sequently appeared in other non-admitting blocks of the institution. Similarly, acute infection reappeared in wards which had been free from dysentery cases for two to four weeks and in which the presence of carriers had not meanwhile been demonstrable. The following list gives some details of incidence in all sections of the institution.

Female chronic sick wards:

9 of 17 wards affected between November 20 and January 27. Inmates 192. Positive findings: 41, including 1 nurse.

Male chronic sick wards:

6 of 18 wards affected between December 3 and January 29. 183 inmates. Positive findings: 13, including 1 nurse and 1 maid.

Male mental observation wards:

90 inmates. 3 positive acute cases on December 3.

Male mental wards:

159 inmates. 4 positive acute cases, January 6-11.

Female mental wards:

222 inmates. 3 positive acute cases, January 3, 3, and 31.

Female mental observation ward:

27 inmates. No cases.

Hospital wards:

8 of 19 wards affected from December 12 to January 16. Total inmates, 523. Positive findings: 17, including 1 doctor, 7 admissions, and 6 possibly secondary cases.

Staff:

Total 643, of whom 233 lived in and 410 lived out. 5 positive findings—namely, 3 nurses (not employed in any infected ward), a kitchenmaid (Flexner X carrier), and a food porter to chronic sick block (Flexner carrier). 2 nurses, 1 maid, and 1 doctor are mentioned above. Of the 5 nurses infected 3 were symptomless Sonne carriers, so that 5 of the 9 staff members found positive were symptomless.

Total population of institution	1,629	} 2,039
Non-resident staff	410	
Persons examined bacteriologically, including those found positive	492	
Positive findings	86	

Summary

Dysentery registrations in Glasgow between 1919 and 1934 averaged 56.3 annually. Between 1935 and 1937 the annual total of institutional infections rose from 42 to 145 and the annual total of cases averaged 215.3. Some epidemiological aspects of these 646 registrations have been noted. Previous occasions of increased prevalence and sixteen outbreaks, including thirteen in institutions, recorded since the introduction of compulsory notification in 1919 have been adduced. Glasgow, with 203 cases, including seventy-two in December, shared in the widespread increased prevalence during the second half of 1937, and towards the end of that period experienced the onset of its first large outbreak of Sonne dysentery. Some details have been given of the incidence of the eighty-six positive findings (seventy-eight Sonne, including eight not associated with symptoms) made during this institutional outbreak. In the absence of case-to-case connexion between several foci within the outbreak it was considered important to devote attention to the methods of cleansing the ward food utensils handled by the uninfected staff of the central kitchen and dairy.

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CARCINOMA OF THE PALATE

HOW OFTEN DOES IT MASK MALIGNANT DISEASE IN THE MAXILLARY ANTRUM?

BY

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In the 1936-7 Statistical Report of the National Radium Commission the relatively low proportion of patients with carcinoma of the palate who have remained free from recurrence after treatment is commented upon. The report states that "the low proportion of patients with carcinoma of the palate who have remained free from recurrence is unexpected in view of the fact that the survival rate for this group approximates closely to that for the alveolus and that this group shows the highest proportion of patients free from glandular metastases when treatment was started. The figures given suggest that there is a tendency for tumours of the palate to spread further than can be easily recognized by clinical means, with the result that the tumour is often inadequately irradiated and thus tends to recur with greater frequency than tumours of the other sites." This particular problem was noticed some years ago at the Holt Radium Institute, and led to investigation with a view to finding, and remedying, the cause. Although at the time of the original investigation certain definite information was obtained, it was felt that the available cases were too few to justify publication of the inferences from their observation.

At the present time analysis of 167 cases of malignant palatal ulceration, and of 104 cases of antral carcinoma passing through a single clinic, is possible, and, in view of the comments in the Radium Commission Report, it would appear expedient that the conclusions to be drawn from that analysis should be placed on record. As a result of the investigation I suggest, and this article purports to demonstrate, that the tendency to recurrence after treatment of carcinoma of the palate is due to the fact that a large proportion of "palate growths" are really neoplasms of the antrum. It will be shown that, with certain limitations which will be discussed in their appropriate place, it is a wise generalization that every case of carcinoma of the palate must be considered and treated as an antral growth unless it has been proved not to be so. This generalization corresponds with those which nearly every medical student finds helpful with regard to malignant disease of the stomach, uterus, and rectum.

