SINUS TROUBLE AND PERSONALITY.*

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It is proposed to consider first some little-noticed experimental facts about the accessory nasal sinuses, and some oft-repeated clinical observations, which are relevant.

1. If a solution of indigo carmine (Yates, 1924) is instilled into a healthy human sinus, the dye is swept out of the ostium, and can be seen some minutes later being swept down along recognizable ciliary paths upon the surface of the mucosa on the posterior pharyngeal wall. If the sinus-lining has been harmed, by infection or by suitable chemicals, the dye is not swept out, but can soon be recognized in tiny blue lines upon the pharyngeal wall, this time under the mucous membrane. It has been absorbed through the mucosa, and is in the lymphatics of the submucosa, and appears in the urine in twenty minutes. This gives some idea of the reason for the frequent association of nephritis and fibrositis with sinusitis.

2. If harmless particulate blue dyes (to resemble micro-organisms) are instilled into the noses of a series of rabbits and the animals killed at hourly intervals, after one hour the olfactory lobes and neighbouring parts of the brain may be stained blue ; also the lymphatics threading the orbital fat, the lymph nodes about the larynx, and in some cases the intermuscular planes in the nuchal region (Le Gros Clark, 1929).

3. If 20 per cent. cocaine (Sluder, 1919) is instilled into the human sphenoidal sinus, there follows, in many cases, sensory palsy of the area supplied by the trigeminal nerve on that side. In many subjects who have a large sphenoid the Gasserian ganglion is in very close anatomical relationship with the sphenoidal sinus, in the upper and outer wall of which there is, in a small percentage of cases, a hiatus in the bone (Ferris Smith, 1934), so that the meninges are in contact with the sinus lining. This experiment gives some idea of the way in which sphenoidal sinusitis may affect the trigeminal nerve.

4. Even in the absence of a hiatus there may be rapid absorption from the sphenoidal sinus to the brain. Ferris Smith (personal communication) reports a case in which the sphenoidal cavity was swabbed out with a solution containing picric acid. The patient died of heart failure the same night, and the lower parts of the brain were found deeply stained yellow. The four obser-

* Read at the Annual Meeting of the Royal Medico-Psychological Association, 11, Chandos Street, London, W. 1, on July 17, 1941.

vations are brought forward to indicate some of the ways in which absorption of toxic fluid from the sinuses may affect the neighbouring parts.

5. Another observation, of primary importance, is that the early response of the tissues to streptococci is the production of oedema, and not pus; and in the writer's opinion many of the most important types of chronic sinus infection are those in which the body seems unable to mobilize a pyogenic response, and in which the infection persists in the deeper layers of the mucous membrane, giving rise to the continuous or intermittent production of oedema. Recognition of the condition has been helped by radiologists, who have for more than fifteen years been describing the presence of thickened linings to sinuses, but its importance has not received adequate recognition by rhinologists in this country. The reason for this is not obvious, but lies perhaps partly in the resemblance between this condition and allergic swelling of the membrane when viewed merely by means of X-rays or the naked eye. Apart altogether from the history, at open operation typical examples of either condition may often be differentiated: the typical allergic swelling is pale, both in the nasal passages and in the sinuses, and is often most pronounced, many of the sinuses being crammed with polypi, which are also evident in and about the middle meatus of the nose. The mucosa in infective oedema, corresponding to "surgical" oedema elsewhere, is usually more reddish, owing to the presence of dilated blood vessels; and, in cases of infection with haemolytic streptococci, bleeds readily. The thickening is not usually pronounced, and does not show in plain skiagrams (compare Figs. 1 and 2).

Allergy and infection may and often do co-exist in the sinuses; and while extreme examples of either condition may be easily recognized, there is a gradual transition from one to the other; and the only crucial test of infection is to make a microscopical examination of a snippet from the submucous layer, after surface-sterilization to exclude commensals and inhaled contamination. This is reliable, and is easy to do, especially if it is made a routine practice. The use of biopsy need not be restricted to the search for malignant disease. In the typical allergic case, e.g. from the polypi which may always be found in the sinuses of asthmatics, there is usually no growth, or a scanty growth of, e.g., pneumococci. The growth in an infective case is usually pure, and is typically a *Strep. pyogenes*, especially in cases of sinus-headache. In two recent cases at Hill End Hospital, one of rheumatoid arthritis, and the other of tachycardia with attacks of pyrexia, a heavy growth of *Strep. viridans* was obtained; this organism appears usually to be of dental origin, and seemed so to have arisen in both cases (Fig. 3).

Using this technique, Rambaud (1936) found that in cases of sinusitis in patients suffering from mental disorder there was usually a streptococcus co-existing with an anaerobe. In several cases under my care this combination has been shown to exist, and the post-operative smell in Case 7 was unusually horrible; but as bacteriologists in this country have not been extensively

Fig. 2.

Fig. 1.

Fig. 1.—Plain X-ray film shows no abnormality in left antrum.
Fig. 2.—Thickened mucosa rendered visible by contrast with the lipiodal shadow, which is raised above that of the antral floor. (From a case of angioneurotic oedema, which began on the face.)

https://doi.org/10.1192/bjp.87.369.479 Published online by Cambridge University Press

interested in the possible pathogenicity of anaerobes, the significance of this finding has not yet been thoroughly investigated.

Another reason—perhaps the chief reason—why the non-purulent type of infection has not been widely recognized is that the symptoms of these cases are often anything but nasal. In allergic cases there are nasal symptoms aplenty: sneezing colds are the rule. But the cases with infected linings are to be sought in the general medical and eye departments, and not (until recently) in the nose department.

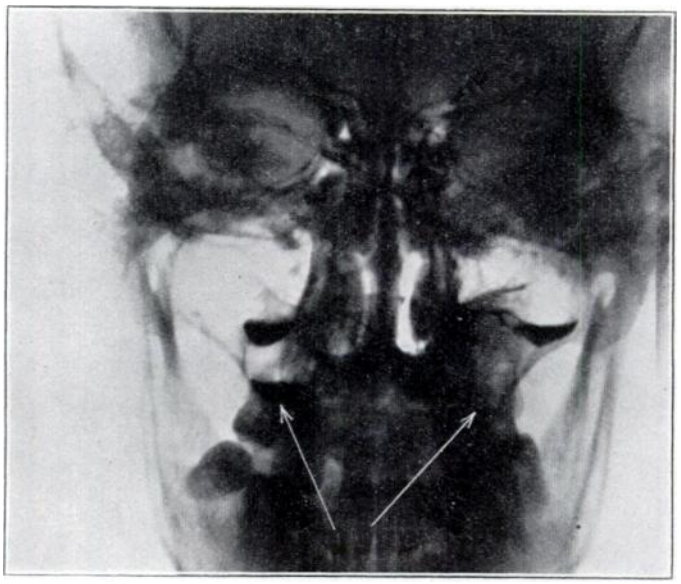

FIG. 3.—Right antrum shows upper and lower lipiodol shadows. Left antrum shows no lower shadow, the lipiodol being raised well above antral floor by a polypus (which overlay an empty tooth socket). Culture of polypus gave dental-type streptococci. (From a case of rheumatoid arthritis in a male, aged 34.)

THE REPLACEMENT METHOD.

At this point it becomes desirable to describe Proetz's displacement method of introducing fluids into the sinuses without operation, the method by which the oil was introduced in most of these pictures. It was described by him in 1931, and has been in regular use at St. Bartholomew's Hospital ever since.

Briefly, this consists in the partial exhaustion, with the head inverted, of the air in the nasal passages, so that fluid, e.g. lipiodol, previously instilled into the nose, may replace the air which has been extracted. If the mucosa be shrunk beforehand by the use of a vaso-constrictor, the lipiodol is in the normal subject found to be accepted by the sphenoidal and ethmoidal cells always, the antra usually, and the frontals quite often (see Fig. 2).

Obstruction by turgid mucosa in the nasal passages proper can be satisfactorily diminished beforehand by the use of a vaso-constricting spray; thereafter, failure of fluids to enter the ostium of a sinus indicates either that

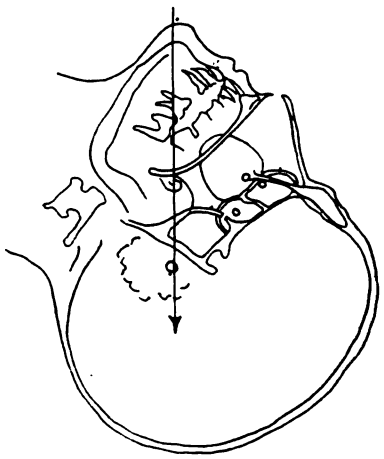

FIG. 4.

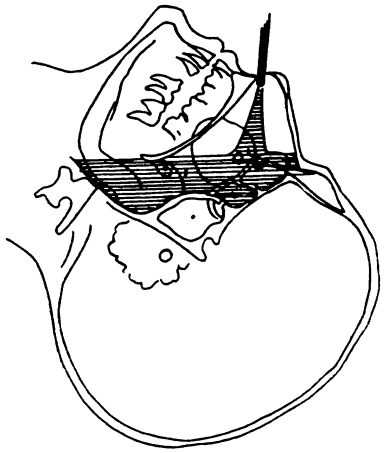

FIG. 5.

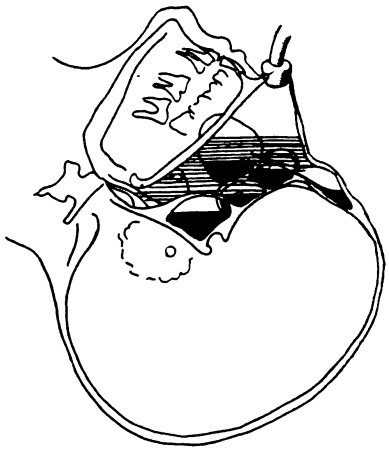

FIG. 6.

FIG. 7.

Diagrams from "The Displacement Method," by kind permission of Dr. A. W. Proetz.

the ostium is blocked, or that the sinus is occupied by something to the exclusion of air. Inspection at operation invariably shows that the ostia of sinuses which refuse lipiodol are narrowed by the presence of oedema under the epithelium; and in asthmatic cases, especially during an attack, it is usual to find that the oedema has so thickened the lining mucosa throughout the sinus that the cavity is obliterated thereby.

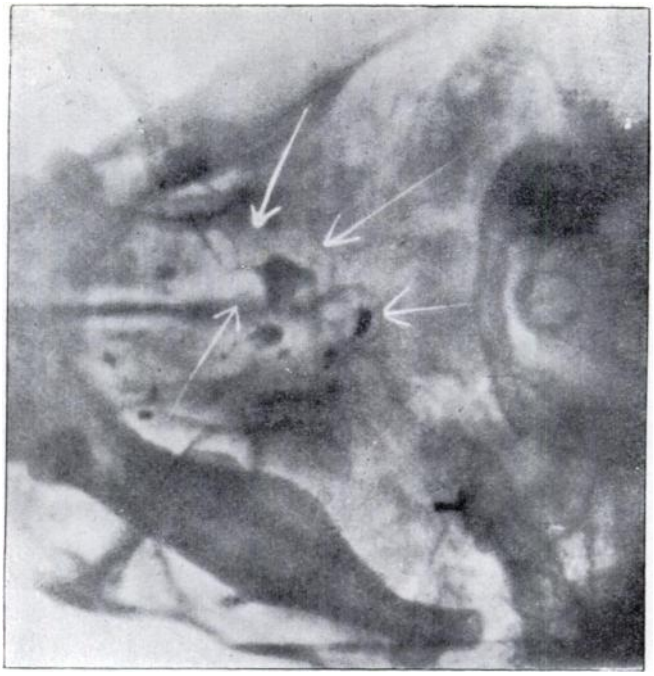

FIG. 9.

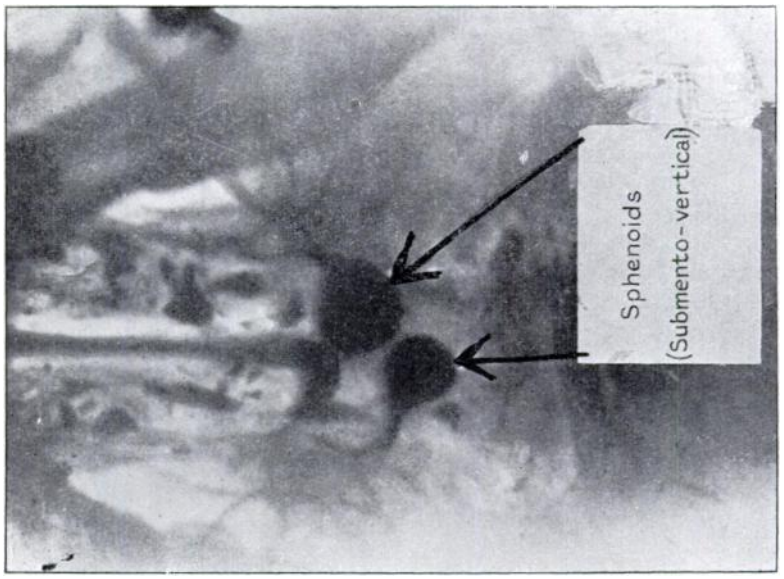

FIG. 8.

FIGS. 8 and 9.—The filling by replacement is normal. In the 72-hour film bad retention is shown in the sphenoids, the mucosa of which upon the right side has swollen—particularly near the anterior part of the sinus—so as to create a valvular block near the ostium. (From a case of migraine, taken as right hemicrania was subsiding.) (*Proc. Roy. Soc. Med.* (*Sect. Laryng.*), **31**, 226, 1937.)

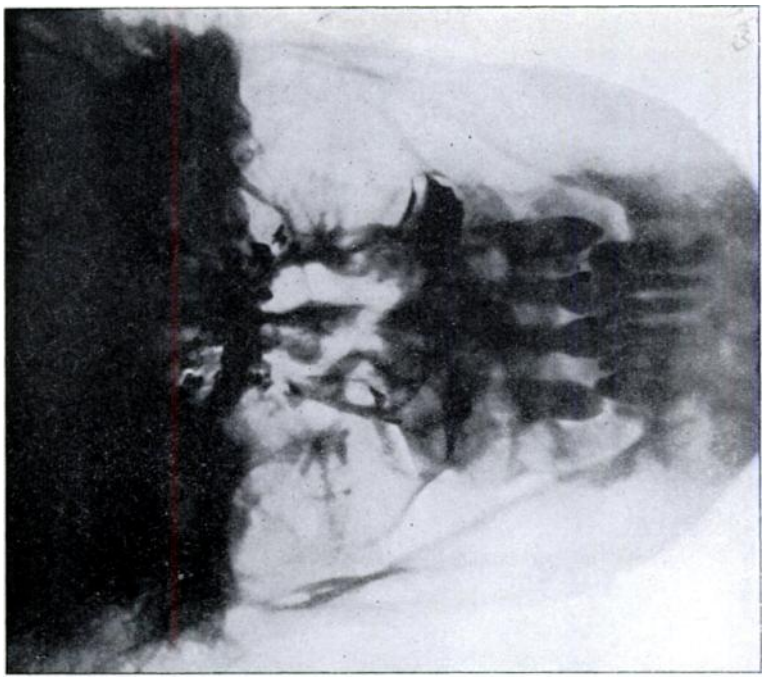

Fig. 11.

