

prevented. Ordinarily one employed bars, marked C on the diagram, running across in between the cusps of the teeth. As the bite was raised there was plenty of room for the bars, which by resting between the cusps held the cradle in position. It was not always necessary to use these, however, for the cradle could be fixed in the same way as the Hammond splint with figure-of-eight wire ligatures, as suggested in the paper; but for cases where there was likely to be any pressure on the gum the crossbars C should be employed.

### An Epithelial Odontome.

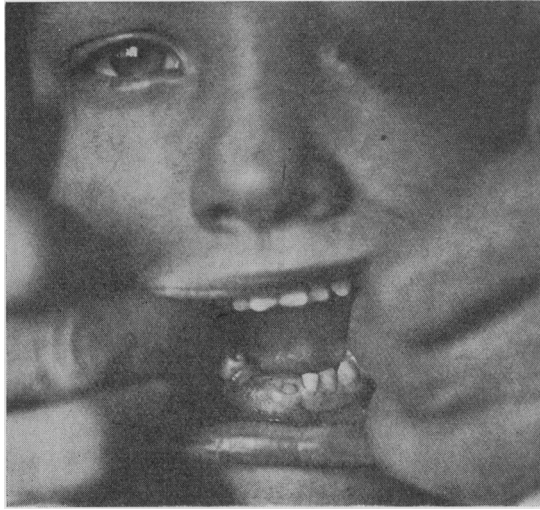
By WARWICK JAMES, F.R.C.S., L.D.S., and  
J. GRAHAM FORBES, M.D.

A SMALL girl, aged  $4\frac{1}{2}$ , had a swelling situated in the anterior part of the right side of her mandible. She was quite healthy, and no history of local injury could be obtained; the temporary incisors and canine of the right side were missing; from the mother's account they had become loose and dropped out, they were not carious. The swelling was just noticeable externally, and beyond the slight inconvenience of its presence there was nothing of which the patient complained. The tumour had gradually increased in size since the mother had noticed it a few weeks previously.

On examination a rounded swelling was present in the mandible in a position corresponding to that of the teeth lost. It extended from the first temporary molar of the right side to the symphysis, just crossing the middle line; the left central incisor was pushed over slightly to the left. The size and shape of the tumour can be well seen in the model. The swelling—somewhat globular in outline, suggesting a fluid character—was situated in the alveolar portion of the bone, the latter existing as a thin bony capsule over the tumour, yielding on pressure the characteristic “parchment crackling.” Fluctuation could be obtained where the bony capsule was deficient in front of the temporary molar. The colour and appearance of the gum were normal, the points from which the teeth had been lost were still indicated, a little granulation tissue being present where the right canine had been situated.

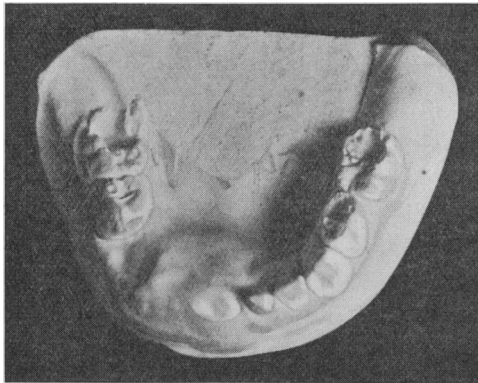
The removal of the tumour was effected as follows: Two incisions were made in the line of the gum ridge to include a fusiform portion of

the overlying tissues and carried down to the capsule. The thin layer of bone was easily cut through, and by using a periosteal elevator the tumour was completely shelled out without difficulty. When separated from the surrounding tissues it proved to be an encapsuled cyst, oval



**FIG. 1.**

Photograph of the tumour *in situ*.



**FIG. 2.**

Model showing the size and position of the tumour. The appearance of the molar teeth is due to a defective impression and not to caries

in shape, measuring 12·8 mm. by 8·5 mm. On incision through the capsule a small quantity of fluid escaped, but the bulk of the contents was composed of loose granular material. The whole of the excised cyst, including the overlying and adherent portion of gum, was carefully examined in section under the microscope.