Material for Study

The material upon which this analysis is based is a group of 167 cases of palatal neoplasm and 104 cases of malignancy involving the maxillary antrum, partly included in the 167. Only those cases in which the palate was the site of major involvement have been considered. The patients were referred in part by general practitioners and in part by the surgical consultants on the out-patient staffs of the general hospitals in the area served by the Institute. In fairness it should be stated that failure to recognize the antral involvement of many of the palate tumours was not restricted to the former of these two groups.

The term "malignant disease involving the maxillary antrum" has been chosen to avoid any implication that it is considered that all, or even the majority, of the

tumours reviewed necessarily originated in the antrum. The investigation was undertaken to obtain information for the purpose of improving the results of treatment of malignant palatal ulceration. From a treatment point of view it matters little which side of the palate was first involved if both sides are involved at the time the patient is treated, since both sides have to be dealt with in any case. The majority of palatal growths could be grouped either as "anterior" or "posterior," although every part of the palate was represented in the cases studied. The posterior growths were usually associated with soft-palate ulceration, and frequently with extension on to fauces and tongue. They formed a group which a certain type of radium implantation (referred to in the Institute as a "tongue-ptyergoid implantation") was generally successful in curing locally. Glandular involvement was usually the reason for eventual failure to cure, and many of the patients had involved glands when first seen.

The "anterior" group were found to involve the palate, upper alveolus, sulcus between cheek and alveolus, and sometimes the cheek in the neighbourhood of the

Typical antral site

alveolus. The actual site of this lesion was fairly constant, being about the junction of the middle and anterior thirds of the alveolus. Glandular involvement was rare, except as a late event. Local treatment of the obvious lesion was often followed by recurrence involving the maxillary antrum.

The factors which determined a final diagnosis of antral involvement may be summarized as follows. In the majority of cases the diagnosis was made before treatment, by radiographic demonstration of bone destruction. In others the diagnosis was arrived at only after failure of local palate treatment had been followed by recurrence accompanied by bone destruction revealed on x-ray examination or presentation of an obvious tumour eroding through another wall of the antrum.

Typical Antral Site

For convenience the anterior situation just described will be referred to as being in the "typical antral site." It may immediately be questioned whether this term can be justified. In Table I 167 cases of malignant ulceration of the palate are analysed with regard to site and antral involvement.

TABLE I.—167 Palate Growths Analysed According to Site and Antral Involvement

Total number of cases with ulceration of palate	..	..	..	167
A: Ulcer in typical site	..	..	..	96
Typical site ulcers involving antrum	..	..	..	91
B: Ulcer not in typical site	..	..	..	71
Non-typical ulcers involving antrum	..	..	..	1

The table shows that of ninety-six typical site lesions ninety-one at some period involved the maxillary antrum (94 per cent.), whilst of the rest only one in seventy-one (1.4 per cent.) did so. There can be no doubt that these figures justify the term.

The textbook description of antral malignancy usually given is of a history of nasal discharge and haemorrhage, often associated with pain in the maxilla, and trismus. There may or may not be nasal polypi. Later, as the tumour increases in size, there is extension beyond the walls of the antrum. A tumour presents most frequently in the malar region, orbit, or nose, but it occasionally occurs in the nasopharynx or the palate. Not infrequently several of these sites are involved. In actual clinical experience, however, it is very often the presence of one of these obvious tumours that is the immediate cause of the patient's decision to take medical advice. The obvious lesion results in a diagnosis of carcinoma of the nose or rodent ulcer of the inner canthus or epithelioma of the palate being made and treatment for this condition being instituted.

In Table II all the cases of maxillary antrum malignancy seen in the clinic are analysed according to the anatomical sites obviously involved.

