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Section of Laryngology

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The Rhinologist and the Orbit—Some Personal Recollections

PRESIDENT'S ADDRESS

By Professor V. F. LAMBERT, M.D., Ch.M., F.R.C.S.

IT has been my good fortune to be associated with the Manchester Royal Eye Hospital as the Consulting Rhinologist for nearly twenty-five years, and it is the interest in the problems of diseases of the orbit which this appointment engendered that has prompted me to choose the subject for this Address. Rightly or wrongly, I have held the view that the orbit is one of the surgical territories which is of interest, not only to the ophthalmologist, but to the neuro-surgeons and ourselves. I share the view expressed by John Foster of Leeds (1948) that there is neither cash nor credit in the orbital tumours, and that the surgical treatment (and I quote him) is "deep, dark and bloody and not a gentleman's operation from the point of view of the Ophthalmologist". This applies to the rhinologist too. And yet I believe that our specialty has a place in the diagnosis and management of the surgical conditions of the orbital cavity.

A casual inspection of the orbital cavity will reveal that more than two-thirds of its bony walls are also the bony walls of the paranasal air sinuses. The roof of the orbit is, in a varying amount, the floor of the frontal sinus, its medial wall is made up of the paper plate of the ethmoid and at the posterior limit of this the sphenoidal sinus. Its floor is the upper wall of the superior maxilla which is, of course, the roof of the maxillary air sinus. From its very nature many of the diseases of the orbit arise from diseases of the air sinuses and diseases of the sinus walls.

The spread of inflammatory conditions from the paranasal sinuses to the orbit is facilitated by certain areas where the bone is excessively thin, amounting almost to a dehiscence, and it is by this loss of continuity of tissue that inflammatory processes may involve the orbit. In addition to this direct method, the spread of an inflammatory process may be by means of local blood vessels, as in the spread from the ethmoidal labyrinth by the anterior and posterior ethmoidal vessels.

William Benedict of Rochester (1949) divides the orbit into three divisions and three zones (Fig. 1). These three divisions are: (1) Subperiosteal; (2) the area between the periosteum and the cone of muscles; (3) the space embraced by the cone of muscles.

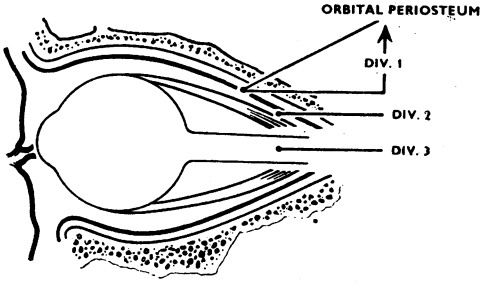

FIG. 1.—Division of orbital cavity—modified from Benedict (1949).

It is in the subperiosteal division that the lesions which interest the rhinologist present, because it is here that an infective process spreading from a neighbouring air sinus is likely to produce a periostitis, subperiosteal abscess or osteomyelitis, any of which may eventually give rise to an infection of the orbit. The bony tissue may also be subject to hyperostoses, malignant new growths, and the disorders of bone metabolism found in acromegaly, leontiasis ossea and the like. It is a fortunate state of affairs for us that any condition which we may be called upon to treat because it arises in bone will mostly be recognizable by careful X-ray examination.

There are three main signs which concern the rhinologist in intra-orbital diseases—firstly, displacement of the globe, secondly, alterations in the mobility of the globe, and thirdly the presence and nature of any recognizable swelling in the orbital cavity. I have omitted changes in the fundus of the eye and changes in the visual fields, as these are part of the ophthalmologist's own department.

Displacement of the globe of the eye, or "proptosis", implies the passive protrusion of the eye as a result of œdema, hæmorrhage or new growth in the orbital cavity. Exophthalmos is the term used when the eyeball is actively protruded, as in Graves' disease. The mechanism of this protrusion is not accurately understood, but in all cases of exophthalmos the forward displacement of the eye is accentuated as a result of spasm of the upper eyelid. I have never regarded the strict differentiation of this terminology as being very important, and I understand from my ophthalmological colleagues that they tend to use the terms "proptosis" and "exophthalmos" rather loosely, without implying any difference in the causative mechanism of the protruding globe. None the less, it is helpful in making a differential diagnosis, particularly when the condition is unilateral, to try to form some opinion as to whether protrusion is the result of a passive displacement from an orbital mass, or whether it results from thyrotoxicosis or other form of hormonic exophthalmos. If the upper eyelid cannot be everted or is only everted with difficulty, the proptosis is more likely to be due to thyro-

toxicosis or a hormonic exophthalmos, whereas if the lid is everted easily, then it is more likely that the eye displacement results from the presence of an intra-orbital mass. This test we know as Gifford's sign.

