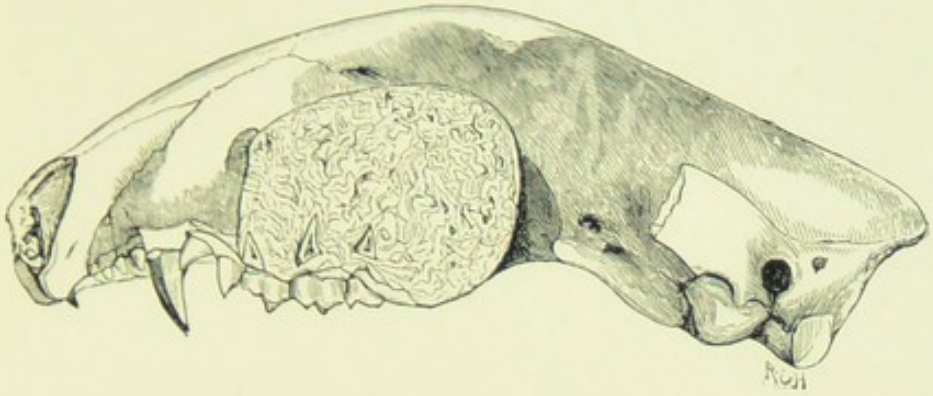

FIG. 91.—A fibrous odontome from a dasyure, described by J. Bland-Sutton. *Trans. Odonto. Soc.*, 1887. (See p. 118.)

FIG. 92.—Section of the fibrous odontome shown in fig. 91.

CEMENTOMES.

CEMENTOMES.

CEMENTOMES are odontomes composed of cementum. If other dental tissues be present, they are normally arranged with regard to one another.

This group of odontomes is with difficulty separated from those cases of proliferative formation of cementum due to local irritation. The latter group (exostoses) is so plentiful in specimens that the true cementome is in danger of being lost sight of. The true cementome has been described as arising either as a calcification of a fibrous odontome, or as an excessive development of cementum.

Macroscopically a cementome usually presents a stalactytic appearance, the surface being extremely irregular, whilst the exact nature of the tissue is not easily determined. On microscopical examination, the tissue presents a marked contrast to normal cementum; it is non-laminated for the greater part; is very vascular, usually being more so than herbivorous cementum; the vascular channels are very irregular; the lacunæ appear isolated with a large quantity of clear or "areolar" matrix; Sharpey's fibres are well marked.

The appearance of the true cementomes must be compared with those due to irritation, which formerly have been described as cementomes. An irritation cementosis is markedly laminated, indicating the manner in which it has been deposited, and there is a closer resemblance to ordinary cementum than in the case of the cementome.

Vascularity is not marked, being less so than in herbivorous cementum. The lacunæ present a characteristic appearance, being numerous, markedly branched, often differing in size, and irregularly distributed. Macroscopically the surface of an irritation cementosis is rounded, and less irregular than a cementome.

Cementomes occur more commonly in the lower animals than in man; some of the specimens from horses have attained enormous dimensions. In both man and the lower animals these attain to a greater size than any other form of calcified odontome.

Very little is known of the clinical course of these tumours; in the majority of cases the specimen has been procured without details of its history. They appear to have gradually increased in size until secondary complications occur; the commonest of these is suppuration following infection of the surrounding tissues. They closely resemble the course taken by other calcified tooth tumours, but may present some variations on account of their greater bulk.

The treatment is the same as that for the other calcified odontomes.

CATALOGUE OF SPECIMENS SHOWN IN THE MUSEUM.

Lent by Mr. W. A. MAGGS.

213. A large cementome in connection with a root of the right lower first molar.

It occurred in the mouth of a youth, aged 19, who came to Guy's Hospital complaining of pain and swelling on the right side of the face. Before admission into the hospital a lower right second premolar was removed, in the hope of reducing the swelling on that side of the mandible, but no discharge followed the extraction and the swelling remained as before. When admitted the patient mentioned that he had twice received an injury on the right side of the mandible. As a child he suffered from rickets. The operation was performed a few days after admission, and the tumour came away in three pieces. On examination, this tooth tumour was found to be a hard, oval, nodular mass, containing patches of soft bone interspersed; the posterior root of the first lower molar was firmly united to it at its upper surface, and microscopical sections taken later demonstrated the prevalence of cementum.

