merely because a sinus had been washed out and nothing could be grown from the fluid. Some of Dr. Rambaud's work in that connexion had been confirmed by workers at St. Bartholomew's Hospital, where specimens of mucosa were steeped in 1% perchloride of mercury for half an hour so as to sterilize the surface. They then obtained a copious growth of hæmolytic streptococci in one case, in one case pneumococci, and in another case *Streptococcus viridans*.

Another feature of the method adopted by Dr. Rambaud was that there was, in inoculated cases, the most remarkable freedom from the post-operative symptoms, otherwise to be expected.

Dr. RAMBAUD (in reply) explained that, at the beginning of his research work, he had proceeded slowly—hence the rather long duration of the treatment, one cause only being dealt with at a time. Thus, in the case of spasmodic wry-neck briefly cited, intrabuccal radiographs taken to ascertain the presence of dental apical infections had shown him that the patient had right antral sinusitis. His colleagues disagreed, maintaining that he could not diagnose chronic antral sinusitis from such a radiograph. Upon his insistence, a puncture of the antrum was made ; about 3 c.c. of fairly clear mucopus was withdrawn ; it yielded a pure culture of pneumococcus. Lipiodol was introduced into the sinus while the canula was in place and radiographs made within a few minutes, with intrabuccal films, showed marked thickening of the mucosa. An improvement in the condition of the patient followed this minor intervention. An autogenous vaccine made with the pneumococcus while giving, at first, the specific reaction on which he laid stress in his paper, and bringing about some additional improvement, did not prove to be completely efficacious. Then he took radiographs of all the sinuses, according to the method of Proetz, and it was found that the left antrum was also affected, though to a lesser extent. A permanent opening into the right antrum was made and cultures of pieces of the whole thickness of the mucous lining yielded other germs, including a *Streptococcus viridans*. However, it was not until a permanent opening of the left antrum was made, followed by local treatment consisting of replacements at first with ephedrin solution and, later, with special horse serum (hemostyl), that the patient finally was completely cured.

In the last case treated, one of dementia præcox with beginning spasmodic wry-neck, within six weeks great improvement followed the extraction of impacted and infected teeth and the radical operation consisting of the opening and draining of all the sinuses, the frontals excepted. After the administration of autogenous vaccine for three months, the patient is now practically well, the vaccine treatment being continued.

Infrasellar Adamantinoma

By Major W. A. D. DRUMMOND, R.A.M.C.

ADAMANTINOMATA (ameloblastomata) are tumours which arise from remnants of the enamel organ forming embryonic epithelium.

Histologically, they may show all variations between the stratified squamous cell and the specialized ameloblast, thus demonstrating the normal course of development of the enamel organ. It is, however, doubtful if true enamel formation ever occurs.

In whatever region adamantinomata occur, they exhibit the characteristic features of the enamel organ :—

(1) A peripheral layer of epithelium corresponding to the layer of adamantoblasts of the enamel, arranged as a single palisade.

(2) A subcolumnar layer of vesicular cells analogous to the reticulated hydropic cells.

(3) A central zone of stellate cells representing the enamel pulp.

The earliest growths are solid ; later they may become cystic and attain a large size, one described by Ewing (1928) from the upper jaw being as large as a child's head.

There are three main sites of origin of these tumours, namely :—

(1) *The maxillary.*—The lower jaw is the most frequent site of occurrence, and here they tend to be of the cystic type. Those of the upper jaw are more often solid, and are usually diagnosed as multilocular cystic odontomes.

(2) *Pituitary or suprasellar.*—Critchley and Ironside (1926) have surveyed the tumours in the pituitary region and describe them as arising in unobliterated portions of the fœtal craniopharyngeal duct. Erdheim (1904) has recorded the frequent occurrence of groups of epithelial cells in the neighbourhood of the infundibulum, and these he regarded as remains of oral ectoderm, capable of giving rise to tumours. Atwell (1926), on the other hand, is of the opinion that adamantinomata arise in the pars tuberalis of the pituitary from dental elements which have become included in the anlage of the tuberal process, at the time when the pituitary was in close relation to the dental ridge.

(3) *Tibial.*—It is difficult to give an adequate explanation of the origin of these rests.

In his embryological studies, Frazer (1931) has shown that the growth of paraxial mesoderm forming the basal bars of the sphenoid constricts Rathke's pouch and so forms its neck.