In the cases we have treated in our Department, the most common nasal condition to produce proptosis was mucocele of the frontal or ethmoidal air sinuses. From 1949 to 1953, 13 have been treated. Of these, 4 bore signs of acute infection and were producing acute inflammatory manifestations in the orbit itself. Their ages varied from 21 to 72. 7 of them were males and 6 females.

Of this group there is one case which I would like to mention.

The patient, a female, 49 years of age, was seen in the Neuro-Surgical Out-Patient Department by my colleague, Mr. Richard Johnson on December 14, 1953. She was complaining of undue prominence of the right eye which she said had been present for seventeen years. She was listed for operation at that time.

She had no diplopia, but had, from time to time, suffered from attacks of frontal headache and pain in the eye, associated with conjunctivitis. Investigations showed some field defect in the right eye. X-ray examination revealed marked destruction of the right orbital roof and a part of the greater wing of the sphenoid (Fig. 2). The appearances were consistent with a mucocele arising in the right frontal sinus, confirming the clinical diagnosis.

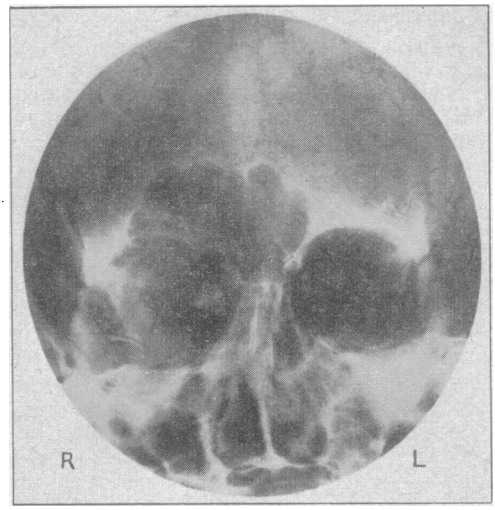

FIG. 2.—Mucocele destroying right orbital rim and part of greater wing of sphenoid.

In view of the extent of the mucocele involvement, my colleague, Mr. Richard Johnson, thought it unwise to rely on the orthodox route to the frontal sinus, offering as his opinion that the Dickson Wright (1948) approach to the orbit would give better access, and with this view I readily concurred. At this stage I shall describe this most useful method of exploring and decompressing the orbit.

It would appear from the author's remarks that it was developed because the older, classical operations of Kronlein and the trans-frontal method of Naffziger gave only a limited approach to the orbit and its contents. As a result of this limitation, an orbital tumour could be missed, and even if found, could only be removed with difficulty and sometimes at the price (and I have quoted the author) "of damage to nerves and muscles in the region with resulting disfigurement and disability".

The secret of an adequate approach is to remove a generous portion of the orbital rim as a free graft, and to replace it at the end of the operation. The particular quadrant to be removed is decided by the position of the lesion (usually a tumour) if it has been localized before operation. As a method of approach to the orbit for determining the site of tumours which it has been impossible to localize clinically before operation, it is necessary to remove the outer wall, or the outer wall and the roof, of the orbit, and through the openings thus made, the cavity can be explored with the finger (Figs. 3, 4 and 5). The author's method is as follows: An incision is planned 1 in. above the orbital margin and zygomatic arch reaching from the middle of the forehead to the auricle. The temporalis muscle is exposed after suitable retraction of the skin and the aponeurosis is incised 1/16 in. from the temporal ridge from the root of the zygoma upwards for 2 in. The muscle is retracted and the temporal fossa exposed. A spatula is then passed down the outer side of the orbit between the orbital contents and the bone, the periosteum of the orbital margin having been previously cleared. A drill hole is made through the outer wall of the orbit on to the spatula: this can be enlarged at will. The anterior cranial fossa may be opened if required, and by removal of the bone in the roof of the orbit and inwards