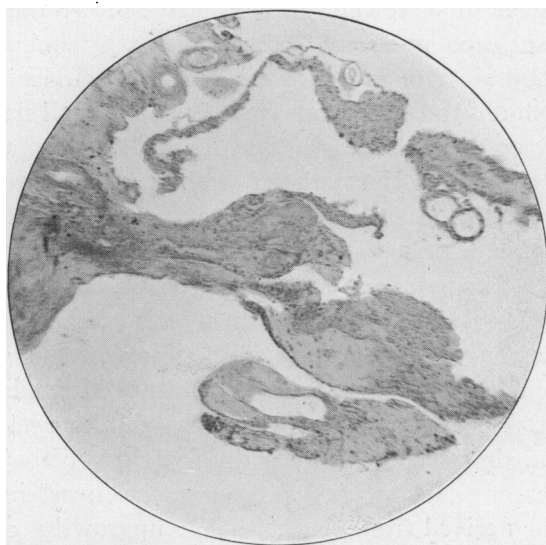
Microscopical appearance: The capsule, measuring 2 mm. in thickness, was composed of layers of dense fibrous tissue enclosing a papilliferous cyst, and continuous on each side with the fibrous tissue of the papillary layer of the gum which formed an overlying cap. Included in the fibrous tissue were seen irregular trabeculæ of bone. Attached by narrow pedicles to the cyst wall occurred long slender irregular papillary processes covered with flattened or oval epithelial cells, which also extended down the fine connecting stalk to the cyst wall (fig. 4). These processes were seen in various planes; tangential section



FIG. 3.

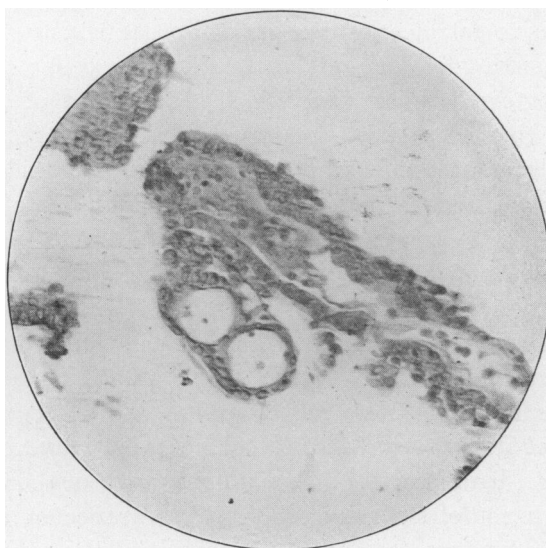
Skiagram taken previous to removal of the tumour. (The negative was placed beneath the chin, so that here the tumour appears to be on the left side.)

through the covering showed an irregular mass of epithelial cells, round, oval, or flattened into a fusiform shape and occasionally grouped in concentric layers. Longitudinal section showed the pedicle to carry a capillary vessel, which in places was dilated into a blood-space of irregular size and shape (fig. 5). Transverse section succeeded in demonstrating an alveolar arrangement of epithelium in the form of rounded alveoli lined by cubical or columnar cells, and surrounded by layers of flattened, stellate or oval cells. Many of the papillary outgrowths into the cyst differed in shape from those just described, and appeared as short epithelial tufts growing from the lining wall. Films prepared from the more fluid contents of the cyst showed numerous stellate cells and degenerated epithelium occurring free or in conglomerate masses.



**FIG. 4.**

Section showing a papillary process.



**FIG. 5.**

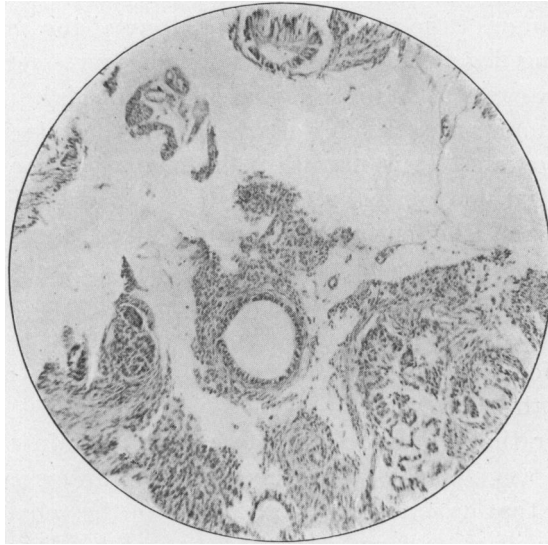
Higher magnification of part of the section shown in fig. 4.