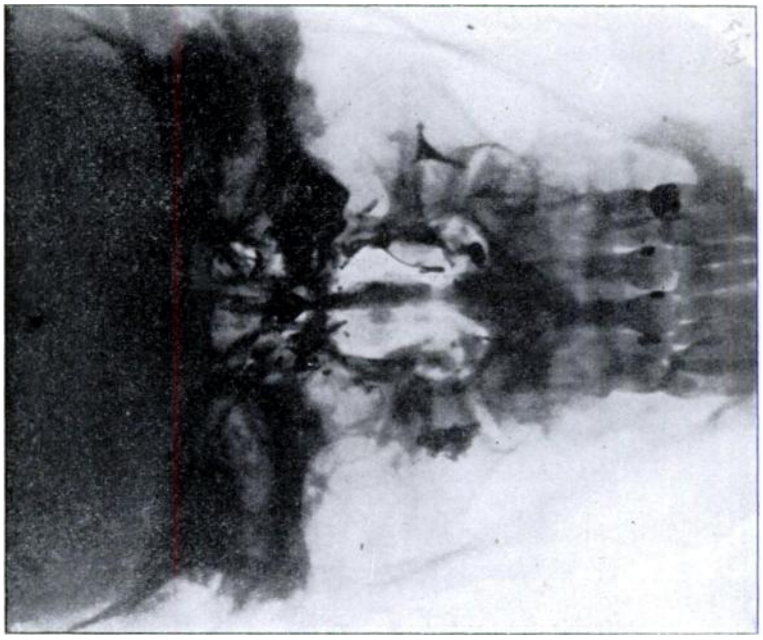

Fig. 10.

FIGS. 10 and 11. (The lipiodol shadows in the antra only are to be studied.) There is a remarkable difference between the shadows upon the first day, and those taken after a few weeks of treatment by ephedrine replacement. The lipiodol (which in the first picture is seen to occupy a central position in the antra) lies, in the second picture, practically upon the antral floor, being permitted to do so by a diminution in the thickness of the mucosa. (From a case of migraine without scotomata.) (*Proc. Roy. Soc. Med.* (*Sect. Laryng.*), **31**, 226, 1937.)

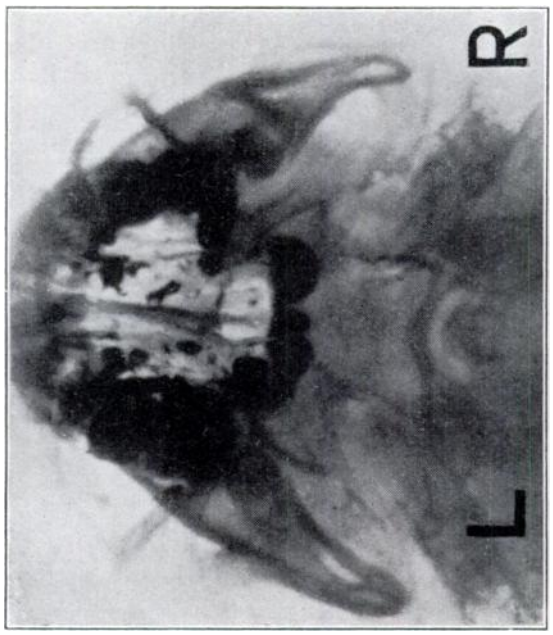

Fig. 12.

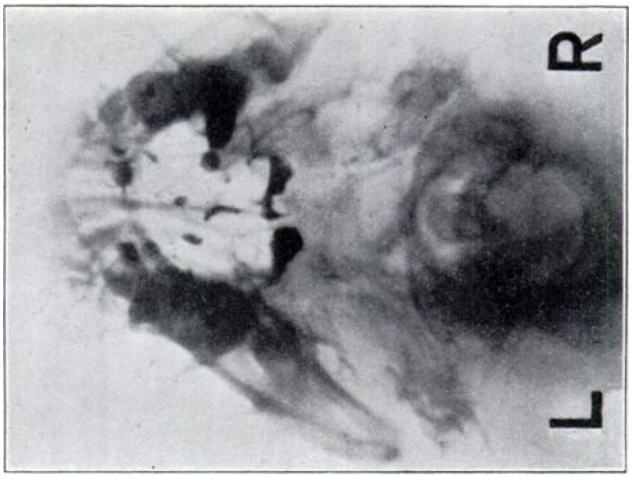

Fig. 13.

Fig. 12.—Taken during interval period, shows lipiodol reposing on the floor of posterior sinuses. (Submento-vertical view, shows typical normal filling.)

Fig. 13.—Taken during recurrence of sore throat with nephritis, haemolytic streptococci being present in nasopharynx and urine. The lipiodol is seen to be lifted off the cell-wall by swelling of the mucosa. (From a case of recurrent nephritis in a young man.)

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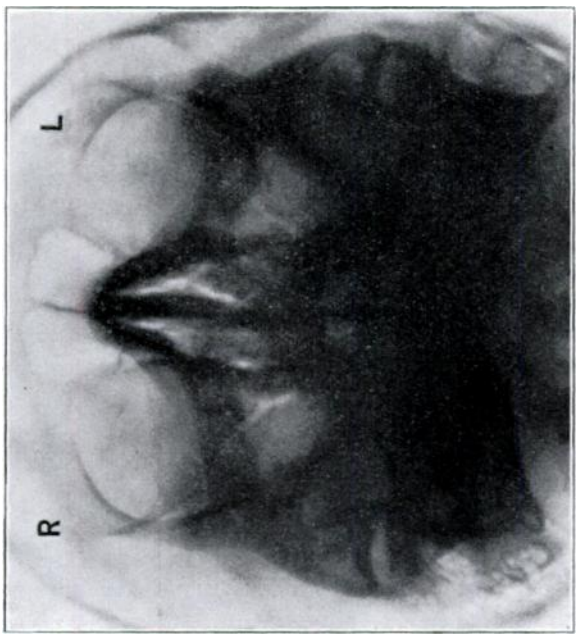

FIG. 14.

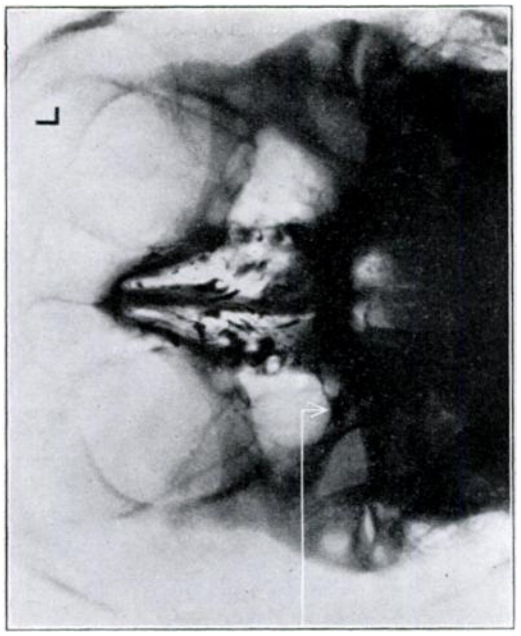

FIG. 15.

FIG. 14.—Plain skiagram, taken during attack, shows no abnormality right antrum.
FIG. 15.—(Also taken during an attack.) Shows stellate shadow of lipiodol off lifted floor of antrum by polypoid swelling of lining membrane.
(From a case of recurring right-sided iridocyclitis in a young woman.)

Lipiodol, introduced by replacement, is used as the contrast medium in sinus X-ray work. It is found convenient to take the first picture two hours after the introduction; a second picture, taken as a rule 72 hours later, sometimes shows the most extraordinary change in the shape of the cavity, induced by an urticaria of the lining membrane (Figs. 8 and 9). In health, the cilia should sweep the sinuses clear of lipiodal in 36 hours. Chronic inflammation is associated with sluggish ciliary activity.

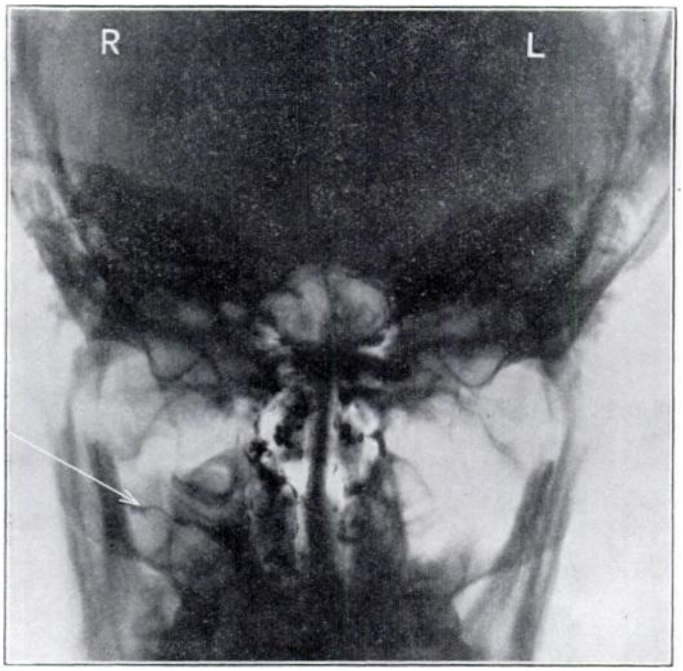

FIG. 10. Lipiodol raised above floor of right antrum by polypoid swelling of mucosa. Taken during attack. (From a case of recurring attacks of right-sided iridocyclitis in a man, aged 40.)

Opportunities have arisen of examining by lipiodol skiagrams and biopsy the sinuses of patients suffering from diseases in which sinusitis is not usually thought to play a part.

Cases of nephritis (Figs. 12 and 13), appendicitis, rheumatism, iridocyclitis (Figs. 14, 15 and 16), certain nervous disorders, certain skin troubles, and most typically, cases of severe headaches and neuralgia (Figs. 17, 18 and 19), are those in which one finds the haemolytic streptococcus under the sinus mucosa. There is a group also of *allergic* diseases in which one finds constant and characteristic changes in the sinus mucosa; in migraine, as shown in Fig. 9, it is the lining of the sphenoids that is characteristically altered; and in asthma or

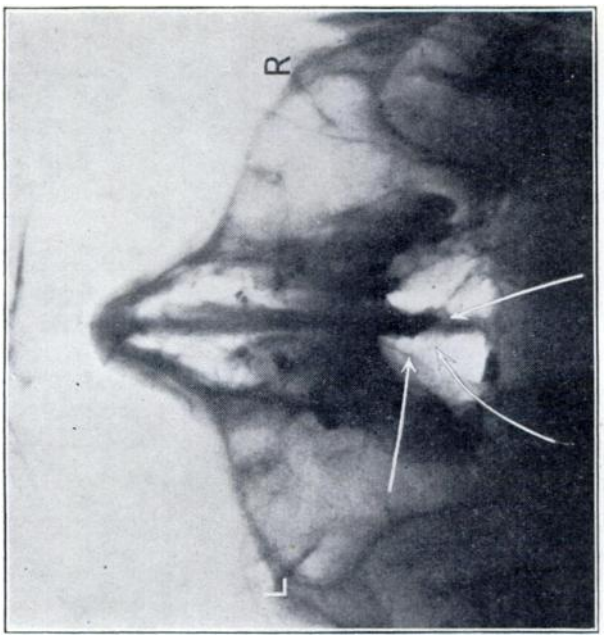

Fig. 18.

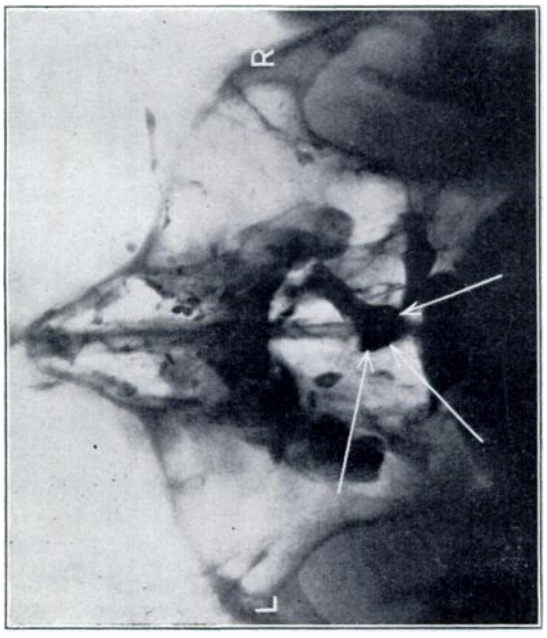

Fig. 17.

Fig. 17.—Arrows indicate outline of lipiodol in abnormal cell within the septum.
Fig. 18.—Arrow-tips indicate cell outline. The lipiodol after 72 hours has been thrust away from cell-wall by oedema of mucosal lining. (From a case of right orbital pain with lacrymation, relieved after 20 years by treatment by means of ephedrine replacements.)

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hay-fever the linings of any of the sinuses (Fig. 20). But these typically are sterile on culture. Examples will be discussed.

One case is recalled which shows how closely an infective case can resemble an allergic case. A female patient, aged 43, was seen in 1935, who had for years suffered from prostrating pain in the left eyeball, of the type sometimes known as ophthalmic migraine. Skiagrams taken with the help of contrast media showed filling defects in the sphenoid upon the side of the affected

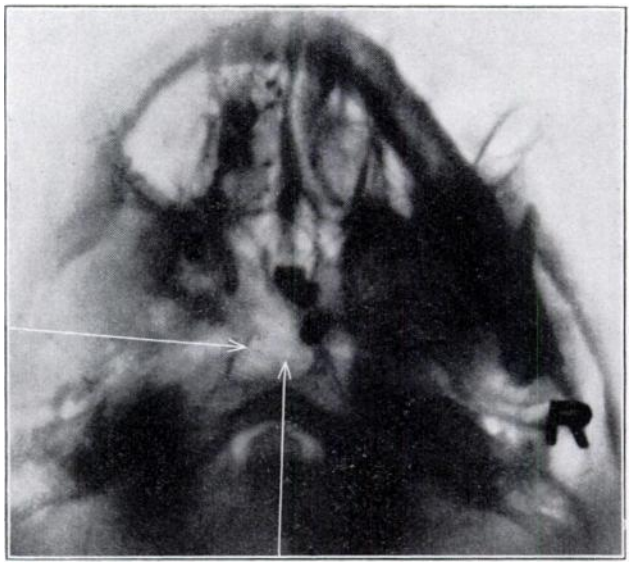

FIG. 19.—Shows refusal of lipiodol by unusually large left sphenoidal cell, acceptance by that upon right side. The left sphenoid was found to be filled with polypi, from the submucosa of which haemolytic streptococci were grown. (From a case of prostrating pain in left eyeball relieved after several years.)

eye. The sphenoid was opened (Fig. 19) and found to contain polypi, from which a profuse growth of *Strep. pyogenes* was obtained; and though there was the late secondary haemorrhage which was so usual in cases infected with this organism before chemotherapy was widely employed, the patient had complete relief up to this month (six years). About the same time a female patient suffering from classical left-sided migraine with scotomata of many years' standing, whose skiagram showed a disparity in the size of the sphenoids resembling that of the patient first mentioned, had little or no evidence of actual infection in the sphenoid found at operation; but she, too, obtained immediate and enduring relief when the sphenoid was widely opened.

These patients with sinus trouble attend our medical departments with their

Fig. 21.

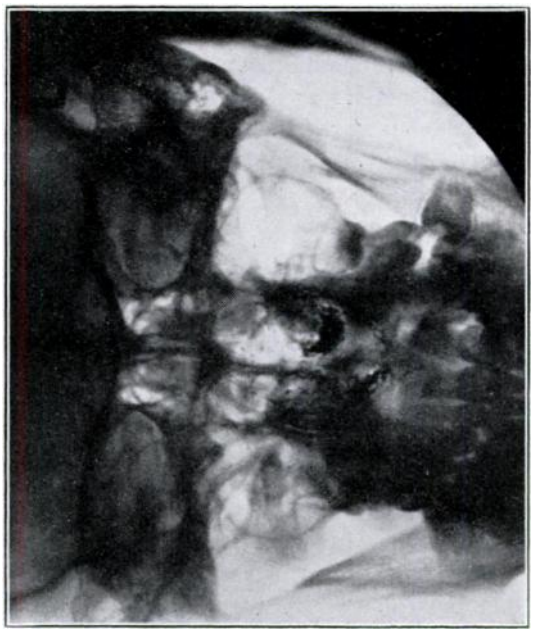

Fig. 20.