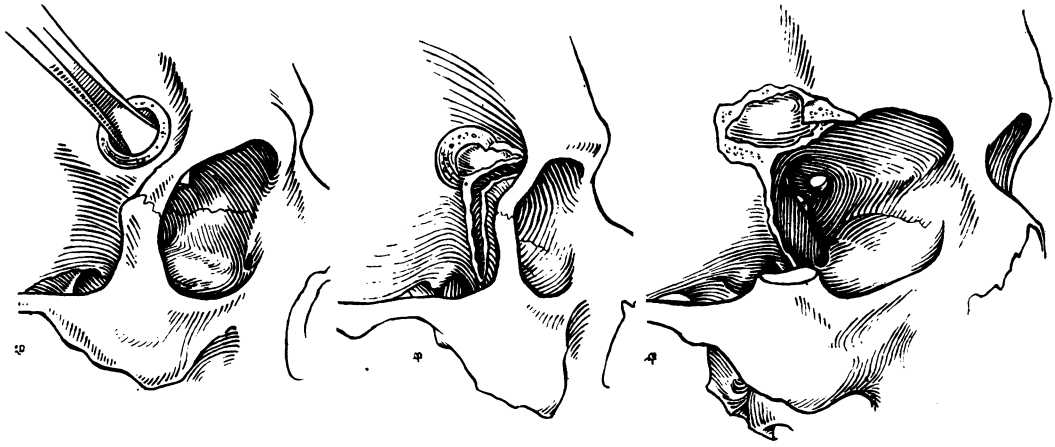

FIG. 3. FIG. 4. FIG. 5.

FIGS. 3, 4 and 5.—Steps of Dickson Wright operation illustrated on dry skull.

FIG. 6. FIG. 7.

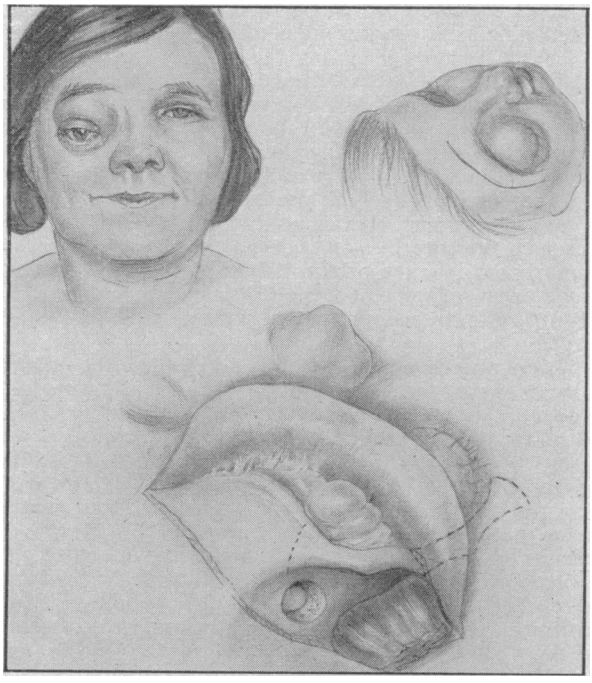

FIG. 8.

FIG. 6.—Pre-operative sketch showing severe displacement of eye.

FIG. 7.—Skin incision.

FIG. 8.—Skin flap turned down—mucocele presenting—temporalis muscle reflected—burr hole in temporal fossa. (Dotted lines represent segment of orbital rim removed.)

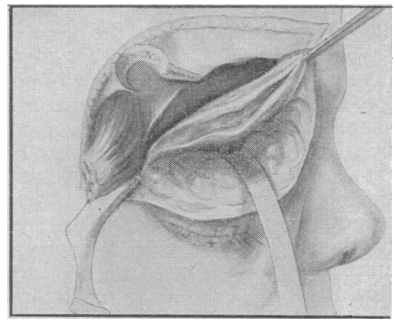

FIG. 9.—Segment of orbital rim freed but still attached to temporalis muscle. Lining of mucocele dissected.