The part of the neck which lies between the basis cranii and the roof of the mouth, is then caught by the developing septal processes of maxillary mesoderm and is carried for some distance along the roof, to terminate at a point on the back of the developing nasal septum immediately above the angle of junction with the soft palate. The neck is thus drawn out into a strand of cells which usually disappears by the ninth week of fœtal life. Some epithelial remnants, however, usually persist.

Haberfeld (1909) reports the regular finding of a strand of cells in the pharyngeal submucosa just behind the alæ of the vomer.

A case of persistence of the craniopharyngeal canal has been described by Cave (1931). It extended for a distance of 16 mm. downwards and forwards through the median septum of the sphenoidal sinus to a termination in the nasal septum.

He states that in only 0·20% of human skulls does the genuine canal persist in the adult (fig. 1).

In the case described below, the tumour arose in the body of the sphenoid and nasal septum, i.e. in the track of the canal (fig. 2).

A. B., a Parsee girl, aged 14 years.

Catamenia commenced September 1937, and was regular until the operation, May 1938. It then ceased until September 1938.

1931 : She was apparently a normal child up to the age of 7. During her 8th year it was noticed that she was speaking with a nasal intonation. She was complaining of headaches, which occurred two or three times a month. These were thought to be due to eye-strain, but the provision of glasses did not ameliorate the symptoms.

1932 : The child was losing weight and becoming listless. In February an acute suppurative otitis media (right) developed. The nasal speech was now more marked, and breathing was almost entirely by the mouth.

1933 : In October the tonsils and adenoids were removed in order to relieve these symptoms, but no improvement in the speech or breathing resulted. The father reports that some difficulty was experienced in removing the adenoids.

1934 : In the early part of the year febrile attacks developed and increased in duration from two to thirty days. The cause of these attacks was not diagnosed. In December she failed so hopelessly in a school examination that medical advice was again sought. It was found that the left eye could only perceive light ; a week later this eye was blind.

1935 : In March the child was still complaining of attacks of fever and the headaches had increased in severity. Later, pains developed in the back and shoulders and the neck became stiff. During an attack of intermittent pyrexia which came on in July, the temperature rose to 105° F. The condition was diagnosed as one of caries of the 1st and 2nd cervical vertebræ. An operation was performed and she was placed in a plaster of Paris jacket in which she remained until, after four months, the development of pressure sores necessitated its removal.

1936 : In January nasal obstruction was complete. A general anæsthetic was given, and it was found that the obstruction was due to a tumour. Later the child was sent to an institution

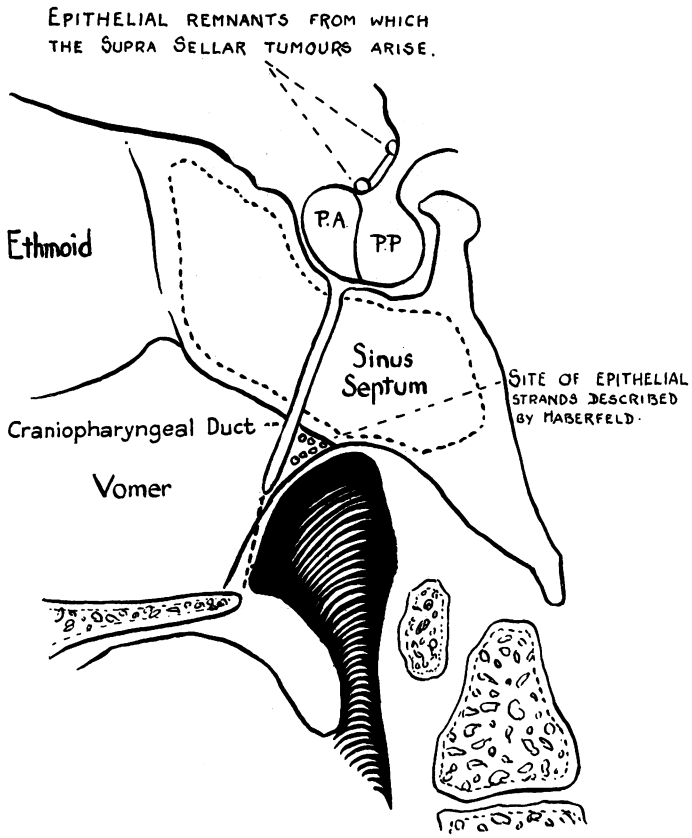

FIG. 1.