Fig. 20.—Shows complete refusal, by the sinuses, of lipiodol introduced by displacement. The sinuses were all found at operation to be crammed with polypi. (From a case of asthma.)
Fig. 21.—Normal filling, to compare with Fig. 20.

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focal infection all unsuspected, for the simple reason that their sinuses are rarely examined (more rarely adequately examined) either before or after death. Failure to examine them during life may be excused ; for adequate examination is difficult, expensive, and takes up more time than would willingly be accorded to the procedure, especially as the disease is not suspected : but routine omission even to make a naked-eye inspection of the condition of the sinuses post-mortem is a surprising reflection upon pathologists and morbid anatomists.

How many physicians here present have seen the sinuses examined post mortem ? And (in spite of the fact that most physicians can completely examine an ear and can give a satisfactory report upon ophthalmoscopy), how many physicians are capable of making a serviceable examination of the nasal passages, or interpreting an X-ray picture of the sinuses ?

6. The next fact on my list is that the mucous membrane in the human sinuses is capable of rapid swelling in conditions not far removed from normal health. The change is reversible in direction ; I have no evidence as to the rate of deturgescence.

The Sinus Pressure-pump.

The importance of this mechanical condition arising in diseased sinuses cannot be exaggerated, and in the writer's opinion is the chief factor which renders them so potent in the production of disease elsewhere (and with them one must consider the teeth, which resemble the sinuses in being housed in inexpansible bone).

It is important to realize that conditions in the sinuses are far from static : their mucous lining, normally about as thin as blotting-paper, is capable of expansion to a thickness of about an inch ; and the speed at which this thickening can occur may, in allergic cases, be measured in seconds (Fig. 22).

In this case the phenomenon was observed indirectly ; but in some cases the writer has actually seen this phenomenon rapidly occurring. In one case a window, about $\frac{1}{8}$ in. in diameter, had been made in the face of a sphenoidal sinus some months before, and could easily be observed from the nostril, its edges being blunted by oedema of its very pale lining membrane. The insertion of a blunt probe was rapidly followed by complete occlusion of the window by swelling of the membrane, for all the world like a contraction of the pupil. The conditions determining such extreme irritability of the mucosa are as yet unknown ; it is probable that the phenomenon is concerned with the suddenness of onset of certain regular headaches in allergic subjects.

While it is difficult to demonstrate and to record examples of such rapid swelling, any observer who works with contrast media in radiology is constantly meeting with cases in which swellings, just as profound, are produced somewhat more slowly (see Figs. 9 and 10).

The mechanics of the production of such turgescence must depend largely

upon capillary permeability; but partly also upon blockage in lymphatic channels caused by swelling of the cells of their endothelial lining under increased osmotic pressure—owing possibly to the breaking down of large colloidal molecules into multiple smaller ones. Perhaps this pressure may rise above that of the blood, for one may occasionally see gangrene of the mucosa in a frontal sinus.

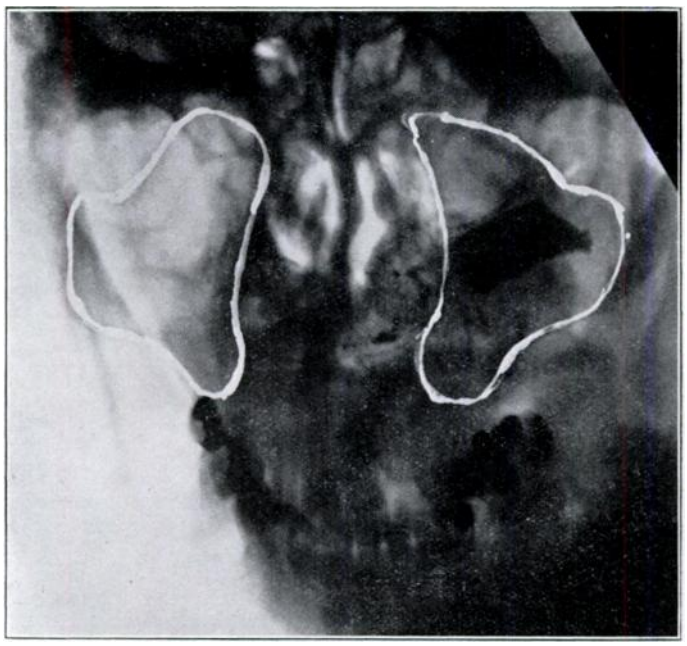

FIG. 22.—The patient was in considerable pain from an empyema of the left antrum. Upon puncture with a trocar and cannula, pus escaped under pressure and continued to do so in large amount, in a way suggesting that something which had been compressed was now swelling again and driving pus before it. The cannula was left in position and an attempt was made to introduce lipiodol thereby in an amount comparable with that of the pus evacuated, but was met with resistance. The skiagram (taken unfortunately with the head tilted) shows that the antral cavity had been greatly reduced by a remarkable degree of mucosal swelling.

TRIGEMINAL SUPPLIES MENINGES AS WELL AS SINUSES.

7. The next point to be made concerns the trigeminal nerve, which is responsible for the nerve-supply of the greater part of the meninges, as well as that of the mucous membrane of the sinuses, of the teeth, the tongue, and of the surface of the face and head. Owing to the fact that the ganglion has to receive impulses from several branches, it is a commonplace that pain may be referred, e.g. from tooth to scalp. But it seems not so well recognized that pain may be referred from sinus or tooth to meninges.

8. We have seen some of the ways in which fluid might be absorbed from sinuses in life, even without any rise in the tension within the sinus. If a dye be forcibly injected under the nasal mucosa in the cadaver (Proetz, 1935) it goes downwards along the prevertebral space and may come to the surface as far down as the second dorsal spine. This fact, taken with the experiment mentioned above in which dye passed without pressure from nose to the nuchal region in a rabbit, may help to explain the occurrence of suboccipital and trapezial rheumatism after nasal infections, and may even have a bearing upon the production of lumbago accompanying such infections.

9. The next three facts have a bearing upon the undoubted association between sinusitis and pneumonia.

It was shown (Mullin and Ryder, 1921) that indian ink injected under the sinus mucosa in a cat passed via lymphatic channels into the glands round the hila of the lungs.

10. If lipiodol be instilled into the nose, and the head tilted back, some of it passes into the lungs.

11. In a series of 12 cases dead of pneumonia, Eadie (1932) found evidence of suppuration in the sinuses in every case.

The Echoing Response.

There is an oft-observed clinical occurrence, the existence of which must be well known to all surgeons—namely, the flaring up of inflammation in some remote region following an operation on a chronic septic focus. Long-standing septic foci may give rise to latent secondary activity by an exacerbation in the primary focus. The relationship between these activities is obscure, but one might compare it with that between the peaceful penetration, hat in hand, of friendly states by the agents of an enterprising Power on the one hand, and the frenzied activity manifested by those agents upon advice from the Fatherland that the great day has arrived.

The communication is doubtless by chemical means, and the response is possibly allergic in nature. The phenomenon has wide clinical recognition, but has not, as far as the writer is aware, been distinguished by an everyday title. The term "echoing" or "secondary" inflammation will be employed for the present.

The commonest example is the otitis media which may follow exacerbation of inflammation in the nose, whether produced by a cold or by surgical intervention. The writer is of the opinion that such an occurrence is usually an indication of previous infection in the ear; and history of previous inflammation in an ear justifies a pre-operative warning of a possible repetition of ear-trouble, which is probable just in so far as the operative interference falls short of complete removal of the primary focus.

The results of sinus operations designed to achieve removal of the infected

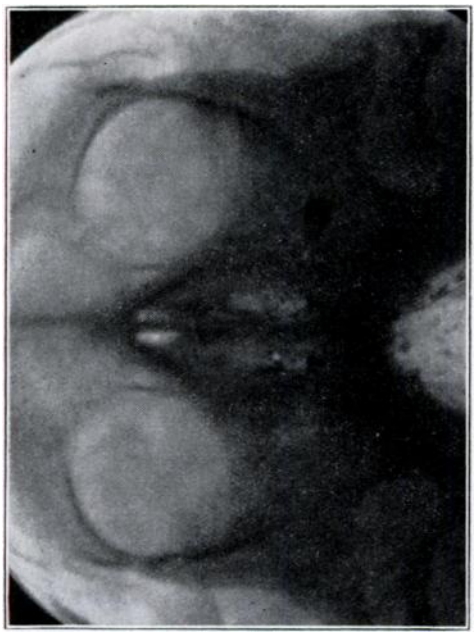

FIG. 24.

FIG. 23.

FIGS. 23 and 24.—Plain film and lipiodol film both show thickening of lining of frontals and antra. (From a case of bronchiectasis in a girl, aged 17.)

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mucosa (rather than merely the provision of drainage) support this conception ; and it is here contended that an operation, say, upon an antrum alone, when the infection involves the ethmoids and sphenoids also, might with some justification be compared with the removal only of the distal half of an inflamed appendix. The pessimism sometimes evinced with regard to the results of (usually incomplete) sinus operations may well depend upon this phenomenon.

This stirring-up of secondary foci would appear to be exemplified in the production of meningitis, and of pneumonia. There is definite evidence that the meninges are subject to a peaceful penetration, over long periods, by organisms from chronic foci of infection in the sinuses, including the middle-ear-cleft group ; and it is possible that the meninges become sensitized to these organisms, acute meningitis being a kind of allergic response to a fresh wave of infection in the sinuses ; and while acute infections in the lungs which are essentially primary may in fact occur, there is much in the study of the noses of patients who have had pneumonia to suggest that a pre-existing sinusitis may be the *fons et origo mali* (Eadie, 1932). The relationship between sinusitis and conditions such as bronchitis and bronchiectasis is becoming widely recognized (Figs. 23 and 24), and depends partly upon inhalation and partly upon lymphatic spread. The patient whose sinuses are shown in these films was operated upon recently ; there were localized collections of pus under the antral linings.

Recognition of the possibility of " echoing " inflammation will lead to care and thoroughness in diagnosis ; the surgeon must ask himself, not merely, " Is this sinus inflamed ? " but " In which sinus did the primary infection gain its firmest foothold, and to what other sinuses has the infection spread ? " Failure to ask such questions has led to a need for the multiple operations which have justified adverse comment upon sinus work in the past. Thus, the omission of a chronically infected frontal sinus from the scope of an operation upon the neighbouring cells may often lead to a post-operative flare-up in the frontal and therefore to the need for a further operation.

Disagreement in Rhinological Opinions.

As the writer's experience endorses that of Graves and Pickworth (1932), if seemed important to consider why it is that there are such diverse rhinological opinions upon our subject. To begin with, very few rhinologists have done as much even as to " go down to one of these places and take out a few tonsils." Furthermore, patients suffering from mental disorder are naturally at once removed from ordinary hospitals, so that only rhinologists attached to mental hospitals are likely to meet with such cases in hospital practice ; while in private practice such cases are not customarily referred to rhinologists.

But there are irreconcilable differences of opinion as to the prevalence and results of sinus trouble held even among those who have had, or have made,

opportunities of examining these patients; and these differences are found to be based on differences in the very foundations of diagnosis.

Criteria of Sinusitis.

When I was a student, the term "sinusitis" meant pus in the sinuses—good honest pus. If lavage of an antrum did not produce pus, that antrum was healthy; and any symptoms thereafter complained of were labelled "nerves," with a capital N. Even to this day, it is usual to find that every patient who is referred for the treatment of headaches, neuralgia, dizziness, tinnitus, difficulty in focusing, and particularly such vague conditions as globus hystericus, cancerophobia and the like, has at some time or other been stigmatized as a *malade imaginaire*.

The same belief in the psychogenesis of all complaints which do not involve the production of something one can see, is evident in the attitude of many physicians towards any departure from the normal affective balance, even though there are always to be seen examples of the profound alteration in the affective state which are produced by the absorption of toxins from bacterial lesions, such as puerperal sepsis, or by a far less powerful poison in the form of alcohol.

Non-recognition of septic foci in the nasal sinuses depends in some degree upon the effort required to establish a diagnosis of infection in the absence of frank pus, and in part upon the recentness in development of the necessary diagnostic measures. It is so easy to take the stand, "No pus, no sinusitis."

A diagnosis of sinusitis, then, based upon the presence of pus, is effortless; and the rhinologist who takes his stand on this point is spared endless trouble. A patient whose nose is innocent of pus and who complains of persistent localized cephalic pain can be labelled neuralgia and left to treatment by analgesics or by psychiatry. Under such a system, pain referred to the eyeball naturally calls for ophthalmological treatment, pain referred to the teeth for dental treatment. Hemicrania with scotomata naturally entails relegation to the physician and to the ophthalmologist, while as for departures from the mental norm, fits of depression call for neurological attention, mania for the strait jacket, and alcoholism of course demands suitable drug-treatment or care in an institution. (And one is far from denying that these easy relegations by label may, on occasion, be justified.) A careful examination of the sinuses, however, with the use of all available means, will show that these complaints are in a remarkably large proportion of cases associated with changes of constant type in the sinuses, or with dental trouble; and it is the writer's experience that if mechanical factors in these regions are neutralized, many of the complaints disappear.

A rhinologist in a recent critical paper (Jowett, 1936) gave certain grounds for diagnosing sinusitis. I will not detail them; they are quite classical, and

if we could regard the diagnosis and treatment of sinusitis as an established scientific procedure, we should have no quarrel with diagnosis by pus; but many patients will remain unnecessarily miserable if the relief of their symptoms has to await a diagnosis based upon such meagre though sound premises as those indicated in the above-mentioned otherwise admirable list. A parallel taken from abdominal work suggests itself; in the early days of the recognition of appendicitis there must have been many sufferers who were denied the relief of treatment (which would nowadays immediately be afforded them) owing to their failure to present some particular feature of the disease laid down by some pioneer authority as classical. While not advocating "diagnosis by treatment" as a method of choice, I submit that the best interests of the patient are not being served if treatment is always to await the ponderous establishment of certain cut-and-dried and accepted criteria of disease in the best teutonic tradition.

Cumulative Evidence.

Diagnosis is more elastic than that; and it is desirable to make clinical use of cumulative straws of evidence which in their sum develop a convincing value. As an example, let us suppose that four signs and nine symptoms occur in twenty consecutive cases of proven unilateral sphenoiditis.

Signs:

1. Pus in the spheno-ethmoidal recess.
2. Homo-lateral oedema of the posterior edge of the septum.
3. Enlarged submucosal vessels in the posterior and upper part of the nasal cavity.
4. Radiological evidence.

Symptoms:

5. Pain in the eyeball.
6. Difficulty in focusing. Proptosis.
7. Unilateral ache in throat.
8. Pain down the anterior margin of the sterno-mastoid.
9. Pain behind and above mastoid.
10. Pain in the infraorbital region.
11. Pain along the gums.
12. Tinnitus.
13. Rheumatism in the suboccipital region.

Now, in practice we may have to deal with a patient in whom there may be a complete lack of the above first three physical signs, but who complains of all the symptoms from 5 to 13.

Are we to turn down as valueless the cumulative presumptive evidence

afforded by such a history and such symptoms? Clinically we cannot do so; and if it is also found that relief by treatment is the rule in certain types of cases not presenting the signs which used to be demanded for a classical diagnosis, it becomes desirable to act upon the recognition of frequently encountered groups of symptoms.

Groups of Symptoms.

Attention, therefore, is drawn to the frequent occurrence of groups of symptoms and signs of sinusitis which, though relatively unimportant when met with separately, may in their sum be accepted as evidence of sinus involvement, when to it is added the fact of frequent relief by treatment.