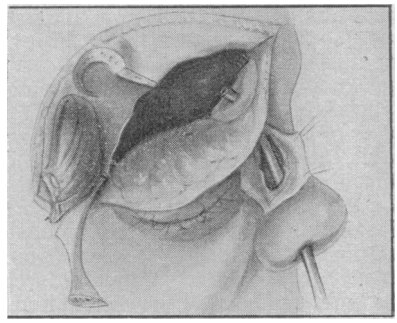

FIG. 10.—Intranasal drainage completes the operation.

towards the sphenoidal ridge, the orbit and anterior cranial fossa thrown into one. When the exploration is being carried out for the recognition and removal of a tumour, its situation will dictate which part of the orbital rim is to be removed. This quadrant is removed by sawing, and is preserved for replacement at the end of the operation.

In our particular case (Figs. 6, 7 and 8) the lateral quadrant was removed and we allowed this to remain attached to the temporalis muscle. The exposure of the mucocele was excellent, and we

were able to dissect the lining from the ridge of the sphenoid and the upper eyelid without difficulty. A small portion of the mucocele was left as a cuff and was used to surround a drainage tube at the end of the operation, which was completed by a classical approach to the fronto-ethmoidal region through the inner angle of the orbit (Figs. 9 and 10).

It is extraordinary that the patient suffered relatively mild discomfort, despite the enormous size of the mucocele, and again despite its size, the co-ordination of the eye movements and other range of movements remained unimpaired. Even after the operation, there was only transient diplopia for a matter of a few days.

During this same period, we have been called upon to treat 8 cases of orbital cellulitis, and in all of them more than one air sinus was infected, the offending organisms appearing to be the staphylococcus and the streptococcus in about equal frequency. This bears out my personal experience of this problem over the last twenty-five years. As with so many of the acute infections in the field which demands our surgical interest, the whole picture has been changed since the introduction of the sulpha drugs and the antibiotics. I can recall in this pre-antibiotic era how the fashion seemed to change in regard to the surgical handling of orbital cellulitis in the absence of frank pus formation when the air sinuses had been pronounced clear of infection. We had waves of enthusiasm for incising the acutely inflamed orbital tissues to reduce pressure on the optic nerve and, we hopefully thought, to diminish the risk of central retinal thrombosis. Then we would have a spell when we would not incise the acutely inflamed tissue in the absence of pus formation. How in this phase of surgical fashion we loved to quote Wilfred Trotter—"When there is pus, let it out—but when there isn't pus, don't." That aphorism of his I read years ago, and also his remark that a scalpel never killed an organism. How often through the years have these admonitions restrained the aggressive scalpel? These problems do not appear to loom quite as large as they did then, because the antibiotics and the like are destroying the organisms and making one's surgical life much less exacting and much less harassing.

Pressure on the optic nerve is, of course, as pressure on any sensory nerve, a serious condition, and there appears to be some indefinable critical period and some indefinable critical amount of pressure which, if exceeded, produces irreparable damage to the optic nerve. It would appear that if this critical point is not passed it has amazing powers of recovery. In relation to this pressure effect on the optic nerve, Williamson-Noble in his paper to the Royal College of Surgeons on March 4, 1954, said that pressure on it from a subperiorbital hæmatoma is likely to produce permanent damage to the optic nerve unless relieved within twelve to twenty hours. If this be true, it is a very disturbing pronouncement, and calls for early relief of such pressure in subperiorbital hæmatoma from any cause. Not only should we take gross hæmorrhages into the orbital tissues more seriously, but I hope it will make us take a much more charitable view of some of the unfortunate happenings to the optic nerve which one has seen as a result of surgery to the accessory nasal sinuses, particularly those of us, who, so far, have not had such misfortune.

An interesting experience illustrating the powers of recovery of the optic nerve when the point of critical pressure on it has not been exceeded occurs to me. In January 1948 I did a Chiari transorbital operation for a chromophobe adenoma of the pituitary gland on a patient of Sir Geoffrey Jefferson's —a woman of 57. I chose to operate via the left orbit because the patient's vision on this side was reduced to the recognition of hand movements only. On the morning of the third day after her operation, she was able to count my fingers, and she said that for the first time with this eye she could see well enough to recognize my facial features. The improvement was continued, and eighteen months after the operation she wrote to tell me that the vision had been restored in this left eye. It was known that the vision had been quite useless for at least three months before the operation.

