Among the things that matter vitally are those of the mind, far more neglected in England than on the Continent by poorer folk. We must not neglect and starve the mind, while lavishly catering for the body. Our ideal must be the *mens sana in corpore sano*; for the latter is virtually impossible without the former. Consequently our health resorts should be equipped for mental as well as for corporal benefit. The provision of libraries, art galleries, and museums is as necessary, if not so patently urgent, as that of convalescent homes and baths, for the ultimate attainment of our goal; for are not the former as much the sanatoria of the mind as the latter are those of the body? A day may well come when the healing art will include advice as to suitable studies in art, science, and literature as mental tonics.

The advantages of our health resorts are not infrequently lost to the sick through doubt, indifference, or

scepticism as to their real value; by bad and selfish building development; by destruction of natural beauty; by ugly as opposed to reasonable and beautiful forms of advertisement; by too much noise; or by a cost of living which it should be the aim of all sensible government to reduce. Signs are not wanting, however, of good efforts to lay the foundations of a better state of things by a well-directed campaign of education as to the great advantages of British spas and resorts, not only to ourselves in these islands and to our kinsfolk abroad, but also to our neighbours on the continents of Europe and America.

Let us hope that the day will dawn when we shall be able in *propria persona* to recite the words of Alexander Pope in his *Essay on Man*:

"For me, health gushes from a thousand springs;
Seas roll to waft me, suns to light me rise;
My foot-stool Earth, my canopy the skies."

FOCAL INFECTION AS A PROBLEM FOR THE LARYNGOLOGIST*

BY

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I regard this subject as being peculiarly suitable for a discussion at such a meeting as this, in that our knowledge is at present fragmentary and in that such progress as has been made has been based rather on clinical observation than on laboratory research. I think it probable that you all have some sort of conception as to what you individually mean by focal infection, and I also imagine that these conceptions would differ one from the other. It would therefore seem necessary, since I have to open this discussion, for me to try and explain what picture is presented to me by this term. By "focal infection" I conceive the existence of a local inflammatory lesion or lesions producing pathological changes in organs or tissues of the body, such changes not being, as far as we can judge, due to the direct spread by continuity of the primary focal disease. I could perhaps clarify what I mean by giving a concrete example. Given a maxillary antral infection as the primary focus, I should regard a complicating conjunctivitis as being due to a direct spread of infection via the lachrymal apparatus, and therefore not as an example of focal infection. On the other hand, I should regard an iritis as being such a result.

In the great majority of cases we are unaware of the method by which the secondary changes are produced from a primary focal infection. In some cases, no doubt, there is a direct transfer of organisms via the blood stream from the primary focus, as is seen in the case of a gonococcal infection of a joint resulting from a primary lesion in the urethra. The clinical picture, however, in many cases seems to render it unlikely that this is the universal explanation, and we are therefore compelled to invoke the idea of the transfer of toxic products resulting from the activity of the organisms in the primary lesion. The picture of focal infection is further confused by the existence of infinite variations of sensitiveness to the effects of organisms or their products, such variations in sensitiveness being either inborn or acquired. I am aware that I have offered an imperfect definition, but the fact that our knowledge is at present imperfect adds enormously to the interest of the subject. As a result of a somewhat close clinical study extending now over many

years I am myself becoming more and more impressed by its importance, particularly in the sphere of chronic disease.

The Problem for the Laryngologist

In reviewing the possible sites for a focus of infection one finds that a considerable proportion of them occur in the domain of the laryngologist. The reasons for this are fairly evident. The skin is, as a whole, resistant to infections, and such infections, when present, do not tend to produce secondary results. The more usual site of infection is the lining of the food passages and upper air passages, and more particularly perhaps the aggregations of lymphoid tissues in these regions. When, therefore, we have taken our share, there is left for others, for practical purposes, the intestinal and genito-urinary tracts. The domain of the dental surgeon marches so closely with ours that, if we carry out our work with any degree of thoroughness, we must inevitably review his territory.

The problem for the laryngologist is, as I see it, twofold. He may, on the one hand, have to initiate the suggestion of a focus of infection in cases in which such an idea has not been thought of, and, on the other hand, when such an idea is put to him, he must try to decide whether such a focus is present and what degree of importance it assumes in the particular case.