The signs and symptoms about to be mentioned are for the most part recognizable by any medical man, and do not call for any special equipment, mental or physical, other than a nasal speculum, a tongue depressor and a means of brightly illuminating the parts under discussion.

1. One of the evidences of sinusitis most often neglected is ***redness and prominence of the lateral columns of pharyngeal lymphoid tissue.*** It is probably no mere incident that they underlie the main ciliary path down which the sinuses are evacuated; and their value as an indication of sinusitis is enhanced when the inflammation happens to be unilateral, and still more so if the unilaterality is reflected in the occurrence of symptoms referred to this side only. As a rule inflammation of the less regularly disposed granules of lymphoid tissue upon the posterior pharyngeal wall also is more likely to derive from sinus infection than from troubles in the teeth or fauces.

We are in future likely to see more and more cases in which the tonsils and teeth have been satisfactorily dealt with, and in which the existence of inflamed "pharyngeal granules" can therefore no longer be taken as of dental or faucial origin.

2. *Alteration in colour and turgidity of the* ***nasal mucosa.*** Though taken into diagnostic consideration by all practising rhinologists, these alterations have not received recognition in a recent list. Here again a unilaterality (shared with other symptoms) becomes a powerful reinforcement of their evidential value.

3. *Localized pain and other kindred symptoms, especially if unilateral.* While it is not possible to diagnose sinusitis or sinus-block (which is not always due only to inflammation but may be allergic also) upon the existence of localized pains, yet the occurrence of neuralgia in certain situations is pathognomonic of nose-trouble. Most of the chosen areas have been discussed *ad nauseam*; but since work upon the sphenoids has ceased to be regarded as unjustifiably dangerous and has become a commonplace of rhinological practice, it has been possible to recognize several areas to which pain originating by disease within this sinus is commonly referred. The area behind and above the mastoid

process was referred to by Tilley and others thirty years ago. It is not constant, but can occasionally be convincingly elicited by raising intra-sphenoidal pressure while washing out this sinus (also by reducing the pressure).

Other positions to which sensations (caused, e.g., by a probe moved about within this sinus) may be referred are :

(*a*) Over the mesial end of the eyebrow (often mistaken for frontal sinus pain).

(*b*) To the ear.

(*c*) To an area beginning above on the frontal process of the maxilla and passing downwards and outwards over the infraorbital region.

(*d*) Along the teeth, either upper or lower. (While pain from any sinus may be referred along the upper teeth, pain along the lower jaw in my experience derives from the sphenoid alone.)

(*e*) A linear area beginning just below the external auditory meatus and passing downwards upon the anterior border of the sterno-mastoid.

(*f*) In the eyeball. The sphenoid seems often to share this area (usually belonging more particularly to the posterior ethmoid).

(*g*) Every now and then one meets with a case in which retching may be elicited by probing or applying suction near the sphenoidal ostium, or more occasionally by reducing intranasal pressure.

(*h*) A diffuse area involving the lateral aspect of the pharynx—the site of a vague "ache" often complained of. The "sore" throat which occurs in the absence of tonsils.

(*i*) (In one case only), a sudden click referred to the ear could be elicited on several occasions by probing upon the lower part of the face of the sphenoid. This is of interest in cases of ticking tinnitus, which might be caused by reflex clonus of the stapedius or tensor tympani, stimulated by sphenoidal trouble.

(*j*) (In one case only) a sense of unpleasant smell could always be elicited by probing a spot upon the mesial border of the sphenoidostomy.

4. *Difficulty in focusing*, with or without burning of the eyes, in the absence of detectable ocular defect, is a very constant complaint in posterior sinusitis.

5. *Protrusion of the orbital contents.*

6. *Injection of the ocular conjunctiva.*

7. *Chemosis of the conjunctiva.*

8. *Puffiness of either upper or lower lids.*

9. *Rashes in certain facial regions.*

10. *Herpes* is so often accompanied by sinusitis that I cannot but attribute a causal role to the sinuses. This possible relationship becomes the more cogent when one reads that Eadie and Campbell (*Arch. Otolaryngology*, Nov., 1934, xx), found sinusitis in every case of pneumonia which they examined. The occurrence of herpes in pneumonia is otherwise more difficult to understand.

11. *Attacks of dizziness and instability, persisting after relief of Eustachian obstruction.*

This symptom, usually accepted as aural or central, is extremely common in long-standing cases of sinusitis, and can often be completely relieved by treatment directed to the unblocking of a sphenoidal sinus.

Giddiness amounting to inability to walk without support, in the case of a medical man, was cured for a year by drainage of the right sphenoid. Later recurrences of this symptom were in every case immediately relieved by lavage of the opposite sphenoid, and were finally cured (now five years) by left sphenoidostomy.

In a woman, aged 30, pain referred to left ear, associated with dizziness and profound mental incapacity, was always immediately relieved by ephedrine replacement. These symptoms have been completely relieved for four years by obliteration of the sinuses upon the left side.

12. *Attacks of "losing oneself" or "blackouts."* Here again it is usual in such cases to find radiological evidence of posterior sinus block. Moreover in one case of a young man it was for some weeks after sphenoidostomy possible by applying suction or pressure to the sphenoidal cavity to reproduce the "blackouts" from which he had suffered since childhood, and which have not recurred (five years).

13. *Attacks of transient blindness* (proved in one case only). Raising of pressure in a posterior ethmoidal cell, by syringing, at once produced homolateral blindness, with severe headache. These symptoms were alarming to the surgeon, but not to the patient, who remarked that one had reproduced his "bilious headache" from which he had suffered for many years. Removal of pressure was at once followed by restoration of the sight and relief of the pain.

Most of the above-mentioned symptoms and signs were complained of by a woman, aged 30, who had daily pyrexia for 18 months following an attack of influenzal sinusitis. Another symptom of which she constantly complained was one mentioned in the description of some of Graves's cases—namely, a visual sensation to the effect that objects suddenly began to get smaller and smaller. Polypi were removed from this patient's sinuses, with relief of the symptoms.

Related to the above case was that of a woman, aged 30, who complained of sore throats, and of a rather rapid enlargement of the left-hand pages of books when reading, which went on to complete temporary inability to see with that eye. Submucous resection was followed by transient blindness of the left eye; a year later the eye symptoms and the sore throats were completely removed by left sphenoidostomy, and have not recurred (seven years).

Any rhinologist who has collected many cases professing some, many, or all of the above complaints will begin to recognize the existence of legitimate standards in the way of symptoms upon which to base a diagnosis of sinusitis

(even should all the criteria in the classical list be absent), the most convincing standard of proof being the immediate and prolonged relief of symptoms by direct local treatment of the sinus trouble.

Should, therefore, a patient who has complained of gradually increasing left-sided localized headache, tinnitus, pain down the neck, tonsillitis, jaw-ache, sub-occipital tenderness and stiffness, giddiness and so forth (all associated in the same attacks) find herself under Dr. Graves's care for mental disorder, I for one will believe he is correct in labelling the case "sinusitis," negative bacteriological examinations and absence of purulent discharge notwithstanding.

Improvements in Diagnosis.

Methods of sinus examination have been enriched within the last ten years by three important measures, two of them radiological, and the other clinical.

The first was the improvement in the technique and in the interpretation of sinus X-rays, due in this country to Graham Hodgson, Grahame Browne and others.

The second was the introduction of radiopaques into the sinuses, by the replacement method of Proetz, described above.

The third, also due to Proetz, was the application of the replacement method to the introduction of ephedrine and saline solutions into the sinuses. Though described by him purely by way of treatment, this manoeuvre, together with certain off-shoots from it, happens to have proved itself a most valuable diagnostic measure, permitting of "diagnosis by treatment" to a degree impossible in the case of surgical measures.

For example, it is frequently possible by this simple procedure immediately to relieve a sore throat or a headache which has resisted the use of drugs and other treatment. I have used this method as a help in diagnosis in many hundreds of cases during the last nine years, as have several colleagues. It has sometimes been found unnecessary to carry out the complete manoeuvre in every case; merely the lowering of intra-nasal pressure by means of a suction-bulb will sometimes elicit the characteristic localized pain or other symptoms and thus support the idea of its genesis within the sinuses. (The same evidential value attaches to a persistent unproductive cough, always associated with a throbbing pain in some localized area of the head. Ventilation of a blocked ethmoid, by this manoeuvre or by operation, may immediately relieve both the cough and the head-throb.)

The importance, then, of symptoms, with or without signs, is stressed. One must not omit to mention that, as in many other diseases, there are numerous cases in which symptoms, even in the presence of gross physical signs, are absent.

A boy, aged 15, had had no colds, headaches, catarrh or any other nasal signs or symptoms whatever, and was considered always to have been in good health till he was examined by a Royal Air Force medical officer. He was rejected because

it was observed that his nose contained pus and polypi, and the antra did not translumine; he was told that he need not re-apply till the condition had been cured.

An X-ray picture showed all his sinuses cloudy, with increased density for half-an-inch or more of the bone bordering upon the sinuses.

The clinical indications for extensive operation were by no means clear; but because his chosen career seemed to depend upon it, operation was undertaken, and, because of the uselessness merely of repeated polypus removals, was planned to consist of removal of all the mucosa lining the sinuses upon one side at each of two sessions.

In spite of the apparent quiescence of the disease, bleeding was more violent than had been previously experienced by the operator, every sinus was found to be crammed with polypi and pus, and a copious growth of haemolytic streptococci was obtained from the submucosa.

When the operative treatment had been finally completed the nose cleared up, and the boy was accepted by the R.A.F.

Here, then, was a case of serious disease without symptoms. If such a boy as this were to develop mental disorder, one could hardly blame a physician for failing to suspect the sinuses, in view of a history apparently completely excluding the nose.

Sinusitis, then, even of severe degree, may be symptomless; and ignorance of this fact has doubtless been responsible for non-recognition of its existence in countless cases of whooping-cough, measles, scarlatina, influenza and pneumonia—and in mental disorder.

Recurrent Sinusitis.

For those who are not convinced that chronic sinusitis may exist without the presence of visible pus, frequent left-sided attacks of purulent sinusitis in the same patient—a series beginning, say, after an attack of influenza—must presumably appear as unconnected phenomena, for in the intervals between attacks it is usual to find a complete absence of pus. Are we to say on that account that the disease is non-existent between attacks?

The answer to this proposition (which I have actually heard voiced by a consulting physician recently) was first given by the use of the Watson Williams technique, by means of which the contents of the more recondite sinuses are withdrawn for bacteriological examination. It may often be found that in an apparently healthy nose, pus swarming with streptococci may be withdrawn from one sphenoid, the other sinuses being empty or their contents sterile. This, then, has been the focus, the presence of which has led to the periodic flare-up of all the sinuses. The value of this technique has been doubted, on the grounds firstly that as the contents are withdrawn air is sucked in at the ostium, with extraneous organisms; secondly, that in entering the sinus the needle has to pass through diseased nasal mucosa, thus invalidating the findings; and thirdly, that one may legitimately disregard the presence of a little mucus.

The first objection may be largely overcome by spraying the region of the

ostium with acriflavine before puncture. (In any case a bacteriologist will at once tell you whether the culture is convincing; and one only takes notice of a characteristically active growth.) The second objection—that the needle may have to traverse diseased nasal mucosa—is rather by way of answering itself, for one simply does not in practice find diseased nasal mucosa in the region of the mouths of the sinuses unless there is demonstrable infection within the sinus. A recent case at Hill End Hospital illustrates this: Pieces of mucosa, taken from the lining of the right antrum and from the right turbinate, were heavily infected with streptococci. The left middle turbinate looked suspicious, but a piece of mucosa from it showed only the presence of one or two white staphylococci. Ten days later a second snippet was removed from the left middle turbinate; but though some swelling and inflammation had occurred as a result of the previous trauma, cultures were again negative.

The third objection is well made, and one does not of necessity take diagnostic notice of "a little mucus" unless it is always present or unless it is heavily infected.

Though the writer does not at present make extensive use of this technique, his only criticism of it is that a negative result may not exclude disease. Its value when positive is indubitable, and its use in mental hospitals is essential in view of the difficulty in securing the co-operation necessary for skiagrams with contrast media.

Translumination.

While on the subject of diagnosis, it is important to review the question of the value and significance of changes observed by means of translumination.

Translumination in sinusitis is an extremely important diagnostic measure. I understand that it was so considered thirty or forty years ago; but one has often heard it summarily dismissed as more or less useless, largely because failure on the part of an antrum to transmit light does not of necessity go hand in hand with the presence of pus in the cavity.

It is often too easily assumed that the presence of pus in the antrum is the major cause of opacity. If an opaque antrum be washed free of pus and immediately re-translumined, it will usually be found to be as opaque as before; so that whatever the cause of opacity, it was not pus in the cavity. The observation of opacity is important, nevertheless; let us suppose it to be due merely to the sclerosis of past disease; in this case then, in view of what we have learnt about residual sepsis in bone as the result of war experiences, the sclerosed bone must be regarded as a potential septic focus of major importance. Or again, if one has the opportunity of making frequent observations over a long period upon a chronically infected antrum which is quite opaque when first seen, it will not infrequently be found that the opacity is variable and may even disappear, e.g. after a summer holiday, only to recur

with the first November cold, in spite of a complete absence of pus in the cavity. The opacity is produced therefore in the walls of the cavity, and not by its contents; and it is chiefly due to hyperaemia of the mucosa, for the opacity is not always reproduced in an X-ray picture. As regards activity of infection, and response thereto, hyperaemia is of a significance far greater than the mere presence of discharge; and pus is occasionally found in one antrum where both are completely translucent—the equivalent of a "cold" abscess elsewhere.

Translumination furnishes its most useful information in the detection of the minor degrees of hyperaemia, which may be one of the few physical signs of the existence of an early chronic sinusitis; and in view of the difficulty of clearing up a late chronic sinusitis, it is desirable that we should pay attention to any and every evidence of failure of an acute infection to resolve.

The foregoing minor physical signs are unconvincing when they are isolated, or when the sign is bilaterally symmetrical; but when intermittent dullness of one frontal is always accompanied, e.g., by homolateral pain, the sign becomes profoundly significant.

Symptoms, Apparently Unrelated, may have One Cause.

Attention is drawn to the diagnostic importance of the association of apparently unrelated symptoms.

A female patient, aged 42, suffered from insomnia, headaches, sneezing and asthma. The sinuses, with the exception of the frontals, were found to have very thickened linings. The symptoms disappeared after the sinuses had been dealt with surgically. No pus was seen. Next winter the frontal sinus flared up, and the patient promptly went into Bethlem with mental disorder. The sinusitis and the mental disorder gradually subsided, and her husband reported that she was well five years later.

The association of headaches with asthma is not uncommon, and it is the writer's experience that in bad cases of asthma (in which the antra and many of the lower sinuses are usually found at operation to be filled with allergic-type polypi), it is common for the patient to be relieved of the asthma immediately after the operation, but to complain of frontal headaches after an interval of three or four months. In several such cases the frontal sinuses have been opened and found to be filled with polypi, after removal of which the headaches and asthma were relieved.

Rhinologist and Mental Disorder.

The rhinologist is not asked to examine many cases of mental disorder, but no rhinologist can have failed to be impressed with the high percentage of his patients who are a little eccentric in their behaviour or beliefs. I would go further, and say that there is a flavour of mental disorder about a large proportion of all the symptoms complained of by patients with sinusitis; while

(for those who can spare time to listen) the imagery employed is surely more picturesque than that of suffering in other departments. And I would here make a suggestion to non-rhinological observers, that if they meet with, e.g., an abdominal patient with unusually bizarre symptoms, they should have the sinuses examined.

CANCEROPHOBIA.