Lent by MIDDLESEX HOSPITAL.

214. A large cementome (together with models, photographs, microscopical sections, and skiagraph) connected with the second and third left mandibular molars, removed by Mr. J. Murray, who fully described it. *Trans. Odonto. Soc.*, May, 1905, xxxvii. (*Plate XLV, fig.* 94.)

Lent by Mr. J. A. WOODS.

215. Cementome (? composite odontome) from the left maxilla of a horse (Prof. Owen Williams and Dr. Annett).

Specimen I.

The subject which had the odontome was an old cart horse. For a year or more he had suffered from slight catarrh from the nostril on the affected side, but as it did not interfere with his condition or his feeding, he was placed under veterinary observation.

Latterly, however, he began to lose condition—the discharge increased, and he had some difficulty in mastication. On examination, the second and third left maxillary molar teeth were found tender. On percussion of the superior maxillary sinus, dulness was obtained, and was supposed to be due to an accumulation of pus in that cavity, and which had probably become inspissated. There was no external swelling or bulging of the bone—nor softening of it in that region. The horse was cast and an attempt made to trephine into the sinus, but after breaking a trephine, and not being able to remove a portion of bone, I desisted. In a few days I tried again, but could not get into the sinus nor into the base of the teeth. The horse was allowed to rise and was taken to his stable.

The irritation of the operation caused a periostitis in the neighbourhood of the operation, the patient was much "fevered," rapidly lost condition, did not feed, and as he was not of much value and in considerable pain, he was destroyed. (Prof. W. Owen Williams.)

216. Cementome, no history, connected with the second left maxillary molar. (Prof. Owen Williams and Dr. Annett.)

217. Cementome, upper molar of a horse. (Prof. Owen Williams.)

218. Odontome, incisor of a horse three years old, no history. (Prof. Owen Williams.)

Lent by Sir John McFadyean, from the Royal Veterinary College.

219. Skull of a horse showing a cementome in the right maxilla. No history. (*Plate XLV, fig.* 93.)

220. Large cementome measuring about 10 in. × 6 in. × 8 in., divided into two pieces.

221. Cementome from a horse, measuring about 8 in. × 5 in. × 4 in. No history. 202

222. Left side of skull of horse showing an enormous cementome.

From Dental Hospital of Ireland.

Lent by Mr. A. W. W. Baker.

223. Cementoma from tooth of horse.

Lent by Odontological Society of Great Britain.

224. Wax model of a cementoma. The original is in the Royal College of Surgeons of England. 422

225. Cementoma in connection with a mandibular molar. 423

Lent by Mr. Walter Glaisby and Mr. J. A. Woods.

226. Microscopical section and photomicrograph of the root of a tooth containing dentine, bone and cementum, irregularly arranged.

CEMENTOMES.