Over the four-year period which I chose for review for the purpose of this Address, there were no cases of cavernous sinus thrombosis. As a result of personal experience of septic conditions of the orbit, there are two views which I hold quite firmly. The first is that the greater proportion of orbital infections result from infection of the nasal air sinuses. Much suffering and anxiety can be saved for the patient if this fact is appreciated, and the causative sinus infection treated without delay. Secondly, I believe that in any acute stage of the sinus infection with orbital infections, whether it be a primary acute one or an acute flare-up of chronic sinus infection, the surgical treatment to the sinus or sinuses should be minimal. Simple drainage, or, as we call it in relation to the frontal sinus, decompression, is all that is required. If more ambitious surgery is undertaken at a later date, then it is far safer carried out when the flames of the acute process have subsided.

Fig. 11 illustrates a right orbital abscess secondary to a fronto-ethmoidal and maxillary sinus infection which has been treated by minimal drainage of the offending sinuses. There is a polythene tube in the right antrum: a small rubber drainage tube through the floor of the right frontal sinus and another rubber tube draining the orbital abscess independently. The appropriate antibiotic was used: the infection was the result of micro-aerophilic streptococcus.

The pseudo-orbital tumour or, as it is sometimes called, the non-specific granuloma is an interesting but puzzling group of swellings of the orbit which may present with a complete mimicry and masquerading of a new growth—irreducible proptosis, limitation of eye movements and a palpable tumour mass. Duke-Elder (1952) says that this inflammatory pseudo-tumour of the orbit is a clinical rather

than a pathological conception of a condition which has a very varied underlying ætiology. He believes that the group may embrace such widely separated conditions as sarcoidoses, the reticuloses, syphilis and tuberculosis and reaction around a foreign body. The three most recent that I have seen had a very widely different underlying pathology. In one the microscopical examination shows a number of foreign body giant cells, and the particular one shown in Fig. 12 appeared to be surrounding

FIG. 11.—Polythene tube in the right antrum. Small rubber drainage tube in soft tissues of orbit and in the right frontal sinus.

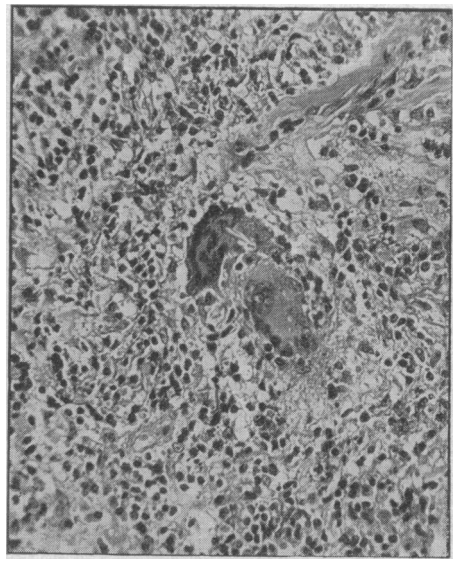

FIG. 12.—Refractile material present in foreign body giant cell. ×400.

some form of crystalline foreign body. There had been a previous history of trauma resulting from glass chippings going into the left eye ten years before the onset of subacute eye signs associated with forward displacement of the globe. The orbit was explored, but the nature of the lesion could not be determined. Following the exploration and parenteral penicillin, the condition appeared to settle, but flared up again twelve months afterwards, and this time biopsy of the tissue revealed a mass of chronic inflammatory granulomatous tissue with the refractile material present in the centre of one of the foreign body giant cells. To classify this refractile mass is not easy: I am informed by the pathologists that it could be a portion of suture material, perhaps even a piece of glass or some crystalline deposit resulting from dusting of the wound with a sulpha preparation. The occurrence of granulomata or pseudo-tumours around crystalline deposits of the sulpha preparations is pretty well recognized. I have been told that it was very common in Germany due to impure sulpha preparations, in the early days of their manufacture. We have had a number of cases of these granulomata in skin incisions in surgically treated breast cancer, and their presence has given rise to quite unnecessary alarm. It is interesting to speculate whether this second flare-up in the case which I have just described did result from the irritation of the sulpha—it would not, of course, account for the original trouble. The case I have quoted I saw with my colleague, Mr. Neville Young, who gave me permission to utilize the information for the purposes of this paper.