It seems to me that this discussion can also be usefully employed in an interchange of our clinical experience as to how far, with our present knowledge, we can decide whether a focus of infection is present, and, secondly, as to how far the treatment of such a focus has resulted in improvement in the secondary lesions. It is along this path of clinical research that our knowledge, and therefore our practice, is likely to improve.

It would be well to consider, in turn, the various possible sites for the primary focus.

Nasal Infections

My experience has led me to join the school in which nasal infections, particularly those of the accessory sinuses, are only to be regarded as of constitutional importance when they are manifest—that is, when there is a definite infective lesion which can be recognized by routine methods of diagnosis. By this I do not mean to imply that there are not many cases of individuals who have a chronic infective focus, say in one antrum, but who do not appreciate the fact through having become so used to their symptoms that they regard them as the normal state of affairs.

Chronic antral infection, particularly if of dental origin, is the type of nasal sinus infection which most frequently

* Read in opening a discussion in the Section of Oto-rhino-laryngology at the Annual Meeting of the British Medical Association, Bournemouth, 1934.

presents the picture of focal infection, the secondary results, as a rule, appearing as a chronic fibrositis or arthritis. In addition, changes in the nervous system do, I believe, sometimes result, and some cases of nerve deafness and optic nerve defects can be explained by such a focus. The type of chronic nasal pansinusitis accompanied by hypertrophic changes with polypi very rarely acts as an infective focus.

Dental Infections

The results produced are similar to those which I have just enumerated as following a chronic antral infection. In considering infection in the mouth, I believe that more importance is to be attached to one dead tooth with an apical infection than to widespread pyorrhoea, presumably owing to the fact that the former is a closed focus and therefore more prone to discharge its products into the blood stream.

Tonsillar Infections

These, you will agree, present the greatest problem of all. For some reason the faucial tonsils seem to be much more usually the seat of a focus of infection than either the nasopharyngeal or lingual tonsils. In addition, the picture of focal infection results from a primary tonsillar disease more often than from disease in any other site in the body. The tonsils seem to have a particularly intimate association with the general vascular and lymphatic systems, and it is, no doubt, their function to absorb samples of the infections in our environment, presumably with the object of establishing immunity. Under civilized conditions, in which opportunities for gross infection abound, such as in the modern cinema, this lymphoid protective machinery seems to break down and become chronically infected, and, by introducing products from such infection into the body to an excessive degree, to produce serious damage to the organism. As a result of a chronic focus in the faucial tonsils there can, I believe, be produced chronic lesions in the skin, joints, heart, kidneys, nervous system, and organs of special sense.

It is in diagnosis that the tonsils present their greatest problem. How can we decide when infection is present? Can the bacteriologist help us? Must we depend on the clinical history, which I believe to be of very great importance, as not infrequently a history of slight recurrent sore throats can be obtained? How far can examination of the tonsils themselves help? Is hyperaemia of the anterior faucial pillar a helpful sign? Is the presence of cheesy secretion in the crypts of any importance? And how far can compression of the tonsils or the application of suction to them help in diagnosis? An interchange of views on these points would, I think, be of considerable value.

The Ears

The picture presented by a chronic infection in the middle ear is, I believe, most commonly one of an individual showing the general signs of a chronic toxæmia, such as some degree of anaemia, lassitude, etc., but without, as a rule, the typical picture of definite secondary changes in the joints or other parts of the body.

Having thus briefly considered the possible foci of infection in the domain of the laryngologist, I should like to consider the other side of the picture from this point of view. Is there any lesion of the nose, throat, or ear which can be regarded as a secondary result of such an infection? We have, I believe, in some cases of nerve or perceptive deafness such an example. I am becoming increasingly convinced that some of these cases are to be explained as resulting from the toxic effects of a focus of infection. To illustrate this, I should like to quote an example: A male, aged 52, was first seen by

myself twenty-one years ago, and has been seen at odd intervals ever since. His hearing during the last ten years had gradually depreciated owing to a nerve defect. Some eighteen months ago I suggested that he should have his mouth, which was obviously infected, put in order. I did not see him again until recently, when, to my surprise, I found that his hearing had recovered to a degree which brought it back to what it had been some ten years previously. Apart from the removal of his infected teeth, I discovered no other possible factor which could have produced this improvement.