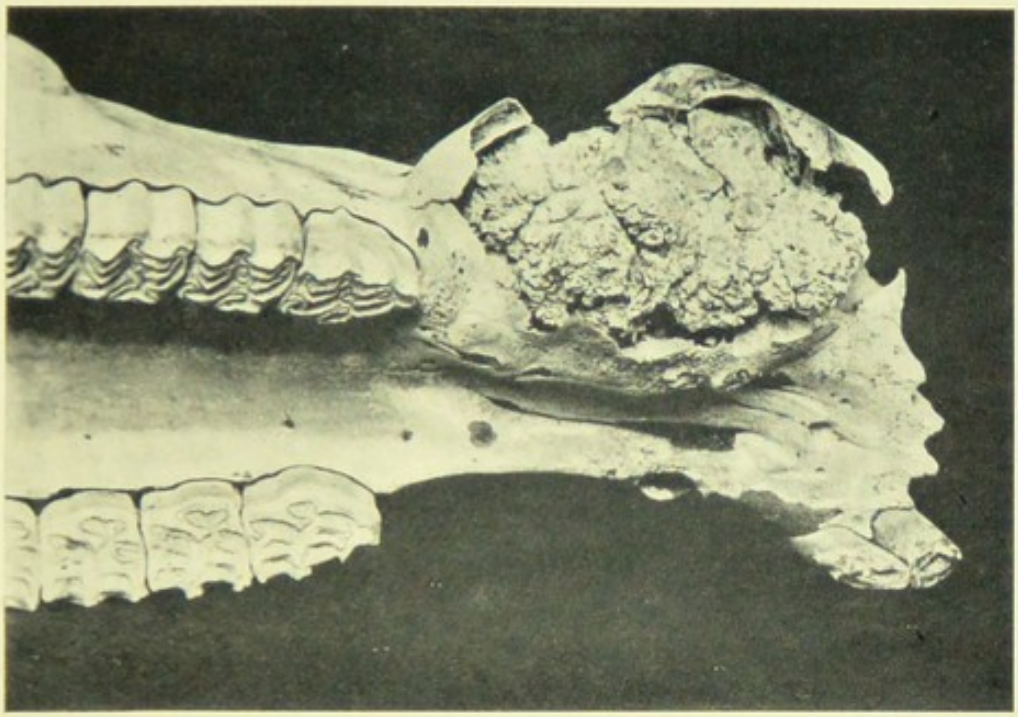

FIG. 93.—Cementome in right maxilla of a horse. (See p. 124.)

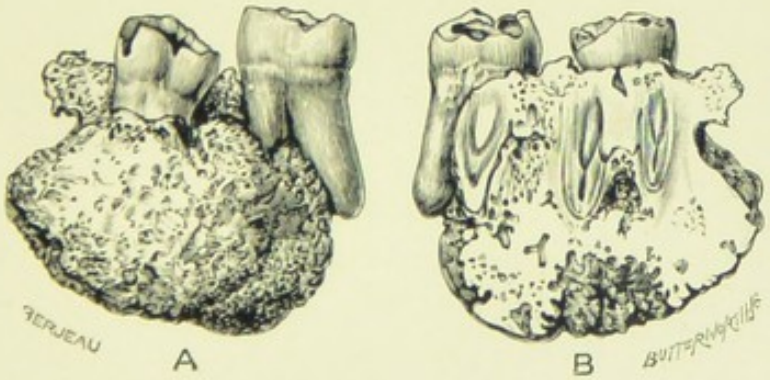

FIG. 94.—Cementome from the left side of the mandible of a man aged 21. Sir J. Bland-Sutton, "Tumours Innocent and Malignant." (See p. 123.)

Described as a radicular cementoma. A mass protruded through the mucous membrane of the right maxilla in the region of the second and third molars; the mass was extracted. It measures 25·4 mm. × 18·7 mm.; weight 11·34 grammes.

Microscopically the tissues of the second molar were normal and marked off more or less clearly from the cemental mass, but the third molar shows no line of definition between the dentine and the cementum of the tumour.

Lent by Mr. J. Bland-Sutton.

227. A cementome connected with a left mandibular molar. (To be published shortly.)

References.

Tomes, C. *Trans. Odonto. Soc.*, 1871-72, iv, p. 103.
Tomes, J. *Trans. Odonto. Soc.*, 1861-63, p. 337.
Barratt (described by Tomes). *Trans. Odonto. Soc.*, 1877-78, x, p. 7.
Bland-Sutton. (Specimen in Royal Veterinary College Museum, 202.) *Trans. Odonto. Soc.*, 1890-91, p. 215.
Maisonneuve. Forget's "Dental Anomalies."
Broca. "Traité des Tumeurs," 1869, ii, p. 350.
Murray. *Trans. Odonto. Soc.*, 1905, p. 176.
Maggs. Bland-Sutton's "Tumours Innocent and Malignant."

APPENDIX.

APPENDIX A.

MALIGNANT ODONTOMES.

A CERTAIN number of tumours arising from dental tissues have been described by names which imply that they are malignant. Such terms as "burrowing epithelioma," "epithelial malignant tumour of the alveolo-dental membrane," "composite embryo-plastic odontome (sarcoma)" and "epithelial odontome (carcinoma)" are to be found. If the claim, that these tumours arising from dental tissues are truly malignant, be substantiated, the formation of a group in the classification of odontomes which would include them becomes necessary. On this account the term "malignant odontomes," to include both sarcomata and carcinomata, was introduced in the catalogue of the Museum on which this monograph is based.