TABLE II.—Site of Obvious Involvement in 104 Antrum Cases

Site	No.	Percentage
Intra-oral only	71	68.5
Both intra-oral and extra-oral	21	20
Mouth therefore involved in	92	89
Extra-oral only : Nose, 4 ; orbit, 1 ; malar, 4 ; more than one site, 3	12	11.5
Malar swelling	20	19

The heavy preponderance of visible mouth lesions over extra-oral involvement in this group of cases is so obvious as to require no further stressing. Consideration of the incidence of face swelling shows that in only twenty out of the total of 104 cases was this visible. Only two of these are found in the "missed antrum" group.

It may be inferred from these two tables that antral malignancy usually involves a typical part of the palate, and that practically every palatal ulcer in that site involves the antrum. The cases forming the background of this analysis do not bear out the usual view as to the common picture of antral neoplasm. Malar involvement is comparatively rare, whilst the palate is involved in 89 per cent. of the cases. It may be argued in reply that because the cases were referred for radiation therapy they were presumably advanced ones, and that consequently the typical picture was distorted. The infrequency of visible involvement of the malar region even in the obviously late cases, however, suggests that this is not the explanation.

The Incidence of Missed Antrum

It has been the custom in the Institute to refer to the cases which have been proved to involve the antrum, although originally diagnosed as some other condition, as "missed antrum." These cases fall naturally into two groups: (1) those which were recognized on first examination in the radium clinic although referred with a different diagnosis; (2) those not recognized until treatment for the first-diagnosed condition had been followed by recurrence. It is necessary in studying these missed antra to consider two proportions. First, there is the proportion of the total antral cases which were missed;

secondly, there is the proportion of the total palate cases which were in fact, or could have been, missed antra.

TABLE III.—*Analysis of Missed Antra in Relation to Total Antral Cases*

Total antra analysed	..	..	..	..	..	..	104
Total referred with misdiagnosis	..	..	..	..	..	..	70
(a) Recognised here but missed elsewhere	..	..	..	..	..	..	55
(b) Not recognized at all till recurrence	..	..	..	..	..	..	15

Table III shows that in seven years seventy possible missed antra have passed through a single institution concerned with general malignant disease. This figure represents 67 per cent. of the total antra seen. Of these seventy cases fifty-five were recognized in the clinic here, but fifteen were not.

TABLE IV.—*Analysis of Missed Antra with Palatal Lesion*

Total palates analysed	..	..	..	..	..	..	167
Total involving antrum	..	..	..	..	..	..	92
Total referred with misdiagnosis	..	..	..	..	..	..	64
(a) Recognised here but missed elsewhere	..	..	..	..	..	..	51
(b) Not recognized at all till recurrence	..	..	..	..	..	..	13

The two cases which were not recognized till recurrence took place, and which appear in Table III but not in Table IV, were diagnosed and treated as rodent ulcer of the inner canthus and as carcinoma of the nose respectively.

When both Tables III and IV are considered it is seen that, while 67 per cent. of all the antral cases were misdiagnosed before reference to this clinic, 91 per cent. (64 out of 70) of the errors occurred in cases with palatal involvement. I submit that this has a very direct bearing upon the comments of the National Radium Commission statistician, to which reference has already been made.

Clinical Investigation

It follows as an obvious corollary of the foregoing analysis that every case of carcinoma of the palate requires special investigation to eliminate the probability of its really involving the antrum. In this institute the usual procedure is to look upon every palate case with suspicion. If the lesion is entirely in the posterior part of the palate and not lateral no particular investigations are carried out beyond examination of the upper surface of the soft palate, either digitally or by inspection through a mirror. A posterior lesion involving the alveolus and the sulcus between cheek and alveolus is investigated as one in the typical antral site. The approach to lesions in the typical site is threefold.

1. *X-Ray of Sinuses*.—In the advanced case in which there is opacity of the antrum and erosion of the bone between the obvious lesion and the antrum the diagnosis is definite. The presence of an obvious lesion and opacity of the antrum but no bone erosion is suspicious enough to determine treatment. A negative x-ray report, however, is not of very great value unless it is confirmed by other examinations. This statement is supported by the fact that thirteen of the fifteen cases of missed antrum which were not recognized until recurrence after treatment were overlooked because negative x-ray reports were accepted as conclusive.