Some Difficulties and Mistakes

As a final contribution to this discussion I should like to relate some of the difficulties and mistakes which are likely to be experienced in applying the principle of focal infection to practice.

1. *The Primary Focus may be Difficult to Detect.*—This state of affairs is most often met with in connexion with a tonsillar focus. As an example of such a case in which serious secondary results have followed a barely discoverable infective focus, I cannot do better than quote the following. A woman, aged 32, had suffered for some months from a pustular eruption on the face. When first seen over two years ago she gave a history of progressive oedema of a few weeks' standing, the urine being solid with albumin. Careful investigation of the medical history disclosed nothing beyond a vague history of occasional sore throats, in no case sufficiently severe to lay the patient up. Superficial examination of the pharynx revealed nothing abnormal, but retraction of the anterior pillars disclosed small and somewhat unpleasant-looking tonsils. Removal of these has resulted in complete resolution of both the nephritis and the dermatitis.

2. *A Mistaken Focus.*—In view of what has just been said it is not surprising that difficulty often occurs in deciding which of two or more possible foci is the guilty one. For instance, I regard the following case as an example of such a mistake of my own. The patient, a man aged 27, had suffered from recurrent attacks of iritis for three years. Two years ago I operated on his nasal septum, on the mistaken assumption that the iritis was secondary to a nasal infection. Six months later he developed a quinsy, which was immediately followed by an attack of iritis, and after this there was a succession of sore throats, followed on each occasion by a flare-up in the eyes. His tonsils were removed nearly a year ago, and, following this, the attacks of iritis have ceased and his general condition has enormously improved. In this case I have no doubt that the tonsillar infection was the primary one. As a result of experience I am now of the opinion that where one is in doubt as to the relative blame of possible foci in the nose and throat the tonsils are by far the most frequently blameworthy.

3. *Consecutive Foci.*—A misleading difficulty that not infrequently arises is that, following the surgical removal of an infective focus with resolution of the secondary results, at a later date a recurrence of these secondary lesions takes place, due, apparently, to the arising of a fresh primary focus in a new situation. Thus I believe we not uncommonly see an intestinal focal infection following on a tonsillar one, and, as in the case which I give here, a tonsillar infection following on a nasal one. In either case we have a descending infection, but it would be of interest to devote special attention to the question as to whether the reverse can take place—that is, a nasal infection follow a tonsillar one.

As an example of this occurrence of consecutive foci a female, aged 44, was seen five years ago with a history of nasal discharge of some years' standing, associated recently with severe muscular rheumatism. Drainage of infected nasal sinuses caused a complete clearing up of the rheumatism,

with considerable improvement in the general condition. Four years later, however, she had an attack of acute tonsillitis, which was followed by a recurrence of the rheumatism. Removal of her tonsils has resulted in improvement in her general condition and rheumatic symptoms.

4. *Multiple Foci*.—The occurrence of multiple infective foci presents a somewhat similar difficulty. Having discovered one focus, the surgeon is apt to rest content and thereby miss another, and possibly more responsible, one. An excellent example of this mistake can be shown by the case of a woman, aged 42, who, fifteen years ago, was affected with septic arthritis of relatively sudden onset. This was presumed to be associated with infected teeth, and these were dealt with, with perhaps some degree of improvement, but the patient remained more or less an invalid. The occurrence of an otitis media two years ago led, as a routine, to the examination of the nose. To my surprise I found on transillumination that the antrum on one side was completely opaque. Operation disclosed chronic disease in the antrum, which from its nature had almost certainly resulted from the original dental infection many years previously. A recent note of her condition states that she is now fit. Some deformity of the joints remains, but there is no sign of any active disease.

To sum up, I hope that to-day's discussion may do something towards the consolidation of our ideas as to the scope of focal infection and as to the way in which the difficulties of its application to clinical practice may be surmounted.