A careful consideration of the cases which have been recorded shows that they do not possess the essential characteristics of malignant tumours. The establishment of a new group is, therefore, not warranted at present.

The features that suggested malignancy were the rapid rate of growth, the uncertain clinical appearance and the microscopical structure of the tumours. But it is most significant in the accounts of these tumours that no deaths are recorded as due to the growth; that recurrence did not take place, in spite of the limited extent of the operation in most of the cases; that secondary

deposits in glands or remote parts did not occur; nor did that important feature infiltration appear to be present.

There is one exception to the above statement, if the following case, designated by Sir Frederic Eve* as a composite embryo-plastic odontome (sarcoma), be correctly attributed to a dental origin.

The account of the case is taken from the Catalogue of the Museum of the Royal College of Surgeons:—

"The tumour was removed in 1877 from a patient aged 67. In 1847 Sir W. Fergusson removed from the right side of the lower jaw a 'fibroid' tumour, containing a cyst of many years' duration. In July, 1877, a cystic tumour, which had developed in the left half of the lower jaw, was operated on by opening the cysts and scooping out their contents. In November, 1879, the patient reappeared with a large solid tumour, which had grown on the left side of the jaw in the site of the cystic tumour. This recurrent growth was removed; it is the specimen preserved. The patient died three months afterwards with recurrence of the tumour in the skin of cheek, with a round-cell sarcoma beneath the right biceps muscles, and a tumour of a similar nature in the pelvis."

Although at present there does not appear to be sufficient evidence to justifiy the establishment of a group of malignant odontomes, yet on theoretical considerations the possibility of such tumours occurring is quite conceivable.

CATALOGUE OF SPECIMEN SHOWN IN THE MUSEUM.

Lent by Sir FREDERIC EVE.

228. Microscopical section and lantern slide. Embryoplastic odontome: sarcomatous. The following account is from Sir Frederic Eve's notes.

* Eve, *Brit. Med. Journ.*, June 29, 1907, p. 1525.

Patient has had lump on left side of face for two years. Commenced about size of small nut, and has been getting larger and larger; now about size of a large orange. No pain, no fixation of jaw, no difficulty in swallowing.

Present Condition.—A lump about the size of a large orange over posterior part of horizontal and vertical ramus of mandible. The jaw is only slightly enlarged on the inner side. Near the external alveolar margin of the left side is an oval ulcer, about the size of a threepenny-piece. Skin movable over lump, which is hard all over. No facial paralysis.

Operation.—Excision and disarticulation of nearly half mandible. Death from shock four hours after operation.

Microscopical Section showed it was an embryoplastic odontome, *i.e.*, sarcoma containing secondary enamel organs and epithelium.

This specimen is similar to Nos. 2,204 and 2,234 in Royal College of Surgeons' Museum. Two of these three specimens were examined microscopically and described by Mr. Eve, who regards them as sarcomata arising from tooth-germs. The third, which is now shown, has not been described before.

Lent by Royal College of Surgeons, England.

229. A soft tumour of the lower jaw. It contains a small cyst near its centre, and another on its upper surface. The upper portion of the tumour contained isolated masses composed of tortuous, closely crowded columns of small epithelial cells, but the bulk of the tumour is a round-celled sarcoma. 2204

The tumour was removed in 1877 from a patient, aged 67. In 1847 Sir W. Fergusson removed from the right side of the lower jaw a "fibroid" tumour, containing a cyst of many years' duration. In July, 1877, a cystic tumour, which had developed in the left half of the lower jaw, was operated on by opening the cysts and scooping out their contents. In November, 1879, the patient reappeared with a large, solid tumour, which had grown on the left side of the jaw in the site of the cystic tumour. This recurrent growth was removed; it is the specimen preserved. The patient died three months afterwards with recurrence of the tumour in the skin of the cheek, with a round cell sarcoma beneath the right biceps muscles, and a tumour of a similar nature in the pelvis. For a full account see Heath, "A Thirty-five Years' History of a Maxillary Tumour," *Brit. Med. Journ.*, May 22, 1880, i, p. 775. The primary tumour is in the Museum of King's College Hospital. (Presented by Christopher Heath, 1880.)