The writer has not examined a patient with cancerophobia in the abdomen, but has eagerly examined the sinuses and teeth in all patients whose imaginary cancer is situated in the throat, and has not so far found such a case in which there was not some easily detectable inflammatory focus. The usual " cancer " is unilateral, and the focus is nearly always in the corresponding sphenoid, suitable treatment of which relieves the cancer. Two striking cases are recalled, one in which a cancer of a year's standing disappeared upon the morning after a sphenoidal drainage operation ; and another in which a growth of less seniority cleared up after a fortnight's treatment with ephedrine replacements. This has happened on many occasions, and I have seen one or two cases in which the patient always gets cancerophobia in March following upon his regular February attack of influenza.

The undoubted relationship between the two conditions suggests the existence of a neurotropic toxin in the sinus which leads to a peripheral sensory neuritis of the pharyngeal plexus, causing an unpleasant local sensation, and at the same time to cerebral irritation with hallucination. Such patients sometimes take their own lives.

The occurrence of what was possibly a toxic interference with the lower centres controlling the motor nerves of the gullet was observed at St. Bartholomew's Hospital in association with an empyema of a large sphenoid in a Sister of Charity. The patient complained of dysphagia for six weeks, and was so thin that oesophagoscopy was performed in the belief that she must have carcinoma of the gullet ; and the symptoms were immediately removed by the drainage of two drachms of pus from the left sphenoid by the Watson Williams technique. In this unusual case there was no departure from mental normality.

Picturesque imagery was employed by one nervous woman, who declared that her " brain flopped forward when she bent down." But the findings at operation, while constituting a complete rebuttal of the lady's own description of events, nevertheless showed that she had an organic basis for her symptoms, in that the sinus was half-filled with thin secretion which presumably gave rise to a succussion splash on movement.

A man, aged 45, in the E.N.T. department, when asked his complaint, said, " I suffer from strongly homicidal tendencies, whenever my nose goes wrong." After the removal of a foul-smelling rhinolith from his right nasal passage, his

symptoms have remained in abeyance up to the present (two years), but will, I imagine, recur, since his sphenoiditis is untreated.

Another man with sphenoiditis had homicidal tendencies so highly developed that he put them into practice, and he is now awaiting His Majesty's pleasure at Broadmoor. The evidence showed that in association with sudden attacks of pain in the right side of his head he had on several occasions made unpremeditated and unwarranted attacks upon people, the last recorded attack being made with a sculptor's hammer upon an unoffending friend. A skiagram after replacement with lipiodol showed the right sphenoid blocked and opaque (see Fig. 25).

Cases.

Turning to the patients with severe mental disorder who have come under observation during the last seven years, one notices that they have all been afflicted physically as well as mentally.

They were all too thin or too fat. In Cases 1 and 9 the patient passed through a stage of being too fat, giving one the impression that the adiposity was a spurious one, due to water-retention (such a state is not uncommon in severe cases of chronic sinusitis without mental disorder, and clears up on relief of the septic absorption). The remaining four seemed to have lost weight from the beginning.

The condition of the facial skin was poor; spottiness was a feature in Cases 6, 8 and 9, even after bromides had long been discontinued; and the distribution of the rash was that often met with in sinusitis without mental trouble.

The following cases illustrate the association between sinus-trouble and mental disorder.

Case No. 1, aged about 56. First seen in 1932 with a view to tonsillectomy as a prelude to thyroidectomy. History of typical sinus neuralgia. Great temporary relief from tonsillectomy. Two years later developed delusional insanity and lost affection for her husband.

On 24.vi.36 the sphenoids, ethmoids and antra were drained by an intranasal route. There was a most dramatic improvement to begin with, the mental condition being apparently normal upon the tenth day, with normal affection for husband. On the eleventh day she was maniacal. On the thirtieth day she was completely co-operative again, and returned home, after which the mental condition relapsed.

29.ix.36: "Very definite mental improvement during the last three weeks."

18.vi.37: "Tremendous strides last three weeks. Feeling for her husband returned."

21.vii.37: Relapse. Violent.

12.xi.37: Six weeks of improvement.

6.xii.38: Steadily improving.

Shortly afterwards she became apathetic and went slowly downhill, dying a few months later without mental improvement. Her response to the incomplete operation, apart from the remarkable temporary improvement, was not, I am told, noticeably better than that likely to be seen with expectant treatment.

CASE No. 2.—Male, aged 61, suffering from confusion. There was a severe degree of chronic purulent sinusitis. Treatment was by ephedrine replacements, and after four months the patient wrote a coherent letter which showed insight into his former condition and described relief to headache and to eructations of wind. In April, 1937, having reverted to his former condition after a severe cold in February, he again underwent similar treatment and was quickly relieved, as before. This case is of interest as showing that palliative measures may be of value, in patients who are still co-operative, even though the sinus-trouble is well advanced.

ALCOHOLISM.

CASE No. 3.—I have notes of several alcoholics. The most striking case was that of a boy, aged 19, who had for three years been growing very fast, was a bad colour, and lacked energy. He had found that he could regain energy by taking alcohol, and became so firm a believer in this treatment that he had to be accompanied by a tutor, without whose restraint he was accustomed to drink to excess.

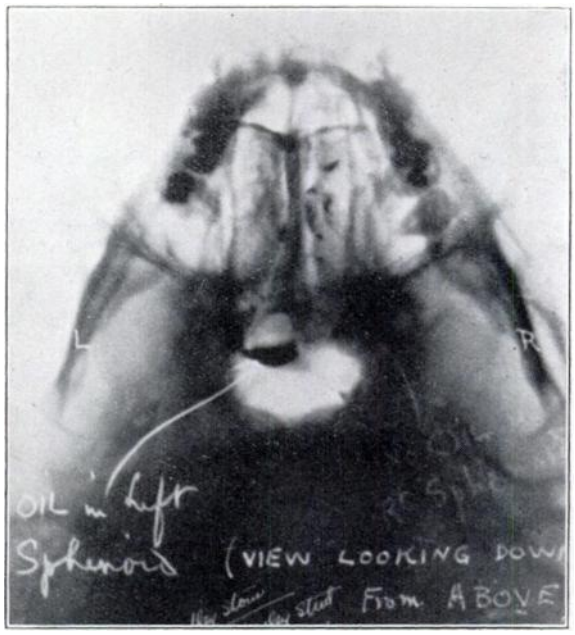

FIG. 25.—Lipiodol is accepted normally by left sphenoid but refused by right sphenoid. (Submento-vertical view.) (From a case of mania associated with right-sided headaches in a murderer).

There were no signs of sinusitis sufficient to warrant operative interference; but there was oedema upon the posterior edge of the septum on the left side only, and skiagrams showed the presence on that side of a structural abnormality known as a pterygoid extension of sphenoid, drainage from which is often defective owing to its dependent position. (Chronic retention in such a pocket was also observed in the case of a medical student who suddenly "took religion" and became gloomy.)

After an ephedrine replacement there appeared a snake of pus in the left sphenoethmoidal recess. After three weeks' treatment he went to Bavaria without his tutor, and has remained well since—five years.

CASE No. 4.—Seen at Brixton Prison on 3.iii.30; suffered from maniacal attacks, during the last of which he had killed an acquaintance during a meal.

The attacks were preceded by pain in the right side of his head. His skiagrams (Fig. 25) showed right sphenoiditis, and there were two devitalized teeth in the right upper jaw. He is in Broadmoor.

CASE NO. 5.—First seen 29.x.36 with a history of frank sinusitis since 1931. He had been a case of dementia praecox for 15 years.

Certain sinuses were drained in early 1936, and in November, 1937, his mental condition had greatly improved. In February, 1938, his parents reported a return of affection for them, for the first time for several years.

In March, 1938, he was reported upon as being " absolutely normal, mentally." I had long conversations with him, on architecture, optics, etc., without being able to detect any mental abnormality.

In June, 1939, he had a mental relapse, associated with broncho-pneumonia and massive crusting in the nose, in France ; since when reports have ceased.

The operation was admittedly incomplete, and, as shown by the infective trouble in the nose in 1939, had not cured the disease in the septic focus.

CASE NO. 6, seen 10.ii.37, was a female, aged 26, who had suffered from manic-depressive insanity for three winters, with frequent masturbation. History of mastoiditis aged 17. She became very violent after a drainage operation upon the sinuses—(it was before routine sublabial procedures)—and took three or four months to settle down, but has now remained mentally normal for three years. It is important that her physical infirmities, which included severe tinnitus, incipient arthritis and a spotty face, have also cleared up.

CASE NO. 7.—A male, aged 26, who had had schizophrenia for nearly a year, was noticed constantly to pass his hand over his forehead as if he had pain there. He was co-operative within limits, for short periods.

The intranasal appearances showed little change, but the antra were somewhat dim to translumination. Skiagrams with lipiodol showed prolonged retention in the right sphenoid, with an " irritable " membrane (Figs. 26 and 27).

A snippet of mucous membrane was taken from the right ethmoidal region, culture of which showed a haemolytic streptococcus together with an anaerobe.

Operation, 19.vii.38 (a bilateral sphenoidostomy by means of a bilateral sublabial approach), was followed by a foul smell from the nasal secretions. Three weeks afterwards he surprised his mother by opening the door of the taxi-cab for her ; and thirteen months later he broadcast music of his own composition at the Oxford musical festival. Two years later his mother wrote that his organizing ability had completely returned. He is still mentally and physically normal.

CASE NO. 8.—Seen 13.x.38 suffering from depression.

There was a history of chronic sinusitis dating from influenza in 1918 with mental symptoms. There was severe facial dermatitis in 1923. Several incomplete operations upon the sinuses had been done.

His skiagrams showed trouble in all the sinuses on the right side.

He cut his throat on 15.x.38.

CASE NO. 9.—Seen 16.xii.38. A girl, aged 26, had suffered from depression alternating with excitement, stupor and confusion, interspersed with periods of relative and absolute lucidity.

Physically there had been cessation of menstruation, pronounced variation of pulse-rate, chilblains, severe constipation, headaches, cystitis, and a myxoedematous state.

When first seen she had been talking loudly and incoherently for twenty days without ceasing. The nasal mucosa was everywhere inflamed. No pus was seen, but culture of a postnasal swab showed the presence of a haemolytic streptococcus.

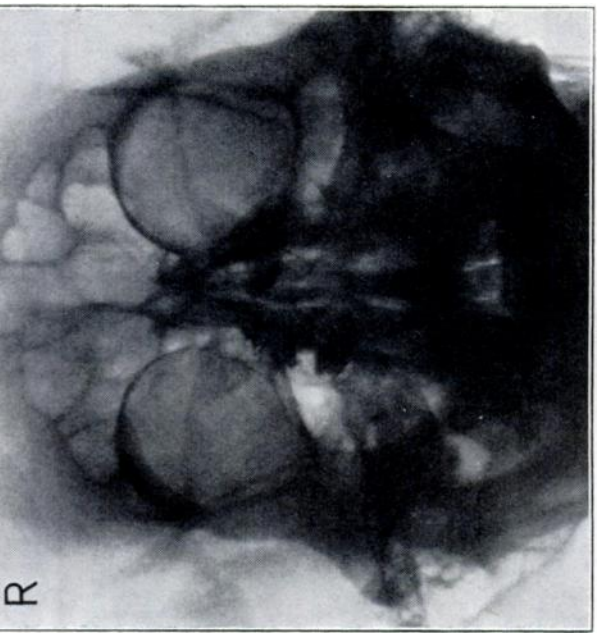

Fig. 27.

Fig. 26.

Fig. 26.—Submento-vertical view, taken 72 hours after lipiodol displacement, shows retention of the oil in right sphenoid the lining of which is thickened.

Fig. 27.—Anterior view of the same case. The lipiodol shadow in right sphenoid is seen to overlap the antral shadow. (From a case of schizophrenia in a male, aged 26, who has been mentally normal for nearly three years following drainage of infected sinuses).

X-rays showed poor ciliary activity, and thickening of the antral and sphenoidal lining. There were impacted wisdom teeth, and there was a persistent leucocytosis.

Treatment of the nasal sinuses, by means only of ephedrine replacements after the method of Proetz, was begun in January, 1939, and a month later she carried on a comparatively long and rational conversation. The impacted wisdom teeth were then extracted. She has remained mentally normal since, and seems to be physically normal also.

CASE NO. 10.—Male, aged 51, suffering from early involutional melancholia. His chief symptom was fear, not directed at any particular object, with exhaustion, aprosexia, self-pity, etc.

The fauces were much inflamed, and there was copious post-nasal discharge. The left antrum was somewhat dim to translumination. He had had both the 1918 and the 1929 influenza infections. Nasal cultures showed a dental streptococcus.

Radiological evidence incriminated the sphenoids. On 20.ix.39 he underwent an operation consisting of bilateral sublabial approach for sphenoidal drainage. His condition began to show improvement within a fortnight, and he left for Australia in a month. On 1.v.41 his wife wrote that he was normal.

EPILEPSY.

The writer has notes of eleven cases of epilepsy, in all of which there was gross evidence of sinusitis. It is hoped to make these the subject of a separate publication.

SUMMARY.

1. The tissues respond to streptococcal infection by producing oedema; and sinusitis of aetiologically important type commonly exists without a regular production of pus.

2. The association of allergy with inflammation may cause great and rapid swelling of the mucosal lining of the sinuses occluding the ostia.

The pressure-changes thus induced promote the absorption of toxins through the haversian canals in the bone separating the sinuses from the neighbouring cavities, notably the cranial cavity.

3. The relationship of these conditions to the production of mental disorder is discussed, and cases are mentioned illustrating the results thereupon of treatment of the sinusitis.

4. Dynamic conditions within the sinuses may be studied by means of radiopaque substances introduced by displacement, a method which is also of therapeutic service.

5. Biopsy may be employed with advantage in the diagnosis of sinusitis.

CONCLUSION.

Mental disorder is commonly associated with chronic systemic disease. Sinus trouble should be excluded as a common cause for both.

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Discussion

Mr. E. WATSON WILLIAMS (Bristol) said that he had the honour as far back as 1925* to contribute to a discussion on the influence of focal sepsis as a source of insanity, and then reviewed some of the evidence already published; it was mainly that in cited cases treatment of infection of the ears (others dealt with infections of other parts) had had the happy if unexpected result of restoring insane patients to normal life. At a subsequent date† he had been able at the Edinburgh discussion on this subject to add some further personal results. Since that time he had had a few patients whose behaviour was so abnormal as to make the question of certification of urgent importance: even at the present time he had under his care a boy of 13 who had been for some weeks in a remand home for delinquency—and he felt confident that treatment of his chronic mastoiditis would put him again on the way to complete health. As he pointed out then, unless they lived in an area where the possible importance of infection as a cause of mental disease was appreciated, few patients that could be described as actually insane came under the care of the otologist; far more often they encountered those with sufficient remaining insight to recognize that they had been behaving in a manner inconsistent with normal health—and who were not "insane" but often regarded as "neurotic."

The ear was not the source of chronic septic absorption that most often caused trouble. Far more often the nasal accessory sinuses were to blame. He regretted that the exigencies of the times precluded his giving a complete statistical review of the several thousand cases of nasal sinusitis that he had treated during the last 20 years. Looking through his private notes only (since hospital records were seldom as complete) he saw that of the last 200 patients who had been proved to be suffering from this protean disorder, 87 (43 per cent.) complained of what one might call the "toxic neurosis"; and of the last 100 who complained of this syndrome 83 were found to be suffering from chronic sinusitis. Even when they made all allowance for the probable "selection" of cases that was bound to ensue when a surgeon was known to take a special interest in a particular group of symptoms, these figures were very highly suggestive. It appeared to him undeniable that chronic toxic absorption produced a very definite effect on the mentality—often perhaps mild, not seldom profound and sometimes passing the borders of what a fairly tolerant public considered sanity. From the opposite aspect, how often focal sepsis was of importance in the aetiology of certifiable insanity, the researches of their President, Dr. Graves, and of Dr. Pickworth, gave evidence.