ELECTROTHERAPY IN THE TREATMENT OF DISEASES OF THE GENITO- URINARY SYSTEM*

BY

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Owing to the fundamental character of its action electricity, in one of its many forms, has proved itself of value in a very large number of diseased conditions. If, however, as Dr. Golding Bird¹ wrote in 1847, when dealing with electrotherapy, we wish to act as "scientific and philosophic physicians," we must inquire into the "rationale of the process" which we employ. It is not sufficient merely to enumerate the various diseases which may be beneficially treated by electricity, or to allege a number of cures. There will be no advance in our methods, and none of our scientific brethren will be convinced, if we lay down an empirical classification of our remedies, baldly stating that "zinc ionization" is good for endometritis, or that diathermy is indicated for the relief of dysmenorrhoea. Such mere assertions will carry no conviction.

On the other hand, if we expound the "rationale of the process" which we employ—namely, that the septic membrane in endometritis can be thoroughly and completely destroyed by the electro-chemical process which ensues from the electro-deposition of a caustic-forming ion, such as zinc, upon the interior of the uterus—we afford an explanation of the "rationale" of our method—which is deserving of the consideration of all open-minded physicians. Or, if we point out how the relaxation of spasm and tension in dysmenorrhoea can be effected by the deep heat generated by the diathermic current, and how the vibratory process, which is the precursor and

generator of this thermal action, further serves by its dispersive action to relieve tension and pressure, then we may obtain a rational appreciation of electrotherapy from all except those whose complete ignorance of electrical methods is only equalled by their reluctance to learn anything about them. It is on such broad principles that I propose to open this discussion.

The main forms of electrical current employed in electrotherapy are: (1) the constant or galvanic current; (2) the interrupted currents of low frequency; and (3) the interrupted currents of high frequency.

Local Application of the Constant Current

In its general application the constant current owes its main effects to the reflex action induced by the stimulation of the skin nerve endings by the electro-deposition of various ions. In this form it is not of great importance to the subject of the present discussion. In its local or polar application, on the other hand, it is one of the most valuable remedies at our disposal. In the treatment of endometritis by the constant current we introduce a zinc rod or uterine sound within the uterus, and connect it with the positive pole of the source of supply. The zinc cations proceeding from this zinc rod carry the positive charge down to the mucous membrane of the uterus, at which point, owing to a change of liquid, another set of ions, mainly the hydrogen ions of the tissues and blood, continues the convection. The mucous membrane thus forms a virtual pole at which the zinc ion, yielding up its positive charge, forms with the oxygen and chlorine of the tissues an oxychloride of zinc, and, by the chemical decomposition involved in the formation of this salt and by its subsequent caustic action, the membrane is thoroughly and intimately destroyed. Provided the indifferent electrode and pad surrounds the whole circumference of the abdomen, the destruction takes place over the whole inner surface of the uterus, and so evenly is the destructive process distributed that the destroyed membrane may be subsequently passed as a complete cast of the interior of the uterus.

The application lasts for about fifteen or twenty minutes, towards the end of which uterine contractions, appreciated as pain, may be excited; these are an indication to cease the treatment. If the application causes any pain in its early stages it is evidence of complications in the appendages, such as pyosalpinx, and further treatment should be discontinued, since these cases are unsuitable for this method. It is interesting to recall that Apostoli employed the method to ascertain the condition of the uterine appendages. According to him, if the large current of 100 to 150 mA was tolerated the appendages were above suspicion. If a current of 50 mA excited pain the appendages were open to suspicion. Intolerance of 30 mA indicated serious trouble in the tubes, and if there was intolerance of 20 mA the uterine annexes should be removed.

From what, in current parlance, may be termed a fifty-fifty experience of curetting and zinc electro-deposition, I have no hesitation in pronouncing in favour of the latter method, except in cases from which placenta remains have to be removed or scrapings obtained for pathological examination. Zinc electro-deposition entails little inconvenience, and no nursing home, anaesthetic, or lying up. The apparatus required is of the simplest kind, the best battery for the purpose, complete with water resistance, costing less than 5s. There is no better, no less expensive, and no more convincing method with which the general practitioner can begin electrotherapy. A similar method of treating gonorrhoea by zinc electro-deposition was introduced by Bouchet in 1907. He employed a zinc wire within a perforated rubber catheter, through which a solution of 1 or 2 per cent. solution of zinc sulphate

* Read in opening a discussion in the Section of Radiology and Electrotherapeutics at the Annual Meeting of the British Medical Association, Bournemouth, 1934.