230. A large lobulated tumour involving the lower jaw from the left angle to the middle of the right ramus. It is a mass of sarcomatous tissue, with here and there small nodules of bone and a few small cysts interspersed. The outer compact layer of the bone is much expanded, and in parts destroyed. The teeth have been irregularly pushed upwards on the upper surface of the tumour, and fungous granulations project from its front portion. Several rounded, epulis-

like masses are attached to the posterior portion of its alveolar border. It measured from the lobule of the ear round the chin to the opposite lobule, 19½ inches, and from the edge of the lower lip to the pomum Adami over the chin, 13 inches; it weighed 4 lb. 6 oz.

The tumour was mainly composed of sarcoma tissue, consisting of spindle-shaped and round nuclei, embedded in a homogeneous or fibrillar connective tissue. Irregularly shaped masses and columns of epithelial cells of various sizes were scattered through it. The cells forming them were for the most part small and round, but those of the outer layer were elongated. 2234

From a man aged 32. Eleven years before death he felt severe pain in the right jaw, and noticed a small, hard swelling, about the size of a nut, just below the right canine tooth, which was not decayed. All the teeth in its vicinity were healthy. The swelling continued of the same size for five or six years, during the latter part of which time it was painless. Then it began to slowly enlarge, and after a violent blow on the face it grew very rapidly. A charlatan burnt the inside of the mouth with acid; another applied a white ointment to the surface of the tumour, which caused the skin to ulcerate. A year before it was removed the portion of the tumour near the right angle of the jaw rapidly increased, and in a short time the skin gave way, and a quantity of offensive pus was discharged. Four years after the injury the jaw was removed. The tumour then bulged down to the sternum, but no enlarged glands could be detected in the neck. There was but little loss of blood. The patient did well till a rigor occurred on the third day; on the sixth, after temporary improvement, he died somewhat suddenly.

For a drawing of the patient taken before operation, and for a full account of the case, see Heath, "On Injuries and Diseases of the Jaw," 2nd Edition, p. 297, and Appendix, Case 25, and *Trans. Path. Soc.*, xix, p. 307; and *Brit. Med. Journ.*, *op. cit.*, January 6, 1883, p. 4.

(Presented by Mr. Christopher Heath, 1868.)

Lent by Charing Cross Hospital.

231 The crown of a molar tooth, around which is a new growth 3½ by 3 centimetres in diameter. The growth is pale in colour, uniform in consistence, presenting a sarcomatous appearance, resembling closely the dentine seen in the base of the crown 998

Microscopically.—The greater part of growth is made up of sarcomatous tissue—resembling embryonic connective tissue—with here and there cylindrical groups of epithelial cells.

Henry W., aged 5. Swelling of lower jaw, left side. Admitted January 27, 1900, discharged March 15, 1900.

Face began to swell six months ago; asymmetrical, swollen on

left side; teeth sound and all present. Just beyond second molar a small granulating surface, into which a probe passed for a short distance. The swelling is on the buccal surface of the alveolus; it comes forward as far as the first molar, and extends back to the angle of the jaw; consistence very hard—not tender on palpation.

On operation, tumour was shelled out with comparative ease, and was found to have a definite capsule, to be little vascular, its tissue resembling sarcomatous tissue.

The crown of a permanent molar tooth was found in the middle of the tumour.

The bony walls were well defined; but at one place near the coronoid process the tumour seemed to have made its way through the bone.

Presented by Mr. Boyd. (Formalin.)

This is of interest as a possible later stage in development than the three previous specimens.

APPEN

Form used by the Committee

No. Owner.

Identification.

Diagnosis.

Original Reference.

Second References.

Sex. Age. at Observation. Operation.

Position. Mandible. Maxilla.

Teeth implicated ——|——

Family History.

History of Injury.

,, of Disease.

Concomitant Deformity.

Symptoms.

Signs.

Treatment.

After History.

DIX B.

for Recording Details of Cases.

Characters of the Tumour. Size.
Weight.
Longest Axis.
Shortest ,,

Macroscopic.

Microscopic.

Remarks.

Printed Illustrations. Fig.

Mic. Slide possessed by

Skiagraph ,, ,,

Photograph, &c. ,,

Models ,, ,,