The other case is again associated with trauma, and the section of the tissue showed a picture highly reminiscent of the traumatic fat necrosis of the breast which clinically so closely simulates scirrhus carcinoma.

The third case I saw after a pseudo-tumour had been removed from the orbit. She presented at the Department with a chronic progressive subglottic œdema of such a severe degree that a tracheostomy had to be performed. A biopsy of this œdematous material revealed fragments of fibrous tissue, diffusely infiltrated with plasma cells and lymphocytes, the features of a non-specific type of inflammation. This report is very similar to the report of the biopsy of the eye tumour, except that the tissue of the eye tumour contained the lacrimal gland which also had features consistent with a chronic inflammatory condition of its structure.

These experiences have confirmed, if such be necessary, the view expressed by Duke-Elder (1952), namely, that the pathology of these pseudo-tumours varies, and labelling the condition is really a clinical label rather than a label of any definite pathological conception.

Of the osteomas which we have seen, only two have come to operation, one because of the double vision it was causing, and the other one because it was not only displacing the eye, but giving rise to

obstruction of the frontal ostium in an infected frontal sinus. The first one was operated on in conjunction with our neuro-surgical colleagues through a combined transfrontal approach and an approach through a modified lateral rhinotomy (Fig. 13). It was quite a considerable undertaking,

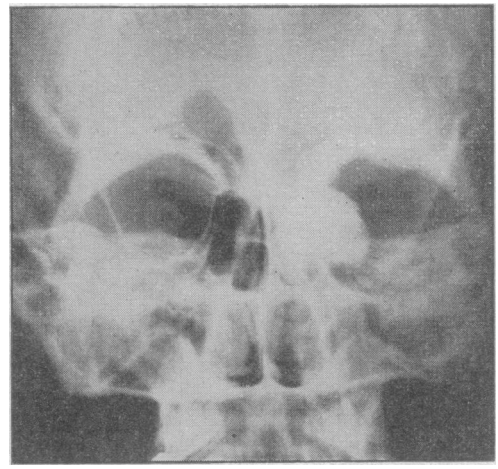

FIG. 13.—Osteoma of left fronto-ethmoidal region.

but the known result was satisfactory. The second case was much more straightforward, and the osteoma was removed through the standard inner canthus incision.

As I have read through the histories of the cases I have reviewed in the preparation of this paper, I have been impressed by the frequency with which trauma is mentioned by the patient as the precipitating cause of their orbital troubles. We are all familiar with the school of thought which regards trauma as the inherent factor in the ætiology of ethmoidal and frontal sinus mucoceles. Not until now has trauma impressed itself on my mind, this despite making allowance for a patient's natural desire and primitive instinctive blaming of all ills on some factor outside the body—and most of all, injury. Perhaps the most striking example in our orbital case is that of the unfortunate girl whose

FIG. 14.—Fullness of orbit—picture of patient when first seen.

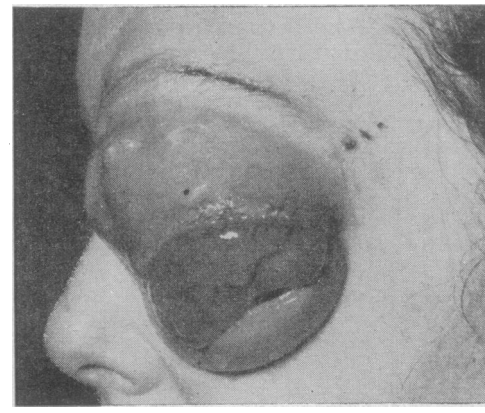

FIG. 15.—Showing rapid growth of sarcoma.

picture is illustrated (Figs. 14 and 15). She came to the ward with this markedly proptosed eye with the history that she had been struck in the eye with a tennis ball fourteen days before. Besides the proptosis, the eyelids were red, giving the impression of a subacute inflammation, superimposed on what we thought likely to be an orbital hæmatoma. Subsequent events made only too clear that the real cause of the poor child's troubles was a rapidly growing sarcoma. Progress was checked for a time, by X-ray treatment, but she died from multiple secondary deposits.