The more solid granular particles, which escaped from the cyst on incision, were seen to be formed of epithelial cells grouped together in concentric masses, and in alveoli loosely united by stellate connective-tissue cells (fig. 8). The alveoli were lined by cubical or definitely columnar epithelium and surrounded by layers of small flattened or oval cells, apparently epithelial in origin (figs. 6 and 7). It appeared probable that these structures were the remains of the papillary processes originally growing from the inner wall of the cyst, but which in course of growth had become detached and formed free collections of epithelium.

In addition to the papillary tufts and processes attached to the inner wall of the cyst and forming the bulk of the tumour, some sections showed proliferation of the surface epithelium of the gum and production of irregular downgrowths of the stratum Malpighii coming into close contact with the more superficial part of the cyst wall (fig. 9). Sections taken in the periphery of the tumour showed that these surface proliferations extended through the fibrous tissue overlying the cyst to reach the papillæ derived from the epithelial upgrowths of the tumour, so that there appeared an intermingling of the epithelial structures growing down from the surface and of those growing up from the deeper tissues belonging to the cyst.

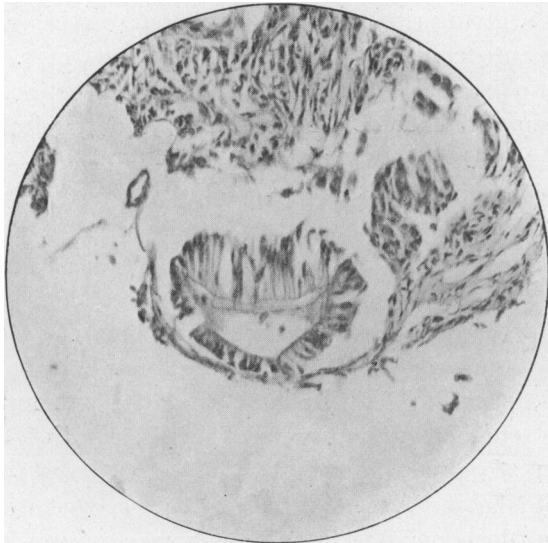
In attempting an explanation of the origin of the tumour it is necessary to consider briefly the structure and changes in the enamel organ. Previous to calcification the enamel organ consists of an internal epithelium, consisting of long, delicate columnar cells; the outer part consists of the external epithelium, which is composed of oval or cubical cells; between these is the enamel pulp or stellate reticulum. The external epithelium of the enamel organ becomes considerably altered by proliferation of its cells, forming buds projecting into the overlying tissue; also processes carrying blood-vessels are said to project inwards and to come into direct contact with the enamel pulp. In the normal process of development the stellate reticulum disappears and the internal epithelium comes into contact with the external epithelium. It is also of interest that the surface epithelium shows changes during the eruption of the tooth, proliferation occurring in its deepest layers, and processes project downwards which become eventually connected with those of the tooth-band and the external epithelium of the enamel organ.

In the description of the microscopical appearance of the tumour it is seen that the structures composing the bulk of the cyst are regarded as epithelial in origin. The majority of the cells of the papillary overgrowths are small in size, rounded, oval, or flattened into a fusiform or



**FIG. 6.**

Section showing an alveolar arrangement.