Quoting from his paper of 1925,‡ he said: "It is remarkable how regularly the same group of mental symptoms occurs in all descriptions of toxaemia. . . . There is a sort of mental lassitude; the victim finds that the effort demanded by social duties is becoming too great; work which formerly he performed with ease and pleasure has become laborious; when he forces himself to work he cannot concentrate his mind; he feels he has lost his initiative; memory may fail or more typically may become "patchy"; and to make a decision on some quite minor matter involves a disproportionate effort." It was this collection of symptoms, evidence of a sluggish or failing mentality, that he had come to regard as probably due to toxic absorption; largely because thorough treatment of lesions that might cause such absorption had so often—so very often, indeed almost so regularly—led to relief.

* *British Medical Journal*, 1925, ii, 11.
† *Journal of Mental Science*, October, 1927.
‡ *British Medical Journal*, 1925, ii, 11.

This " patchiness " of memory was very curious—and often extremely important. Some of them might recall several years ago the series of cases known as the " Irish Horse Frauds " ; certain horse importers in this country were alleged to have bought horses in Ireland for importation into England at fictitiously low prices (plus a very large " bonus " to the seller, which did not appear on the sale note) so as to avoid paying the full import duties. He was consulted by one of the dealers some time before, suffering from chronic mastoiditis with an acute exacerbation ; he found a very ill patient, and had to perform a radical mastoid operation ; the result was very good, and he was restored to complete health. Some months later he was charged with extensive frauds ; the essence of the charge in his case was certain statements he had made to the Customs Officers before operation—in several cases while he was actually lying ill in bed. It seemed clear that he had made statements which were entirely untrue, simply because his memory was not functioning ; statements which he later knew quite well were contradictory, and quite at variance with his own business records. The speaker had no doubt at all that his illness was responsible and he was happy to state that his evidence saved him from a criminal conviction. This man was never insane—but the consequences to him might well have been even worse than those which might follow certification.

Far more often than the ear the nasal sinsuses were the site of infection that led to mental changes. So very often depression and loss of mental capacity were the phenomena.

Mr. A— came to him in 1927. He was then 26 and the owner of two chemist's shops in Bristol. Some two years before he had found the superintendence of both shops too much for him, and had put a manager into one of them ; a year later he put a manager into the other. He had been a keen golfer, but gave up the game—it was too exacting after business, he did not feel up to it. He had been a keen bridge player, but gave up his club—he really could not concentrate on cards ; he was too weary. He had been accustomed to visit a theatre once or twice a week, but found he was only depressed and bored, so gave that up. In effect, at 26 he was a typical valetudinarian—no " obvious " disease, but business, play, social life were alike too much effort. He reported headaches and " catarrh," i.e. a sense of stuffiness in the nose without any discharge. There was no obvious evidence of disease ; but the speaker found the left posterior ethmoid and sphenoid cells grossly infected. These were freely ventilated, and the effect was almost electrical ; six weeks later he was plunging into the life of Monte Carlo, and later he returned to England, discharged both his managers and three years later was a busy and respected citizen taking a full part in the business and social life of the city ; he was still active and happy in 1936.

Flight-Lt. B— had been invalided from abroad in 1935, but nine months later returned to work in England. He complained of feeling " something dreadful in the head." Two X-rays of sinuses were negative, yet on opening the left antrum it was found to be full of pus ; the right antrum showed thin mucus only. He improved after this until 'flu in January, 1940. He was now feeling " tremendous weight in head," poor memory, complete inability to concentrate—quite unable to carry out duties. He presented attacks of bad temper with fits of great depression and inability to sleep, which he very unwisely treated with massive and ineffective doses of whisky. For over a year he had been unable to fly ; had lost interest in his work, in cards, fishing and shooting—" Life's just Hell." There were no obvious abnormalities in his nose ; both ethmoids were opened and showed gross polyposis ; left antrum was reopened. Four days later he was emotional with gratitude. " My brain has begun to work again for the first time in six years." He returned to duty in a few days, very well and cheerful. Before going he said that he had quite got rid of the (previously unmentioned) rheumatic pains in neck and limbs, and felt his head clear again. He kept well for over a year—so well that he neglected after-treatment and was flying in Iceland, Scotland and N. Ireland. In February, 1941, he had a bad attack of influenza and gradually after this all his symptoms returned, including inability to do his duty and domestic irregularities. The

speaker carried out a series of thorough washings of the right antrum and frontal sinus (which was full of muco-pus) and in 17 days he was feeling completely fit again and insisted on flying back to Ireland. This case was an interesting and rare example of the recurrence of mental symptoms coinciding with recurrence of physical disease and rapidly relieved concurrently with treatment of the latter.

He wished to make three points. *One :* In the search for focal infection it was not enough to review only the obvious sources; the teeth and, of course, the tonsils—placed, like Uriah the Hittite " in the forefront of the battle " and likely to suffer as he did for their unmerited prominence. The ear should not be ignored; and the nasal accessory sinuses—complete investigation of which demanded a most careful and painstaking technique (though neither too exacting nor too troublesome for application on a large scale and among patients showing little co-operation)—deserve the most meticulous care. A negative clinical and X-ray investigation was certainly not enough; the nasal endoscope should be used as a routine, and examination of the sinus washings was frequently essential.

Two : He would not for a moment claim that sinus (or ear) infection was the *only* cause of insanity. In the 'nineties they heard much of the importance of " autotoxis "—which meant chronic constipation; however it had lost caste in the profession. Later thyroid and more recently gonad insufficiency attracted attention and the claims of hyperpyrexia and " shock therapy " were still loud. Yet it seemed irrational to expect permanent results in chronic disease if they treated what might well be only the secondary manifestations, and neglected the sinus infection which was the real starting point of trouble.

Three : Apart altogether from actual " insanity " there was a great bulk of invalidism and inefficiency which at the present moment might be of genuine and urgent national importance, and which was often demonstrably due to obscure chronic infections. In all these cases the greatest care should be exercised lest quite accessible sources of trouble remain neglected. In mental disorders, minor or " certifiable," the importance of focal sepsis was that treatment was so gratifyingly successful.

Mr. James Cecil Hogg (London) said: I desire to draw attention to the high percentage of cases with some mental abnormality which are encountered among rhinological patients. It is often most difficult to obtain a coherent history from them, and it requires much patience and experience to form a reliable picture of their symptomatology. It must not be supposed that the rhinologist is frequently confronted with an obviously psychotic patient, but one cannot help wondering how much incipient or mild mental disorder is overlooked during the course of a busy afternoon.

One of the most difficult questions to answer is, " What is sinusitis ? " Everybody will understand what is meant by acute inflammation of the nasal sinuses—acute sinusitis—and not many will find difficulty in accepting the definition of a chronic empyema of the antrum or frontal sinus. But there is another far larger group of cases, so ably detailed by Mr. Bedford Russell, which are mainly characterized by oedema of the nasal mucosa, and in which frank suppuration, if it occurs at all, does so only secondary to the nasal obstruction already existing. It is easy to take the view that sinusitis always implies pus, and that if there is no obvious pus there cannot be sinusitis; but rhinology does not lend itself so readily to oversimplification. The truth is, of course, that there are infinite degrees of change which may be present in the nasal mucosa, and it is by no means always gross and obvious disease which gives rise to the remoter and more serious systemic disorders. For it is our experience that very slight pathological changes in the membranes lining the nasal sinuses will often give rise to severe and crippling headache, whereas there may be widespread disorganization of the nasal sinuses without any pain whatsoever.

I believe that sinusitis offers a large field in preventive medicine. Almost all sinusitis commences with a nasal infection accompanying a cold or an attack of one of the exanthemata. It is upon adequate ventilation through the normal ostia

that nasal sinuses depend for the maintenance of their powers of resistance to infection and their power to overcome an infection once encountered. Undoubtedly repeated or very severe nasal infection such as can occur during influenza epidemics is prone to bring about fibrosis in the submucous layer, and interference with the vascular supply of the mucosa. Every effort should therefore be made to prevent the spread of nasal infection and to prevent the incidence of colds in childhood if the child is to avoid irreparable damage to the nasal mucosa.

Much may be said about the diagnosis of sinusitis, and many pitfalls lie in the path of the unwary. You have already heard of the specialized measures, such as X-rays with contrast media. There will remain cases where the symptoms are strongly suggestive of sinus infection, but where the diagnosis cannot be established beyond all reasonable doubt by the means at present at our disposal. About a month ago I was asked to see a young man, aged 18, who had been well until he developed nasal catarrh and obstruction about 18 months previously. A gradual change in his personality then took place, and his father had great difficulty in keeping him under control. In fact a nurse was employed to look after him, but he responded by falling in love with the nurse and making confusion worse confounded. His physical condition was unsatisfactory. His tonsils were large and grossly infected. During my examination of him he showed considerable mental agitation and fear that he was suffering from serious disease. Arrangements were made for his nasal sinuses to be X-rayed, but the following day he put his head in a gas oven and committed suicide. This was a case of mental disorder brought on by a chronic infection in the nasal sinuses.

I have recently seen a patient with iridocyclitis in the left eye. The case was first referred to me in 1933, when I found he had a very marked nasal obstruction with hypertrophic turbinates, a deflected nasal septum, and practically no airway at all. Since his iridocyclitis had resisted six months of treatment I took him into hospital and ventilated the left nasal passage and performed left ethmoidectomy and drainage of the sphenoid. It was a remarkable case because, within six hours of my operation, the left eye, which had been bloodshot and angry-looking, returned to normal, the only evidence of any inflammation being a little murkiness of the cornea. The eye remained well for two years until he had an attack of tonsillitis. Again he was treated by the ophthalmologist without success, until I removed his tonsils, when, once more within three or four hours of the operation, the eye, which had been very red, appeared white. Nothing more was heard of him until about two months ago, when he returned with his eye bound up, and the story was that he had contracted influenza in January, following which the eye had undergone a relapse. There had been an interval of six years between the tonsillectomy operation and the influenza attack. On this occasion it resisted treatment, and I found on transillumination that he had an opaque left antrum. I washed out the antrum, and there was some muco-pus in the wash. This I repeated on several occasions, but although his eye improved quite a lot, yet it did not get well. Therefore I took him into hospital and dealt with the antrum surgically. On this occasion it took about three days for the eye to get better, but it did clear up and has now remained well for about six weeks. It strongly suggests that infection travelled by the blood stream.

The treatment of sinusitis arouses much controversy both amongst rhinologists and the medical profession at large. Broadly speaking, the partisans are divided into those who favour complete surgery in the first place, and those who would prefer to go step by step. Bearing in mind that the ciliated epithelium is probably the most valuable structure which guards against infection, it is usually unsatisfactory to attempt to drain the sinuses one by one. There is a tendency to set up a low-grade osteitis. But where the decision is reached that the tissues are diseased and that the symptoms will not be relieved by conservative measures, my opinion is that adequate and complete surgery should be performed.

Mr. REGINALD STANLEY STRANG (Birmingham) said that as Visiting Ear, Nose and Throat Surgeon to the Mental Hospitals of the City of Birmingham and of the

County and City of Worcester, he had seen and treated a large number of mental patients for ear, nose and throat disorders, and had seen patients referred as out-patients from the psychological clinic of the Queens Hospital and from the Midland Nerve Hospital.

The ear, nose and throat conditions of these patients might be obvious on ordinary clinical examination by the usual methods and those were recognizable at once by any surgeon. On the other hand there were beyond this group a very large number of infective conditions, especially of the nasal sinuses which gave on ordinary examination very little indication of their presence. In the first group he would place conditions such as chronic empyema of the antrum, ethmoidal polypi, and discharging ears. In the second, closed infections of the ethmoidal cells and sphenoidal sinus infections.

All the patients referred to him were examined by the usual clinical methods. In a certain proportion of patients, most of whom were women, this was extremely difficult on account of the non-co-operation of the patient. Many of these were so confused and fearful that even the slightest attempt at examination proved impossible. For the same reason he had found that X-ray examination, which they regarded as of great value for confirmation in diagnosis, was of no help in just those patients on whom they were most anxious to obtain information. He had also found that very few patients would co-operate sufficiently to allow of examination with lipiodol displacement and X-rays.

In those who would allow of proper examination he had come to the conclusion that the most important evidence of chronic non-evident disease, especially in the nasal sinuses was to be seen in small alterations from the normal. The examination of the post-nasal space was most important in this connection, and he also paid attention to slight alterations in the translucency of the antra.

In these cases they had also to depend to a very large extent on the observations of the medical officer on the attitude and conduct of the patient. These observations might show evidence of sensory and motor disturbances which could be associated with somatic diseased conditions. He need only mention disturbances of the three special senses of smell, taste and hearing to make this clear. Of all the patients he had examined he found that approximately 10 per cent. could be said to be completely free from all evidence which would justify fuller exploration.

One method of examination which would give accurate information about the condition of the nasal sinuses was the Watson-Williams suction exploration technique. He, like his predecessors, had used this exclusively in the investigations of the nasal sinuses in the patients referred to him and he had found it to be simple and accurate, and not to cause any injury to the patient. In a co-operative patient it could be carried out under local anaesthesia, but the majority were done under general anaesthesia. In either case the nose was sprayed previously with cocaine and adrenaline to prevent haemorrhage. At one time in all patients, and still when any doubt existed, a carefully controlled bacteriological examination of the aspirated contents of the sinuses was made.

The fluid aspirated from the normal sinus was completely clear and free from haemorrhage. Very slight haemorrhage might come from the trauma of the puncture and this was disregarded. Any haemorrhage greater than this he regarded as pathological and due to the effects of the injected fluid on a hyperaemic and infected membrane. Some years ago bacteriological examination of a series of such cases invariably showed the presence of virulent streptococci. In other cases evidence of infection was shown by the presence of flakes of muco-pus in the aspirated fluid. On many of such cases he had operated both in mental hospitals and in general hospital practice, and the lining membrane of the sinus showing this return had invariably been grossly thickened, polypoid and infected. In still other cases a return of frank pus was found and this was evidence of an empyema of the sinus.

He found that in a few cases it proved impossible to get any return flow at all of the fluid injected. He had found that this might be due to anatomical abnormalities or to such gross infection of the sinus that the purulent contents were so

thick that they would not aspirate. The latter condition invariably showed other clinical signs.

Of these conditions the ones he wished to stress were the haemorrhagic returns and those containing flakes of pus. The infections which produced both these conditions could be entirely eradicated by proper surgical treatment and by proper post-operative treatment. He had been in the habit of draining these infected sinuses intranasally in the usual way and had reserved the radical operation for those which did not heal on intranasal treatment.

Operations for straightening deviations of the nasal septum had been required in several patients as a preliminary to further operations for drainage of infected sinuses; but the submucous resection had been reserved for this purpose and to improve completely obstructed nasal airways.

He had said little about tonsillar infection and infections of the middle ear. On the desirability of tonsillectomy in patients who had had repeated sore throats or quinsies, and whose tonsils were adherent and obviously septic, there was no argument. Nor was there any about operations to cure chronic suppurative otitis media. He had carried out mastoid operations in several patients and had found that the greatest difficulty was experienced not in the surgical procedure, but in the after treatment. After a great deal of trouble he had managed to get most of the ears dry and several of these patients had shown a most marked improvement in their mental state.

On the effect of ear, nose and throat treatment on mental states he was quite convinced that considerable amelioration or even cure could be obtained by the removal of chronic infective states which were by no means always obvious. He had also noticed a considerable improvement in the mental state of patients in general hospital practice in whom similar rhinological findings had been made and in whom minor degrees of mental illness existed.

For these reasons he regarded a complete investigation into the ear, nose and throat of mental patients as offering some definite hope of improvement in their distressing condition.