2. *The Needle Test*.—A sterile hypodermic needle whose sharpened end has been blunted is grasped in forceps and pushed into the tumour. If it passes through the bone, erosion is assumed to have taken place. In every case in which the antrum is found to be involved irradiation of the antrum as well as the palate is undertaken. The needle test is useful, but is open to criticism, and unless the palate is completely perforated it is apt to be

painful. Injection of a local anaesthetic has not proved very helpful on the few occasions on which I have used it. In cases in which only the oral surface of the palate is eroded it is often possible to force the needles through the remaining bone. Probably, however, in designing treatment, lesions of this kind should be considered as already involving the antrum. When the erosion spreads outward, obliterating the alveolo-cheek sulcus, care is necessary to ensure that the needle is not merely passing upwards in soft tissues completely external to the antrum. Other than in this case a positive needle test ought to be considered to indicate the need for treatment designed to include at least the floor of the antrum in addition to the oral malignancy. Failure to get the needle through the bone has little diagnostic value, since the clinician has no sure means of knowing that he has not missed probing the one site which is perforated.

3. *Exploration of the Antrum*.—It occasionally happens that both these tests are inconclusive. In these cases either of two courses is open to the investigator: he may decide there and then that the statistical probability of antral involvement is so high that he is justified in carrying out treatment which includes the antrum, or he may ask an aural surgeon to open the antrum so that direct inspection of the lining settles the point at issue. Either of these procedures is infinitely preferable to failure to treat an involved antrum, for in thirteen of the fifteen missed antrum cases only recognized after recurrence the patients are dead, nine of them in less than a year after recognition.

It may be asked why biopsy has not been included in the description of clinical investigation. For biopsy to be of value antral lesions would need to present an entirely different histological appearance from palate ones in an overwhelming majority of cases. If they did so lesions originating in the antrum could immediately be segregated, leaving only the palate lesion perforating into the antrum to be recognized. In Table V the pathological findings in seventy-eight palate cases which did not involve the antrum are compared with those in seventy-five cases of known antral malignancy.

TABLE V.—*Proportion of Squamous Carcinoma in Palate and Antrum Tumours*

	Number Sectioned	Squamous Carcinoma	Other Tumours
Palatal malignancy not involving antrum ..	78	75	3
Malignancy of antrum	73	58	15

The table shows that of the seventy-eight non-antral palate growths 96 per cent. were squamous carcinomata, while of those involving the antrum 79 per cent. were of the same histology. Although there is a considerable difference in these percentages, the great preponderance of squamous carcinoma in both groups renders histological examination of little value as a differential diagnostic agent.

Improvement following Recognition of the Palate-Antrum Relationship

The relationship between lesions of the palate and the maxillary antrum was recognized in this institute two years ago, after a preliminary examination of the available statistical material. At the time it was felt that the cases were too few to justify publication of the findings. The information gained was, however, used in determining policy with regard to palate lesions.

Having demonstrated a relationship, and subsequently carried out a policy based on it, can it be shown that

improvement has been effected? I believe that it can. There has been no change in the methods of reference of patients to the Institute over the whole seven years under review, and cases referred as carcinoma of the antrum remain few. The average number of missed antrum cases per year is ten. During these seven years the Institute staff failed to recognize fifteen out of the seventy cases until recurrence took place. Of these fifteen only three have occurred during the last two years—that is, since the high incidence of antral involvement in palate malignancy was realized. Each of these three cases was missed because again a negative x-ray report was accepted as being conclusive.

Conclusions

It may be inferred from the report of the National Radium Commission that the frequent involvement of the maxillary antrum in certain palatal and upper alveolar malignant lesions is not generally appreciated.

Investigation in the Manchester Radium Institute of 167 cases of malignant disease of the palate showed that 94 per cent. of the lesions of the middle third of the palate, spreading on to the alveolus and into the alveolo-labial sulcus, involved the maxillary antrum. In the Institute this is known as the typical antral site. Lesions in the other usual palate site—that is, the posterior part of the hard palate, spreading on to the soft palate and fauces—did so in only 1.4 per cent. of the cases.