Malignant tumours of the orbit are far from being a common condition, and in the records of the Christie Cancer Hospital and Holt Radium Institute I am only able to trace something under 70

cases of this condition since 1932 to the present time, and considering the general unsuitability of most cases of orbital tumour for surgical treatment, I think it is a fair assumption that this figure of just under 70 must represent a considerable share of orbital tumours occurring in the North-West of England.

I commenced my Address on perhaps rather a gloomy note in the early references to these tumours, and it is with a very brief mention of one case that I would like to end. This was a patient—a male aged 50—who was seen in January 1939 with a tumour of the upper jaw which was invading the orbit (Fig. 16). The tumour was a non-keratinizing squamous carcinoma, and, as will be seen from Fig.17,

FIG. 16.

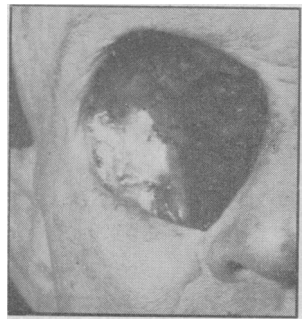

FIG. 17.

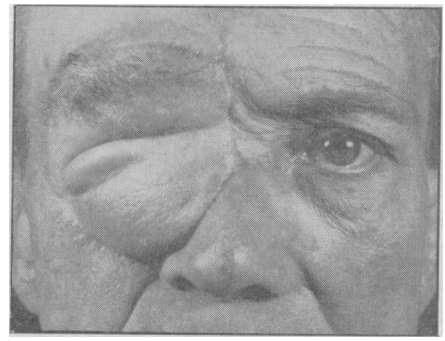

FIG. 18.

FIG. 16.—Tumour of upper jaw invading orbit.

FIG. 17.—Partial removal of upper jaw and exenteration of orbit, followed by treatment of cavity by radium.

FIG. 18.—Final stages of plastic repair.

the orbit was exenterated and a Moure's modified excision of the superior maxilla performed. A sorbo radium bomb was placed in the cavity—the patient is still alive to-day. Fig. 18 shows the repair of the defect: I could not match this result with any other of my own.

In the period of 1940–1944 my radiotherapy colleagues treated 21 cases with a 30% survival rate. Most of these tumours I fancy would be gliomas of the retina in children and scarcely fall within the province of the rhinologist, and, therefore, do not call for consideration in this paper.

Finally, I would like to stress again how seldom proptosis and diplopia occur as a presenting sign in post-nasal tumours. In the 132 cases which I surveyed in February of this year, only 7 of these first sought advice because of eye troubles.

One case of orbital tumour that came my way last year was spotted by a general practitioner who, when visiting a sick patient, noticed that another member of the family had a slightly proptosed eye which was otherwise painless and symptomless. It was ultimately proved that this was a secondary tumour resulting from a pelvic growth. We have had one or two other oddities and freaks of this type, but the story of these must wait for another day.

I would like to acknowledge the help I have received in the preparation of this paper from all my colleagues, both in my own Department and in the other Departments of the Hospital, and I shall not select anybody by name. My indebtedness is also due to the Departments of Medical Illustration of the Manchester Royal Infirmary and the Christie Hospital, to Miss D. Davison of the Department of Medical Art, and last, but by no means least, to my University Secretary, Mrs. Kathleen Barnes, for preparing the typescript and other duties connected with the compilation of the records.

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[*December* 3, 1954]

A discussion was held on **Malignant Granuloma and Scleroma.** Papers were read by Mr. GILBERT H. HOWELLS, Dr. I. FRIEDMANN, Mr. E. ZWIEFACH and Mr. E. J. GILROY GLASS. These papers will be published in the *Journal of Laryngology and Otology.*

The following took part in the discussion: Miss JOSEPHINE COLLIER, Mr. K. M. MAYALL, Dr. A. LASKIEWICZ, Mr. MAXWELL ELLIS, Mr. J. H. OTTY, Mr. S. W. ALLINSON, Mr. W. A. MILL and the PRESIDENT.