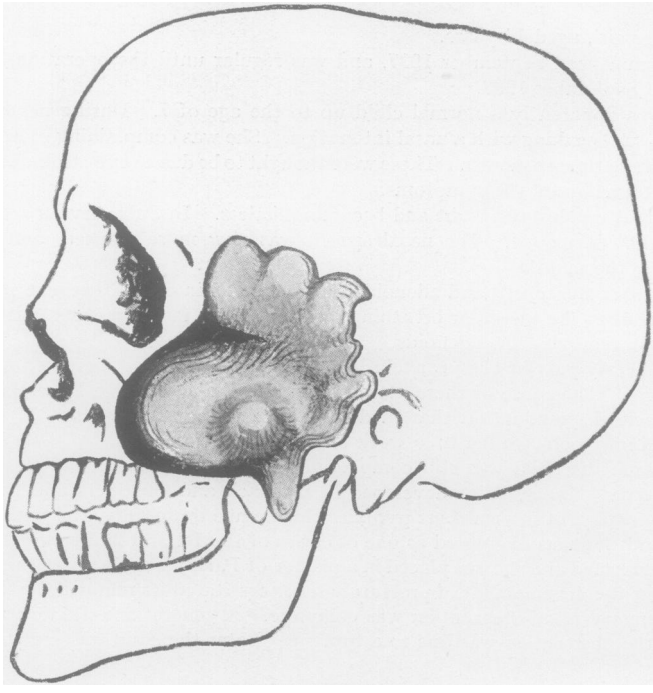

FIG. 2.—Reconstruction of the tumour.

for radium therapy and, on two occasions, radium needles were inserted into the nostrils for a period of twenty-four hours. After this treatment she became very deaf.

1937 : In October she complained of pains in the throat and difficulty in swallowing, and it was found that the tumour had depressed both the hard and soft palates and was extending into the pharynx. Two further applications of radium, each lasting for eight hours, were then given.

1938 : In April it was realized that the sight of the right eye was rapidly deteriorating. Headaches were continuous and intense. There were frequent attacks of vomiting without apparent cause.

Condition on examination (23.4.38).—Patient is a frail child with a vacant expression. Both eyes are protuberant. She is listless, yawns frequently, and complains of severe headache.

Nose : In the left nasal fossa there is a red tumour extending forwards to within ¾ in. of the vestibule. Laterally, the tumour displaces the inferior turbinate and the lower half of the middle turbinate. From here it sweeps over to become confluent with the nasal septum. On the right side the growth can be seen but, owing to septal deviation, its size cannot be estimated.

Mouth : The posterior three-quarters of the hard palate and the soft palate are flattened. Posterior to the soft palate there is a grey corrugated tumour extending down into the pharynx (fig. 3).

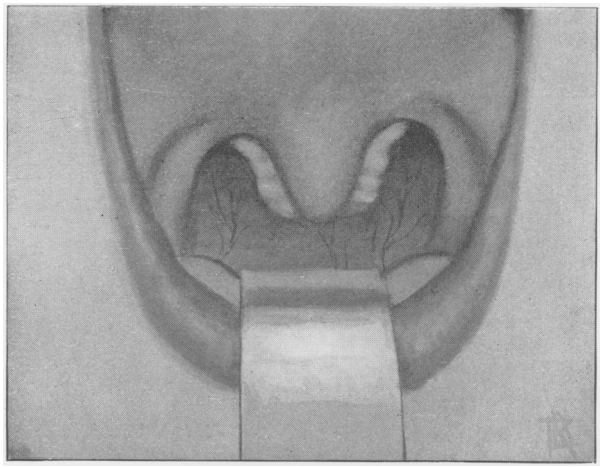

FIG. 3.

Ears : There is obstructive deafness in both ears. A large central perforation is present in the right tympanic membrane.

Blood : The Wassermann and Kahn reactions are negative.

Ophthalmological report, 26.4.38 (Lieut.-Col. J. Biggam, R.A.M.C.) : Left eye blind, right eye approximately normal. Left eye : Complete primary optic atrophy. No other fundus abnormality. Right eye : Vision $\frac{6}{12}$ with a −1·75 cylinder at 90°, reads J 6 near vision. Right fundus is normal to ophthalmoscopic examination. Visual acuity suggests early nerve involvement but no ophthalmoscopic signs of it present yet.