Typical antral-site lesions should be regarded as involving the antrum unless it is proved that they do not. If definite proof is not forthcoming they should be assumed to do so, and be treated accordingly. X-ray examination alone is conclusive only when positive. A negative report should not be accepted as being conclusive. Thirteen cases out of fifteen with antral involvement, missed until recurrence followed treatment, escaped notice through the acceptance of negative x-ray reports.

The needle test described is useful, but should only be accepted when positive.

Histological examination does not help to clear up the diagnosis, because of the high proportion of squamous carcinomata in both the simple palate lesions and those involving the antrum, taken in conjunction with the fact that all malignant tumours of the palate are not epitheliomata. As treatment must include both mouth and antrum, anatomical differentiation of site of origin is not considered to be of great clinical importance.

The cases seen in the Institute suggest that intra-oral ulceration is by far the commonest evidence of antral neoplasm. This finding is contrary to accepted teaching, but is not due to the fact that usually it is the more advanced cases which are referred for radiation therapy, as cheek-bulging is rare even in the obviously late cases.

It is shown that recognition of the palate-antrum relationship has been followed by a great reduction in the number of cases entirely missed until local palate treatment was followed by recurrence.

From April 1 the importation into this country of all meat, including bacon and ham, and also meat products such as canned meats, sausages, and sausage casings, will be permitted only if they are accompanied by an official certificate recognized by the Minister of Health as evidence of satisfactory inspection and hygienic preparation. The importation of certain defined classes of meat (such as scrap meat) continues to be prohibited.

TINEA OF THE FOOT

BY

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Since the discovery of pedal tinea by Whitfield in 1908 the condition has become increasingly prevalent (C. J. White, 1927a), and according to American authorities presents to-day one of the major problems of dermatological practice. The many statistical surveys that have been made in America by Hulsey and Jordan (1925), Legge, Bonar, and Templeton (1929), Andrews and Birkman (1931), and Gilman (1935), to mention only a few, appear to confirm this, and it seems strange that no comparable figures have been produced in this country. It may be as Gray (1934) said, that "the profession as a whole is still barely aware that the problem exists," and should the disease achieve the lay popularity it has achieved elsewhere there is every danger of a too free diagnosis on inadequate evidence.

Difficulties in Diagnosis

The frequent and early spontaneous disappearance of fungal mycelia from the infected area is one of the main difficulties, and in late cases there may be nothing to distinguish the condition from dermatitis from other causes (Whitfield, 1908, 1911). The reason for this disappearance is hard to understand in view of the viability of the pathogenic fungi (Farley, 1921; Weidman, 1927a; Bruhns, Alexander, and Kadisch, 1929), but the secondary bacterial contamination which sometimes occurs may in some way exert a lethal influence on the moulds. In this connexion the observations of Weidman (1926) on a case of pedal ringworm sown with yeasts are of importance. Thus it would appear that many cases of tinea, when seen, will not show the causal agent, although such authorities as J. H. Mitchell (1922) and C. J. White (1919, 1927b) countenance a diagnosis on clinical grounds alone in the chronic keratotic pedal type. This may be admissible under certain circumstances, but the demonstration of the specific factor still remains a *sine qua non* in diagnosis, and the following statement by Ramsbottom (1931) may be taken as an expression of general opinion:

"There is, however, a tendency on the part of some investigators to assume a fungal origin of a disease on insufficient evidence. It is not enough to postulate the parasitic nature of a disease and then, bacteria, protozoa, and other parasites being eliminated, to describe it as mycotic; the evidence must be as clear as that for any other parasitic group."

In addition it must be remembered that all cases of interdigital scaling and maceration are not mycotic, although von Graffenried (1918) and Catanei (1932) have shown that such lesions form a suitable nidus. Dirt seems to bear no relation to infection, as the highest incidence is to be found among the wealthy and more leisured classes (Beintema, 1931). Therefore the practitioner will often be confronted with strong clinical evidence of fungus infection without microscopical or cultural confirmation, and a specific dermal test would be of great help in accurate diagnosis.

Previous Investigations with Mycotic Extracts

The use of mycotic extracts in the diagnosis of superficial tinea infers an altered state of reactivity in the body. That this state exists in certain bacterial diseases is a well-established fact, and for many years mycologists have endeavoured to find a corollary in ringworm infections.