Mr. SAMUEL ERNEST BIRDSALL (London) said that the remarks of previous speakers had brought out the fact that sinusitis as seen clinically was commonly a chronic disease. Mr. Hogg had pointed out that chronic sinusitis must at one time have started as an attack of acute sinusitis. The study of the noses of children enabled some idea to be formed as to the stage in life at which human beings were first susceptible to the disease and likely to get it. A large number of children were examined at Paddington Green Children's Hospital, and 85 were found in the course of a year to be suffering from obvious sinusitis—he used the word " obvious " in a rhinological sense—after full investigation. The fact was brought out, however, that although in the adult careful inspection of the nose might fail to reveal sinusitis, yet in children careful examination would usually lead to its detection. Even in children the disease was chronic in the large majority of cases, when first seen, and in his series the average duration of symptoms before coming for observation was about two years, and very commonly a history of five or six years was given.

As this was an insidious disease, there was no dramatic onset as there was with otitis media, which was extremely painful and gave rise to obvious discharge and affected a special sense organ. In the case of sinusitis, there was no special sense affected unless the olfactory sense, a symptom which was not likely to be noticed in a small child. Probably the onset was painless in children because the ostia of the sinuses were relatively greater than in adults, and therefore empyemata in the sinuses and rise of pressure within them were probably not so marked. During the course of influenza in an adult sinusitis was extremely common and occasionally obvious symptomatically by pain in the face or headache. In children with colds or specific fevers there was no doubt that sinusitis occurred just as commonly as in the adult with influenza, yet it gave rise to no symptoms and was probably overlooked in the vast majority of cases.

The way to diagnose sinusitis in its very early stages was by routine examination of the nose in all cases. This was almost certainly not done, but in about 90 per cent. of his 85 cases inspection of the nose by anterior rhinoscopy revealed the presence of an abnormal secretion, muco-pus. In his experience of children, if careful examination were made, abnormal secretion would be found.

The further methods of diagnosis were radiological. The straightforward X-ray appearance might reveal nothing, and lipoidol was often used. The sinuses were demonstrated either by the replacement method or by instillation through a cannula after puncturing the antrum, the antrum being the sinus most frequently affected in children in whom the sphenoid might be absent or very slightly developed. By concentrating on the antrum a good picture would be obtained of the course of the disease in children.

After showing some lantern-slides illustrating the value of lipiodol when introduced by replacement, the speaker said that most cases of sinusitis in children would admit of treatment by replacement because the fluids used actually got into the sinus. If unsuccessful at first, puncture lavage of the antral wall would often make possible the method of replacement subsequently, and if the condition persisted, operative treatment should be done. Even in a child there was very little to be gained merely by making holes in the sinuses, because sinusitis in children was not a closed sinusitis as seen so often in adults, and drainage was going on already. Merely making a hole in the antrum would not effect any difference at all in the clinical condition.

The connection of sinusitis with mental disorder in children was difficult to assess. In his experience mental disorder was not common in children in association with sinusitis. The rhinologist, who saw a large number of cases of sinusitis, found only a small number in which mental disorder could be said to exist. Out of 80 cases he himself had found five children who had been referred on account of what could be described as mental symptoms, such as listlessness, inattention, and excessive fatigue, which must be regarded as departures from the mental normal. The ear, nose and throat department of a children's hospital was half filled with children who had been referred by the school doctor, and there was evidently a connection in the mind of the school doctor between being a dunce and having large tonsils. But in very many cases he thought it could be shown that the sinuses and not the tonsils were at fault. The lethargic and backward child was recognized as one with his mouth open and a snuffling nose and nasal discharge, and such a child was an outstanding example of sinusitis and not of enlarged tonsils.

With regard to open and closed sepsis, the fact that a sinus was open did not mean that the sepsis was open sepsis. It was easy to make the mistake of saying that if a patient had sinusitis and the sinuses had been drained, then he might have sinusitis, but now open and not closed. That was not so.

He had recently operated on two medical men, young house surgeons, who had as prominent features of their illness marked mental depression, considered by their friends to be connected with sinusitis largely on the purely empirical ground that the patients had said, "If I could get this sinusitis cured I should be different."

It became common knowledge to their colleagues and friends that their queer mental state was due to the accumulation of matter inside their heads which had to be scraped out, and at operation in both cases collections of pus were found in the posterior part of the antrum. Since operation both had undergone a tremendous difference in their mental outlook as well as in their physical health.

The question of chemotherapy had not been mentioned. He had not found chemotherapy to be of any value in chronic disease. After operation in chronic inflammatory states there was often a succeeding phase of acute inflammation, and chemotherapy was useful at that stage, but he did not himself believe that chemotherapy would offer a solution to chronic sepsis. He did not consider that by chemotherapy one could relieve oneself of the responsibility of searching for hidden foci of infection.

The connection between ear disease and mental disorder could be approached in two ways. The ear being a special sense organ, if a patient be deprived of that sense

it must necessarily follow that mental abnormality would occur. By abnormality he did not mean insanity; but the mental processes must be vastly different in a person without the sense of hearing from what they were in a normal person, and in deaf-mutes, although he had no special knowledge, he believed it to be a fact that depression was not common. From his own experience he knew several deaf mutes who were exceptionally happy and lively people, and as far as one could judge, their mental capacity was as high as could be expected in view of their disability. The type of person who had acquired deafness of high degree, on the other hand, was very different (he excepted senile deafness), and the person whose deafness was due to long-standing aural sepsis gave the impression usually of being introspective and morose, depressed and ill-adjusted, in contradistinction to the rather genial type who had been deaf from birth. Whether the sepsis was responsible for the difference in mental outlook he was not prepared to say, but that there was this difference was a fact.

The outstanding mental symptom associated with chronic aural sepsis appeared to be irritability, and very often after the performance of a radical mastoid operation on a patient with gross sepsis, cholesteatoma, and long-standing suppuration, there was remarked by his relatives and friends a definite change for the better in his nature. To his mind that showed that there might be a connection between the sepsis and mental change. If the change were due to the mere fact of deafness a similar change ought to occur in deaf-mutism, and thus an admirable control was furnished.

Tinnitus was the most difficult symptom with which they had to deal, and it must be very rare for any aural surgeon to cure tinnitus. It might disappear spontaneously, but only too often all their endeavours were useless.

To the observations about the throat he had very little to add to what Mr. Bedford Russell had remarked concerning globus hystericus. In one type of patient carcinophobia was outstanding. The other class of case was one with chronic posterior sinusitis, with a large quantity of phlegm being swept down into the pharynx by ciliary action, so that there was a definite physical symptom to account for the subjective sensations of the patient.

Dr. F. A. PICKWORTH (Birmingham) showed a number of lantern-slides dealing principally with chronic infection of the sphenoidal sinus and adjacent structures. The first slide showed the sphenoidal sinus with intracranial extension, the man having died from meningitis. It showed chronic densification of the bone around the sinus, which was evidence that there had been a chronic infective condition for many years. His mental symptoms had begun twelve years previously. It was thus illustrative of a spread of infection from which partial recovery took place, but subsequent acute involvement was responsible for the death of the patient.

The next slide showed the pituitary fossa seen from above. There was a perforation leading from the fossa to the sphenoidal sinus and an abnormal ridge of bone to which the dura was attached. It was another example of pathological change indicating the chronicity of an infection near the base of the brain, and its age was not inconsistent with the patient's symptoms of four years' duration. When the probable duration of infective processes in the sphenoidal sinus was considered, it appeared that they might occur, as his next slide showed, in a baby three months old. This was almost as soon as there was a sphenoidal sinus, and it was here shown full of pus. The frequency of occurrence of chronic sphenoidal sinusitis was shown by a chart slide. The figure of 31 per cent. in his autopsy cases agreed well with the clinical findings of Dr. Graves of 26 per cent.; his later figures of over 3,000 cases were even closer to 31 per cent.

He had investigated the spread of organisms from the sphenoidal sinus into adjacent tissues in a large number of cases. The bone was decalcified with trichloracetic, sectioned, and stained for organisms, projected on to a large sheet of paper, and the site of the organisms charted as in the slide. This was easy in the cases of necrotic tissue, where the organisms preserved their morphological characteristics in altered vessels or in acute extensions. Chronic invading organisms

were, however, more difficult to recognize on account of loss of shape and the occurrence of bizarre forms. Other slides showed such forms in living tissues which were much altered, but nevertheless were quite recognizable to the expert investigator. In the bone the growth might be so slow that there was real difficulty in deciding the nature of abnormal structures found. Further slides showed commonly encountered forms. Rarely organisms were found in the brain capillaries. It was thought that their existence there was short—about four days.

Undoubted extensions of organisms therefore occurred, but the effects due to the absorption of toxic material must be of even greater clinical significance. He had many examples of the association of sphenoidal sinusitis with atheroma of the internal carotid artery, and it was fair to conclude that the sepsis was at least partly responsible for the atheroma and vascular thrombosis. One slide showed changes in the carotid actually visible through the posterior wall of the sphenoid. Similarly the large colloid masses found in the pituitary, which appeared in several slides, might have been at least partly due to the contiguous sepsis. Meningitis was not always fatal, and one slide showed vascularized adhesions of dura and arachnoid which were commonly found in mental hospital cases and in his opinion might indicate past local meningitis.

Infection of the sphenoidal sinus was not *per se* a cause of mental disorder, but was a source of vascular changes in the brain. He believed that such vascular changes inhibited neurone integration by obstruction at various synapses, so that the pattern of motor behaviour was rendered abnormal; and that clinical mental disorder became evident when such vascular changes were extensive or of certain anatomical localization.

The PRESIDENT here referred to the statistics which he had had circulated illustrating the presence of nasopharyngeal sepsis in 3,050 cases of psychoses, aged from 10 to 71 years, treated during the period 1927 to 1941, and the results of treatment by five surgeons working independently, using the Watson-Williams technique for investigating nasal sinuses.

Mr. Strang had made the point that about 10 per cent. of the cases he saw were those in which he considered no further investigation was necessary. The remaining 90 per cent. represented cases for investigation by the Watson-Williams technique. With a large number of cases which went into mental hospitals it was impossible to deal owing to degeneration, but those which it was possible to examine were represented in the figures he had brought forward. The total discharge rate in the " diseased " group was from 61 to 62 per cent., but allowing for readmissions, the net discharge rate was 53–54 per cent. On the other hand, this did not treat the subject entirely fairly, because out of 210 readmitted, 27 had been discharged for over four years, 31 for four years and under, 36 for two years and under, and the remainder for 12 months and under, so that roughly 80 to 90, or practically 50 per cent., had been discharged for at least two years.

Dr. H. F. FENTON (Worcester) said that the subject chosen by their President for consideration that afternoon, " Total Somatic Approach," covered a wide field in the treatment of mental disorder, embracing as it did those pathological conditions, nervous, cardio-vascular and endocrine, so frequently seen in association with acute and chronic psychoses, which are in so many instances indicative of the presence of chronic infective disease. The term " total somatic approach " was very apt and, including as it did a wide and comprehensive field of investigation and treatment, was one that appealed to him.

In participating in this discussion it was not his intention to enter into statistics as to the number of patients treated and the results obtained, but to state the conclusions he had formed based on the clinical work undertaken.

For many years the treatment of mental disorder had concerned him greatly; a feeling of helplessness prevailed and the question what more could be done often loomed up. The patient might not be aware of physical illness, which might have existed for a long time, but investigation often revealed its presence. A striking

Some Statistics Illustrating the Presence of Nasopharyngeal Sepsis in 3,050 Cases of Treatment by Five Surgeons Working Independently, Using the

Types of cases.	Number of cases.			Tonsil disease only.		Sinus and tonsil disease.		Sinus disease only.	
	M.	F.	T.	M.	F.	M.	F.	M.	F.
General paralytics	51	20	71	7	8	5	5	29	6
Epileptic psychotics	57	41	98	11	10	19	16	19	12
Psychotic imbeciles	15	27	42	2	9	5	8	6	9
Post-encephalitics	13	9	22	3	3	5	2	4	3
Functional psychotics (before 1923)	26	24	50	3	4	11	11	9	7
,, ,, (after 1922)	1,351	1,416	2,767	355	519	570	488	306	265
	1,513	1,537	3,050	381	553	615	530	373	302
Totals	3,050			934		1,145		675	
Totals 1,492 — Discharged				196	282	308	272	163	137
				478		580		300	
313 — Died				18	31	52	51	67	45
				49		103		112	
201 — Readmitted				17	32	51	45	20	21
				49		96		41	
152 — Transferred				12	20	30	23	33	15
				32		53		48	

Out of a total of 3,050 cases (1,513 male, 1,537 female), nasopharyngeal sepsis was found in 2,754 cases (1,369 male, 1,385 female), a percentage of 90·29 males and 90·11 females.

Tonsil disease was present in 2,079 cases (996 male, 1,083 female), percentages being 68·16 total (65·82 male and 70·46 female).

Types of cases.	Antra only involved or with others.		Ethmoids only involved or with others.		Sphenoids only involved or with others.	
	M.	F.	M.	F.	M.	F.
General paralytics	28	10	17	2	10	1
Epileptic psychotics	33	24	24	17	13	12
Psychotic imbeciles	4	15	6	6	5	6
Post-encephalitics	5	2	6	3	4	1
Functional psychotics (before 1923)	18	13	11	10	10	7
,, ,, (after 1922)	715	578	487	424	344	282
	803	642	551	462	386	309
Totals	1,445		1,013		695	

The distribution of the nasal sinusitis was:

Out of . . . . . .

The antra were diseased in . . . .

Ethmoids ,, ...

Sphenoids ,, ...

DISCHARGES.

Taking functional psychotics admitted after 1922 and subtracting the "Not diseased" and "Transferred" groups, the net "Diseased" remain, viz.: . . . . .

Of these there were completely discharged . .

Giving a percentage of . . . . . .

Discharged from same "Diseased" group were .

Giving a percentage of . . . . . .

https://doi.org/10.1192/bjp.87.369.479 Published online by Cambridge University Press

Psychoses, aged from 10 to 71 years, Treated during 1927 to 1941, and Results of Watson-Williams Technique for Investigating Nasal Sinuses.

Tonsils and sinuses not diseased.		One sinus involved.		Two sinuses involved.		Three sinuses involved.		Four sinuses involved.		Five sinuses involved.		Six sinuses involved.	
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
10	1	11	7	13	3	2	..	3	..	3	1	2	..
8	3	10	4	11	10	7	3	7	7	2	1	1	3
2	1	3	4	2	7	2	3	3	1	..	2	1	..
1	1	2	2	1	2	1	..	3	1	2	..	..	..
3	2	2	6	5	3	4	4	2	2	2	2	5	1
120	144	220	214	268	229	120	103	137	110	65	46	66	51
144	152	248	237	300	254	136	113	155	121	74	52	75	55
296		485		554		249		276		126		130	

58 76
134

25 24
49

6 9
15

14 5
19

1820 sinus disease with or without tonsil disease.
934 tonsil disease.
296 neither tonsils nor sinuses considered diseased.

3,050 total.

Nasal sinusitis was present in 1,820 cases (988 male, 832 female), percentages being 59·67 total (65·30 male and 54·13 female).

During the period 1927 to June, 1941.

Discharged, including those later readmitted.			Readmitted, still in Hospital.		Completely discharged.		Died.		Transferred elsewhere.	
M.	F.	T.	M.	F.	M.	F.	M.	F.	M.	F.
19	12	31	1	..	18	12	19	1	3	1
13	13	26	2	2	11	11	22	17	6	1
4	12	16	..	3	4	9	2	5	2	3
5	3	8	2	..	3	3	4	4	..	..
5	3	8	1	..	4	3	1	4	3	2
773	831	1,604	88	102	685	729	114	122	75	56
819	874	1,693	94	107	725	767	162	153	89	63
1,693			201		1,492		315		152	

M.	F.	Total.
988	832	1,820 cases showing sinusitis.
803	642	1,445 i.e., a total percentage of 79·39.
551	462	1,013 i.e., ,, ,, 55·65.
386	309	695 i.e., ,, ,, 38·18.