X-ray report, 18.5.38 (Major J. C. Coutts, R.A.M.C.) : " The central portion of the sphenoid, and the apices of the petrous bones have disappeared. The two sides are joined superiorly by a thin bony arch, the raised roof of the sphenoidal sinus.

The lateral view shows extensive bone destruction involving the sphenoid and basisphenoid with enlargement of the sphenoidal sinus which contains irregularly distributed opaque material forming poorly defined cystic spaces. The region of the sella turcica has been pushed upwards and flattened " (fig. 4).

It was considered that if no operative procedure were undertaken, death would result in the near future. It was decided to operate via the nasal route and endeavour, in the first instance,

to mobilize that part of the tumour which was distending the sphenoidal sinus and later, to remove the growth through the nasopharynx.

Operation (22.5.38). — Under morphine and local anæsthesia a submucous resection was performed and the septal cartilage removed as far as the front of the tumour. The right middle turbinate bone was then excised. This afforded room to strip the mucosa from the anterior surface of the body of the sphenoid. It was found that most of the bone had been destroyed and its place taken by a large, grey mass which transmitted the arterial pulse. An attempt was made by blunt dissection to shell out this mass from the body of the sphenoid. During this procedure it was accidentally punctured and a quantity of clear fluid was expelled in gushes. The puncture was enlarged, and a big cyst lined by white epithelium was exposed. Trabecula, formed by deposits of white crystals, adhered to the posterior wall. The cyst was explored by the finger, and on either side the internal carotid artery could be felt. While the right side was being palpated the patient complained of sharp pain and flashes of light in the right eye (fig. 5).

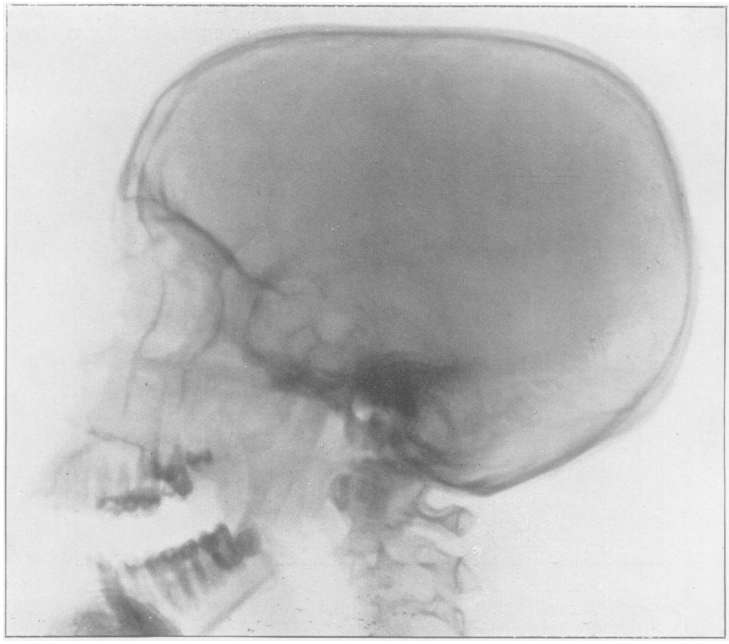

FIG. 4.—Radiograph of skull showing extensive destruction of the sphenoid and basi-sphenoid.

After the operation the temperature rose to 104° F. and fell to normal by the fifth day. During this time the patient complained of periodic dimness of vision. A week later there was a transient rise of temperature which subsided after two days.

Headaches and vomiting had now entirely ceased. The child was no longer sleepy and she began to take an intelligent interest in life.

26.6.38 : The patient complained of a right-sided neuralgia and a thick white discharge from the right nostril. The right antrum was washed out and a large quantity of old blood-clot and mucus removed. After this the temperature rose to 103° F., and the febrile attack lasted for six days.

Second operation (14.7.38).—A horizontal incision was made through the nasal septum on the level of the floor of the nasal fossa up to the edge of the tumour and the septum dislocated to the right. The septum was then incised round and over the tumour, the incision being carried postero-superiorly to the cribriform plate. Inferiorly, incisions were made through the mucosa of the floor of the nose anterior and lateral to the tumour and then, by blunt dissection, an

endeavour was made to roll the growth through the nasopharynx. This was found to be impossible owing to its deep extensions into the soft palate and basisphenoid, and it had eventually to be removed piecemeal. The basisphenoid with the anterior half of the margin of the foramen magnum and part of the anterior arch of the atlas had to be removed in the extirpation of the nasopharyngeal mass. The pharyngeal orifices of the Eustachian tubes were completely blocked by lateral extensions of the tumour. Although the tumour had infiltrated the body of the sphenoid, the basisphenoid, the nasal septum, and the soft palate, it had not invaded the lateral nasal walls, despite the fact that they were distorted by pressure.