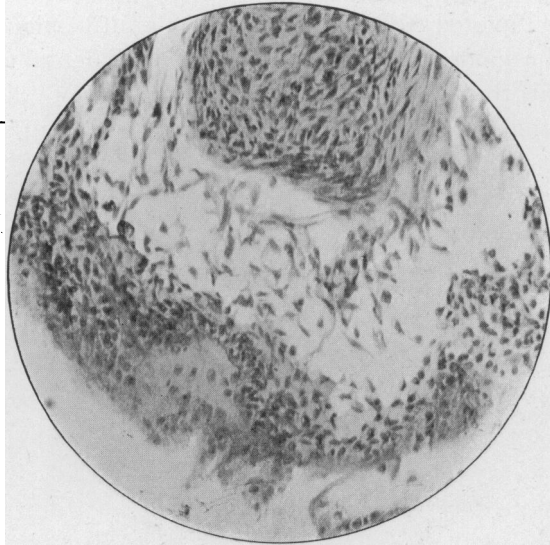
**FIG. 7.**

**Higher magnification of part of the section shown in fig. 6. The columnar character of some of the cells is well seen.**

elongated condition. These correspond closely with the cells of the external epithelium of the enamel organ. Many of the cells also appear to be undergoing degeneration, and some strongly resemble those composing the stellate reticulum (fig. 8). The columnar cells lining many of the alveoli of the tumour are probably derived from the internal epithelium of the enamel organ. It is necessary, however, to bear in mind that the tooth-band, which normally extends as a line of cells between the enamel organ and the surface epithelium, is at first formed of an outer layer of columnar cells; these persist for a considerable time in the neighbourhood of the enamel organ, but the typical polygonal cells of the upper part of the tooth-band are not present in the tumour, nor are cells to be found undergoing the changes which normally occur in those of the tooth-band.

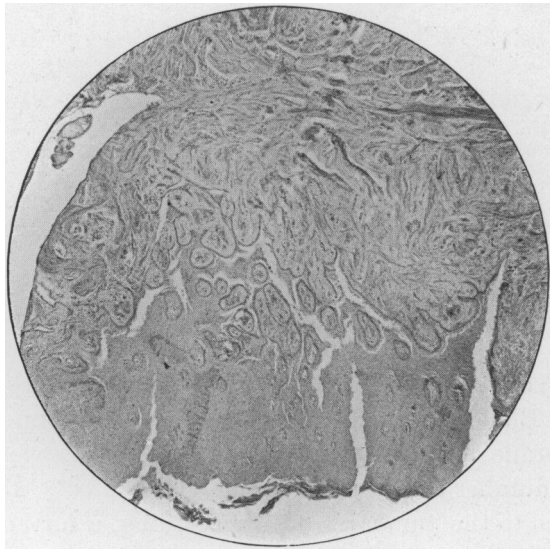
We consider that this particular tumour arose mainly in the enamel organ and was associated with changes in the surface epithelium. It seems probable that an extensive proliferation of the cells of the enamel organ has taken place to form a papilliferous cyst. By epithelial overgrowth of the two layers there has developed an abundance of papillary processes and tufts, some of which have become broken off, to form free masses of epithelial cells and alveolar structures. In addition to these changes in the enamel organ proliferations of the surface epithelium have taken place, giving rise to extensive downgrowths in the direction of, and coming into contact with, the papilliferous cyst. The contrast between the two was well shown in sections of the periphery of the tumour, and seems to exclude the surface epithelium from taking part in the origin of the cyst.

When considering the literature dealing with the tumours of the jaw, which are described under epithelial odontome, multilocular cystic epithelial tumour, and other applied names, it is important to determine whether, under their different titles, they possess a common origin, or whether, for purposes of classification, their nomenclature should be distinguished to indicate their different origins. Among the earliest cases described, Falkson [3] concluded that the tumour he examined arose from an enamel organ, or part of it, as the tissues closely resembled it in structure, and that it was not necessary for a whole enamel organ to be involved. Magitot [5], on the other hand, considered that multilocular cysts arose from numerous tooth-follicles. In 1883 Eve [2], giving them the name of multilocular cystic epithelial tumours, stated that, after repeated examination, he had been able to observe in several specimens appearances which distinctly indicated that



**FIG. 8.**

Section showing cells resembling those of the stellate reticulum or pulp of the enamel organ.