. . . M. 1,156, F. 1,216; total 2,372.
. . . M. 627, F. 653; total 1,280.
. . . M. 54·23, F. 53·70; total 53·96.
. . . M. 715, F. 755; total 1,470.
. . . M. 61·85, F. 62·08; total 61·97.

https://doi.org/10.1192/bjp.87.369.479 Published online by Cambridge University Press

example of mental disorder due to toxic infection, and one of the first to make him realize how much could be done by treating the bodily condition, was that of an ex-policeman who came under his care fifteen years ago and was discharged " Recovered " following eradication of dental sepsis, the only treatment he received. It was his second admission. During his first admission he attempted to commit suicide. He was depressed and agitated, had a feeling of being wronged, was garrulous and lachrymose. His teeth were bad and there was pyorrhoea ; they were extracted after much persuasion. He had been discharged from the police force for queer behaviour and for uttering disloyal statements, and was a source of worry and anxiety to his wife. Some years later he had met him in charge of mental patients in a public institution ; he said he had never looked back since he had had his teeth out. This case so impressed the speaker that he formed the firm opinion that cases of toxic infection did occur and could be successfully treated. Dental treatment was pursued alone until facilities for the treatment of chronic infective disease became available on a larger scale with the appointment of an E.N.T. surgeon and a radiologist.

The clinical results obtained by the method of treatment under consideration, as observed by himself, had demonstrated that chronic as well as acute cases could be treated. This, he ventured to say, was somewhat of an exception, it being amongst the present ideas of treatment an accepted axiom that " the case must be got in the early stage if treatment is to be successful." Where focal sepsis was found and eradicated, mental and physical improvement ensued in the majority of cases, in many the response was remarkable and in those where recovery did not occur there was generally a reduction in psycho-motor activity, better behaviour and improved health. A result also of importance was the improvement in the general health and hygiene of patients consequent on dental and ear, nose and throat treatment covering a period of some years. In connection with this he would refer to the foetid odour once so noticeable in wards before dental treatment of patients received much attention and to a remark made by a member of the Board of Control attributing it to lack of personal cleanliness. This odour, however, disappeared when later routine treatment for oral sepsis had been undertaken.

The period during which treatment on these lines has been carried out under his direction was now long enough to allow of some opinion being formed as to the continuance of the amelioration of the mental condition after treatment. It was of interest to note that few of the cases so treated had been readmitted and that the acuteness of the mental disorder was less in those who did return.

A type of patient often presenting difficulty in treatment was the one who was subject to recurrent attacks of mental disorder, the one who realized his misfortune and whose life was marred by repeated nervous breakdowns necessitating admission to a mental hospital. These recurrent attacks were clearly due to some cause often not ascertained but which, when ear, nose and throat and dental investigations were made, was found to be some form of focal sepsis. This condition was well illustrated by the case of a female patient who ceased to have recurrent attacks after the removal of her diseased tonsils. In 1926, at the age of 21, she became insane and was admitted to a mental hospital and again in 1928. In October, 1930, she was admitted to Powick and discharged in May, 1931. She had four subsequent attacks, for which she was admitted to hospital. In addition she had had other attacks during which it was possible to take care of her at home. Each attack was similar to the preceding one and was marked by excitement, exaltation, erratic and irresponsible behaviour and swearing freely in her conversation. Her mental condition varied with her menstrual cycle and her discharge could not be considered until she had passed two periods without a sign of relapsing. The longest time she was able to remain at home between October, 1930, and January, 1938, was fifteen months. During her last admission, October, 1937, to January, 1938, she was, on examination, found to have diseased and septic tonsils, which were removed. She then had a course of non-specific protein therapy (T.A.B. vaccine). Improvement quickly followed and she was discharged recovered. She had then been at home for three and a half years, was her normal self and had

not had any mental trouble since her discharge. The cause of her recurrent attacks was obviously toxaemia of varying intensity arising from disease of her tonsils.

It had been observed in those cases where chronic infection of the nasal and sphenoidal sinuses and antra was found to exist that the psychotic state, frequently characterized by delusions of persecution and hallucinations, usually cleared up when active treatment of the infected area was carried out. He would refer to such a case mentioned by him in a paper in the *Journal of Mental Science* for May, 1938. The patient, a trained general nurse, had been in an unbalanced state for eighteen months following influenza and had to be certified. She was admitted from another mental hospital in June, 1937, seven months after certification. She was suicidal, hallucinated and difficult in her general behaviour. On investigation one sphenoidal sinus was found to contain thick pus. Her mental condition improved when the sinus was washed out, but became worse when pus appeared again ; this occurred on several occasions and can be regarded as an example of association between toxaemia from focal sepsis and mental disorder. The infection was finally disposed of and the patient was discharged recovered in January, 1939. Realizing that her nursing career was jeopardized she took up domestic science for a livelihood. She had kept well since her discharge and was now doing war nursing. His reasons for referring to this case of sinus infection were that she had not been discharged from hospital at the time her case was reported in the Journal and also that it was extremely likely she would have become a victim to chronic insanity had the infection not been located.

In addition to the actual results on the individual mental conditions obtained by this mode of treatment, other beneficial results became manifest. The patients were generally better behaved and less difficult to manage, and the use of sedative drugs was much reduced. They felt that something was being done for them to get them well, and the majority had a better insight into their condition and exhibited a wish to co-operate. Their relatives also had a feeling of satisfaction and hope. Finally, and not of least importance was the attitude of the nursing staff to this work. It could be said that they appreciated it, particularly from the nursing point of view, and now looked upon it as necessary. Since its introduction there had been a change in the atmosphere and spirit of the hospital.

He had already referred to non-specific protein therapy, T.A.B. vaccine being used. This, in his opinion, was to be considered not only as an adjunct to but as part of the treatment of mental disorder by the somatic approach. Used as a separate mode of therapy it was found to give highly satisfactory results and had been the means of promoting recovery in a number of cases, in others it had brought about a change in the mental picture for the better, a destructive patient, for instance, had ceased to tear up his clothes, the habit of sedative drugs had been broken and excitement reduced.

On looking back over the period during which the somatic treatment of mental disorder had been practised at Powick Mental Hospital and on reviewing the work it had entailed and the results obtained, he was satisfied that every endeavour should be made to pursue and develop the treatment embodied in the term " total somatic approach " and he regarded it as one to which each patient was entitled.

Dr. ARTHUR POOL (York), after thanking the President for arranging this symposium, suggested that they ought perhaps to go a stage further back than the openers had taken them. They had told them about infection of the nasal sinuses, but he thought it had to be explained why only a percentage of the population, practically all of whom got colds frequently during life, developed this sinusitis. He would suggest that a possible factor was the dietetic one, and that a good many of these patients originally acquired and maintained their infection because they had not got the right diet which enabled them to withstand the ordinary infective process to which so many people were exposed. He thought that there was something to support this in the excellent illustrations which had been shown on the screen illustrating that the main factor in the nasal sinusitis was not a frank empyema but an oedema. It was well to be reminded that every cell in the body was a mass

of protoplasm surrounded by a semi-permeable membrane, and that whether or not a cell increased or diminished in size depended upon the salt content within that cell. In pneumonia it was a commonplace observation that chlorides were retained in the tissues and not excreted in the urine. He thought this alteration in salt content ought to be kept in mind; he also suggested to any surgical team that some of their cases in future should be investigated from the physician's standpoint.

He believed that the headache associated with sinusitis could be relieved by the injection of hypertonic saline—20 c.c. of a 30 per cent. solution. While he accepted the great help which surgical investigation of the type about which they had heard at that meeting could offer, he thought that before patients were subjected to the severe operations outlined they ought to be given the benefit of medical treatment and the administration of adequate quantities of vitamin C, together with a regulation of the salt content of the diet, particularly sodium chloride and calcium salt.

Dr. W. J. T. KIMBER (St. Albans) said that this had been a most interesting discussion from a number of points of view. He for one would like to get some ideas into his head as to where the value of this eradication of sepsis, particularly nasal, lay. He appreciated what had been said that there was a very great factor of importance in the adequate treatment of these cases. But it seemed to him that the results of treatment along these lines, when it came to studying the discharge rate and so on as between hospitals which were carrying out work on these lines and others which were not proceeding in this particular direction, did not justify the conclusions that would otherwise be drawn from what had been said in that discussion. It would be interesting to arrive at some conclusion on this matter. Dr. Fenton had mentioned a point of very great interest when he said that, quite apart from the question of eradication of sepsis, there was as a result of treatment greater happiness among the patients, who felt that something was being done for them to get them well. He thought that was a factor which must have an effect on the patient. The nursing staff had now something they could do for the patients, and that in itself must have a direct psychological bearing on the situation. They had all seen these changes when they had pursued vigorously various lines of treatment. The atmosphere and spirit of his own hospital had changed. As at Powick, of which Dr. Fenton had spoken, there was no aroma, and the conditions were such as encouraged the patients to co-operate. These were all very important factors as compared with other days when no effort was made towards a hopeful treatment of the patients. An infusion of the spirit of hopefulness throughout the hospital, the knowledge that energetic treatment was being pursued, might well have its effect on patients apart from the surgical aspects.

Dr. H. A. ASTLEY COOPER (Berkshire) asked whether, with regard to the statistics circulated by the President, the figures relating to general paralytics meant that the treatment they received consisted only in removing the sinus disease.

The PRESIDENT said that that was only part of the necessary treatment.

Dr. ASTLEY COOPER said that in that case he did not think they were reasonably included in the list. The point that arose out of the President's statistics was that he found sinus disease in 90 per cent. of his cases. That meant one of two things, either that sinus disease was the almost universal cause of mental disorder and that its eradication ought to produce recovery, or else that the findings were so universal for the population as a whole that in this particular connection their value was negligible, so that in most of these cases one was not dealing with sinus infection as a cause of mental disorder at all. What was being done, as had been suggested by another speaker, was to introduce a very radical method of suggestion into the minds of the patients and it was not remarkable if they showed the same "improvement" as was apparently to be found in all the recently introduced "successful" treatments of schizophrenia. He thought it rather a pity that at the present

juncture when medicine in general had rather abandoned focal sepsis, and when the claims for cardiazol had been reduced to their psychotherapeutic effects, they should have to examine all their patients for nasal sepsis, even though their ears, nose, and throat surgeons told them it was not as common as all that.

Dr. A. A. W. PETRIE (Banstead) said that he gathered that Dr. Kimber had not discharged all his psychotherapists, and, like Dr. Kimber, he was not entirely converted to the view expounded with so much force in that discussion, but he admitted, of course, that one could make mistakes. At Banstead an endeavour had been made to see how far they were blatantly making mistakes in not dealing with nasopharyngeal sepsis. One of his colleagues took the trouble in carrying out a series of post-mortem examinations to dissect the sinuses, making a slicing cut laying the sinus open, and he found among 250 cases only two which had rank empyemata. But had the ear, nose, and throat surgeon attended the post-mortem examinations he might have condemned a number of those sinuses, although he was afraid that they in their ignorance had passed them over. He was more and more convinced as he got older in this work that one must do something for one's patients. One speaker had rather satirically referred to their endeavours with cardiazol and electrically induced fits and so forth. It was a very happy circumstance that everything was being investigated and followed up to the greatest extent possible, but, although he was no longer so ignorant as formerly on the subject of ear, nose, and throat work, he was not entirely convinced that this was the only, or even perhaps the most important, cause of mental disorder. Perhaps, however, they would find on further investigation that they had made a mistake. But he thought the intensive application of investigational and treatment methods to patients did have an exceedingly good effect, and this was certainly one factor in what was well known as Dr. Graves' great success in dealing with his cases.

Mr. BEDFORD RUSSELL, in a brief reply, supported very strongly the suggestion of Dr. Pool on the effect of diet in sinus trouble. He was quite certain that Dr. Pool was right, and if they all lived on a perfect diet there would be far less sinusitis. It was possible to overcome many of the results of sinusitis by putting young people on a correct diet which included the elimination of the too digestible carbohydrates. Carbohydrates originally were considerably wrapped up in indigestible coatings of cellulose or the like. Nowadays they were predigested and never reached the colon, whereas in a natural state they did presumably reach the colon. He was ignorant of the effect of the alteration of the salt content of the diet except in the matter of sodium chloride, and he was keen to advise patients not to take sodium chloride because there was, or should be, enough in the food, which contained about 1 per cent.

The PRESIDENT said that Dr. Pool's remarks on diet were very interesting. It was many years ago since he started his interest in calcium, the addition of which was found to stimulate an increased reaction, acting upon the latent infection. He was strengthened further by the observations of Grove and Vines published in the *British Medical Journal* about 1922, i, p. 791.

Dr. Kimber and Dr. Cooper had suggested that by the mere treatment of the patient a psychologically beneficial effect was produced. He would be only too glad if some other easier methods could produce the psychological effects. He was quite satisfied that the essential point was to get at the portal of entrance—that was the whole substance of the treatment that had to be carried out. The patient in his confused state was unable to appreciate what was done for him until it had been done.

Sir HUBERT BOND proposed a vote of thanks to the President and General Secretary and to the openers of the discussion for this noteworthy meeting. He did not feel that the meeting was finished by any means, he hoped it was only adjourned. He rather wished that there could be set up a small body consisting,

on the one hand, of advocates of the thesis which had been put forward, and, on the other, an equal number of those who could not for the moment see eye to eye with them. In that way difficulties could be hammered out which it was not possible to explore fully in a large meeting.

This meeting, had it not been for the war, would have been a gala one, celebrating the centenary of the Association, nevertheless it had been a celebration. He recalled that the first year of Dr. Graves' presidency corresponded to the completion of a quarter of a century since he began to occupy the difficult post of superintendent physician in chief of a mental hospital. He remembered very well Dr. Graves' appointment to Hereford. Two things were noteworthy about it as a forerunning of what had really happened. In the first place, he was appointed superintendent within eight or nine months of being a junior medical officer. That was not done nowadays, and one had to go back to the sixties and seventies of the last century for classical examples. The other notable thing was that he came to this position already a Fellow of the Royal College of Surgeons, and he moved on from his rather smaller post to the great one he now held in Birmingham, where there was established—he was sure it was through his suggestion—with the late Sir Frederick Mott as Director, a Board of Research, now the Department of Mental Disease Research of the University, under the directorship of Dr. Pickworth, who had shown them some of his interesting work that day. He thought it was in 1922, that the President first touched upon the association of colloidal calcium with chronic sepsis, and ever since that date, year in and year out, in the most single-minded way he had pursued the subject. On this occasion he had brought together a number of distinguished surgeons who had emphasized the immense importance of these findings. There were many doubting Thomases, to whom perhaps the Collect for St. Thomas's Day might be commended when it spoke of the doubt of St. Thomas as overruled to the confirmation of faith. That was what he believed might possibly be the outcome of this single-minded work.

In the course of the discussion he had much appreciated Dr. Petrie's mode of approach. Surely the issue was not with hospital superintendents, but with the surgeons, some of whom they had with them that day. But he sympathized with the superintendents who were seeking a method of obtaining improvement in their patients, and who had specialists who told them after examining the patients that there was no evidence pointing to the necessity of surgical interference. What was the superintendent to do unless, indeed, he had at the back of him a very large amount of experience which enabled him to say to the specialist, " Will you consider your decision again ? "

The PRESIDENT, in response, after expressing thanks on behalf of all concerned, said that the position with regard to the medical superintendent and the ear, nose, and throat surgeon could be summed up in two words—co-operation and collaboration. That was a subject which would deserve a special paper. But it was certainly helpful to have cleared the air as this discussion had done. He thought that ear, nose, and throat surgeons should be stimulated to know that something was expected of them in relation to patients in mental hospitals.