After extirpation of the tumour there was a febrile attack during which the temperature rose to 104° F. This attack lasted for five days and loss of vision was again noted.

Cases of adamantinomata quoted in the literature have shown rise in temperature after operation. This rise was thought to be due to the liberation of toxic material during the removal of the tumour, but more probably results from injury to the hypothalamic region.

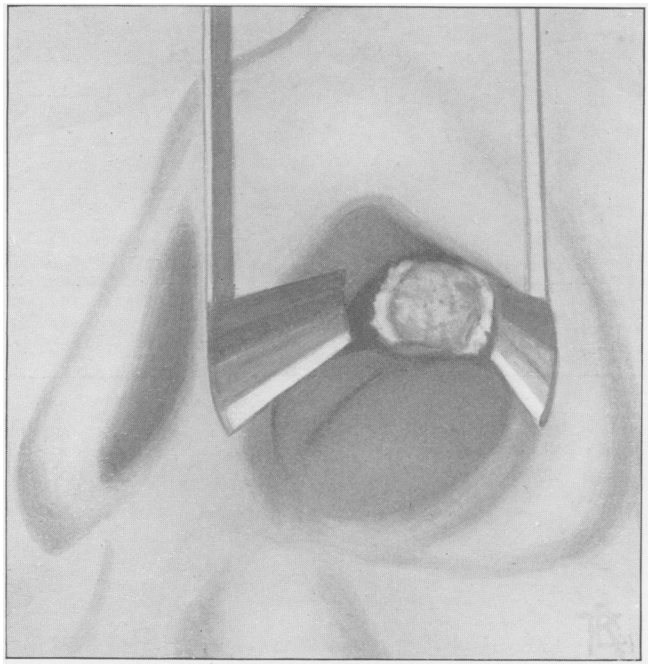

FIG. 5.—Showing the appearance of the tumour after the mucosa had been stripped from the body of the sphenoid and the cartilaginous part of the septum removed. Note the sphenoidal and maxillary divisions of the tumour.

Pathological report, 2.8.38 (Major H. J. Bensted, R.A.M.C.): This is an epithelial tumour that consists for the most part of a cystic-adenomatous structure. The epithelium lining the cysts varies from the high to the flattened type. In many cases there are papillomatous projections of the wall into the cyst cavity.

The general structure is suggestive of an adamantinoma of the so-called glandular type (figs. 6 and 7).

Second ophthalmological report: Distant vision. Right eye $\frac{6}{12}$ with glasses. Reads near Jaeger 1 with difficulty.

The right optic disc shows a primary optic atrophy. It is abnormally pale and the lamina cribrosa shows well. The ophthalmoscopic signs are now apparent.

Progress.—Report, 27.10.38: The child is in good health. She has put on weight and now takes an active part in games. There have been no recurrences of headache since the first operation. Breathing is now nasal. There is no further improvement in the vision of the right eye.

FIG. 6.—Section showing glandular type of structure, together with many small cystic spaces (× 15).

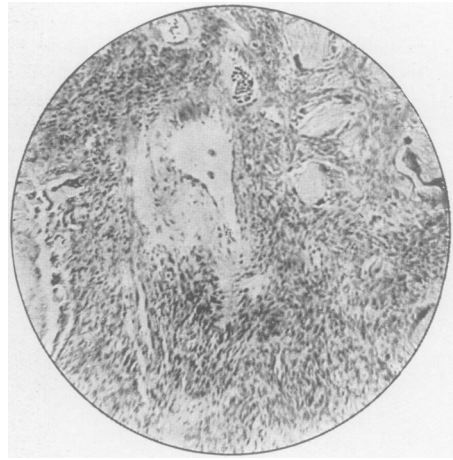

FIG. 7.—Section showing solid portion of tumour (× 20).