**FIG. 9.**

Section showing the relationship of the tumour to the gingival mucous membrane.



they originated from an ingrowth of the epithelium of the gum. In 1894 Heath [4] quoted Malassez's view that multilocular cystic tumours of the jaw had a mode of origin similar to that of dental and dentigerous cysts, and that they arose from an overgrowth of the rudimentary paradental epithelium. Bland-Sutton [1], more recently, came to the conclusion that the majority of the specimens described as multilocular cystic tumours were really endotheliomata, especially in the cases occurring past middle life, and that some of them arose in the gums.

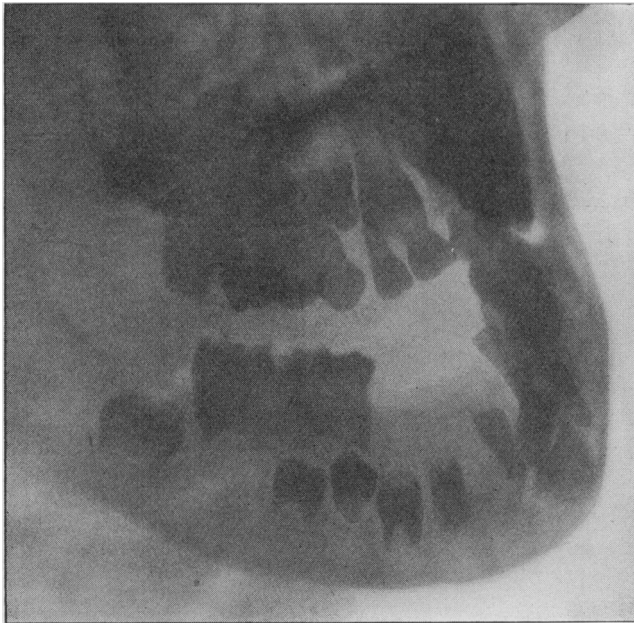


FIG. 10.

Skiagram taken about six months after the removal of the tumour.

The majority of the cases of the tumours collected by Heath are considered by Bland-Sutton to have originated in connexion with the mucous membrane of the jaws. He supported this view by the fact that a certain number displayed malignancy.

In reference to the tumour we are recording, a further statement of Bland-Sutton's is of value—namely, that if these tumours arose in epithelial vestiges of the enamel organ they ought to be met with in the young. This has a direct bearing on our case, the patient being a child

aged 4½. Her future history will be of great interest; deformity or absence of the permanent teeth may occur in the part of the jaw occupied by the tumour. A skiagram, recently taken, suggests the absence of an incisor.

In conclusion, we restate our view that the growth probably had its origin in the enamel organ, and therefore the name "epithelial odontome" should be applied to it.

## REFERENCES.

- [1] BLAND-SUTTON. "Tumours, Innocent and Malignant" (1906), p. 228.
- [2] EVE. *Brit. Med. Journ.*, 1883, i, pp. 1, 91, 241, 298.
- [3] FALKSON. *Arch. f. path. Anat. und Phys. Virchow*, 1879, lxxvi, p. 504.
- [4] HEATH. "Injuries and Diseases of the Jaws," 1894.
- [5] MAGITOT. "Mémoires sur les kystes de Machoires," Par., 1879.

## A Note on the Ameloblast Cells in Esox.

By JAMES T. CARTER, L.D.S.

MR. J. T. CARTER exhibited lantern slides of preparations of the enamel organ in the pike, demonstrating for the first time the existence of processes connecting the lateral surfaces of the ameloblasts.

## President's Valedictory Address.

THE PRESIDENT (Mr. Leonard Matheson) said that, before actually concluding the meeting, he had to say farewell to the Fellows so far as the office was concerned that he had, by their suffrages, held for the past few months. In doing so he did not propose to give a formal address, because, at all events in certain quarters, inaugural and valedictory addresses were not looked upon as either useful or desirable; and whatever might be the feelings of those present, he felt that it was not a proper thing to inflict any lengthy address upon them in view of the fact that only four months ago he addressed them inaugurally. There were one or two remarks, however, he might be allowed to make; first