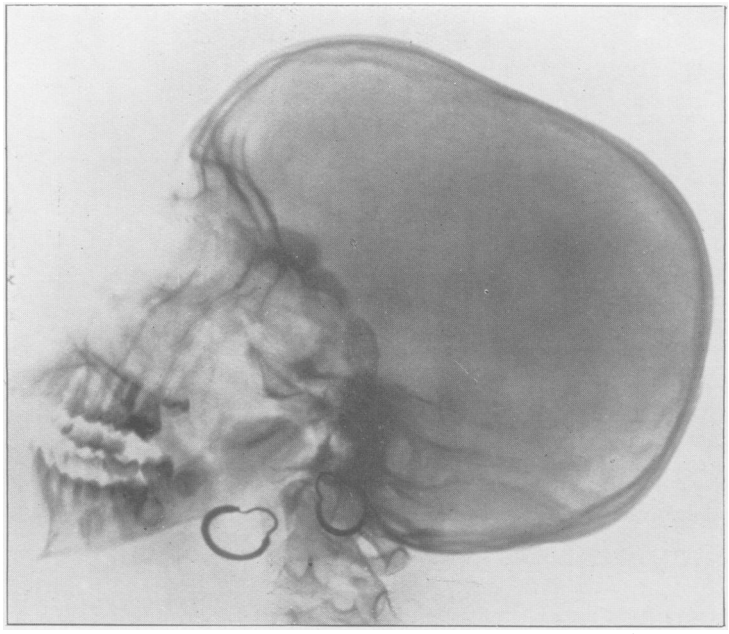

FIG. 8.—Radiograph of skull three months after operation, showing considerable thickening of the bony arch joining the two sides of the sphenoid. (X-ray report by Major J. C. Coutts.)

Comment

The following facts support the view that this tumour arose from the vestigial craniopharyngeal duct :—

(*a*) The presence in 0·20% of adults of a patent craniopharyngeal canal which may extend from the floor of the sella turcica through the sphenoidal septum into the vomer.

(*b*) Isolated para-dental débris or epithelial rests have constantly been found along this axis.

(*c*) The body or axis of the tumour extends from the under-surface of the floor of the sella turcica, through the sphenoidal air sinus into the vomer to terminate immediately above the junction of the soft palate and the nasal septum, i.e. it follows the course of the craniopharyngeal duct.

The tumour thus forms a link between the suprasellar and the maxillary adamantinomata.

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Tuberculosis of the Larynx.—STEPHEN SUGGIT.

Female, aged 26.

Admitted to Harefield sanatorium on October 7, 1937, with a history of huskiness, duration one year. First seen January 1938, when indirect laryngoscopy showed a pale turban-like œdema of the whole epiglottis and arytenoids, without ulceration. From then until leaving the sanatorium on July 1, 1938, the condition slowly improved. A biopsy was performed on June 21 on pieces of tissue removed from epiglottis and left arytenoid. The sections (on view for inspection) show rather atypical tuberculous granulation tissue. During the patient's stay in the sanatorium she was under the care of Dr. Stokes, who at no time found any clinical, radiological, or bacteriological evidence of tuberculosis apart from in the larynx.

Discussion.—R. SCOTT STEVENSON said he happened to have a similar case in a youth of about 19 under his care at the moment. There were no tubercle bacilli in his sputum and no clinical or X-ray evidence of tuberculosis in the lungs. It was unfortunate that such cases slipped into the literature every now and then as being cases of primary tuberculosis in the larynx. He thought that everyone now admitted that true tuberculosis of the larynx was never primary in that site. Cases such as that shown by Mr. Suggit were not strictly true tuberculosis but lupus; and that was what he took Mr. Suggit's case to be, a typical case of lupus of the larynx. His own case had been treated with a long course of direct ultra-violet light without any improvement whatever, but he was now going to carry out tracheotomy and give the larynx complete rest, which he considered beneficial in lupus though not in tuberculosis.

STCLAIR THOMSON said that the case under discussion was a manifestation of tuberculosis, but he would rather it were not called tuberculosis of the larynx. It would be better, while agreeing that pathologically it was a form of tuberculosis, to say it was either lupus or, to use a term he had coined many years ago, a "lupoid" form of tubercle of the larynx.

It was rather bold, in view of the lessons of present-day methods, to say there was "nothing in a chest". Many years ago it was stated positively that there was nothing in lots of chests where to-day the X-ray revealed that there might be extensive trouble, trouble incalculable according to the methods of investigations available in former days. He thought it possible that, though there was no evidence of it, there was likely to be undiscoverable tuberculosis in the lungs of this patient, as in the lungs of any individual suffering with lupoid disease of the larynx.