been able to find that disallows the alternative explanation that the improvement in results was due not to the treatment but to a fortuitous change in the virulence of the prevalent streptococcus. There are, however, two reasons for questioning the value of these diagrams. In the first place they refer to only small numbers of patients (fifty-six in 1934-5 and thirty-two in 1936-7), so that statistically they are open to criticism. In the second place, although I consider that invasion of tissues is the best possible clinical measure of virulence in haemolytic streptococcal infections, it is not possible to assert that the tissues were equally widely invaded in the two groups concerned. Great care has been taken to include only those patients in whom a definite inflammatory mass was demonstrated, but it is just possible that the average size of the mass was considerably greater in the 1934-5 series than in the 1936-7 series. If this were so it might be evidence of a minor variation in virulence of the streptococcus in the two series. No further analysis on these lines has been attempted, because it would incur the possibility of statistical and observational errors so great as to negative any results.

Conclusions

The new aniline derivatives have been employed at Queen Charlotte's Hospital since 1936; in the doses in which they have been given their use appears to be free from serious danger and has been followed by a very great reduction in the mortality rate for haemolytic streptococcal infections. Analysis of the causes of this improvement in mortality rate shows that it is associated mainly with a decrease in the widespread invasion of tissues by the haemolytic streptococcus rather than with a greater tendency to resolution of the disease once widespread invasion of tissues has occurred. This feature makes it necessary to consider whether the improvement since January, 1936, is due to the efficacy of the treatment or whether it is due to a change in the virulence of the prevalent organism. It is possible that both factors may be concerned. In non-fatal cases in which tissues beyond the limits of the birth canal have been invaded by the haemolytic streptococcus there is some clinical evidence that the new drugs do actually hasten the resolution of the inflammatory process, and this is a good reason for believing that the treatment, rather than a change in the virulence of the organism, is responsible for the improvement in this direction.

While I am unwilling to guess how far the new drugs have been responsible for the undoubted improvement which has followed their clinical use, there is every reason to continue to employ them until their value or otherwise is firmly established.

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The first number of the seventh volume, dated March, 1935, of the *Index to the Literature of Food Investigation*, which has only just been issued, covers the literature published in 1934. It is hoped, states a prefatory note, to complete during the next twelve months abstracts of the literature published during 1935 and 1936, which will form vol. vii, No. 2, and vol. viii. Meanwhile the first part of vol. ix, covering papers published this year, is in preparation. Copies of the *Index* may be obtained from H.M. Stationery Office, London, price 5s.

OTITIS EXTERNA *

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By this term otologists refer to certain types of inflammatory lesion of the external auditory canal. These are all infections of the skin lining the canal. Since, however, this skin is directly continuous with that covering the auricle and surrounding parts, obviously the infections need not always originate in or be confined solely to the anatomical boundaries of the canal. Therefore, in discussing their aetiology and treatment we should not limit ourselves too strictly to this part of the external ear.

Aetiology

As a cause of the lesion the most important factor is naturally the invading organism or virus. Those of external origin give rise to the commoner types of eruption and include the pityrosporon, acne bacillus, *Staphylococcus albus*, *Staphylococcus aureus*, and *Streptococcus longus*. The rarer forms may be due to various fungi, especially those of the aspergillus variety, to the *Bacillus pyocyaneus*, the bacillus of diphtheria, Plaut-Vincent's organism, and very occasionally the tubercle bacillus. On the other hand, the infective organism or virus may reach the skin of the ear by way of the blood stream, producing eruptions that can be recognized as exanthematous, syphilitic, or influenzal.

Their location, and in the case of organisms their site of growth in the various structures of the skin, bring about defence reactions which in turn determine different characteristics in the form of the lesions. The defence reactions include the usual phenomena of inflammation—for example, hyperaemia, oedema, exudation of leucocytes, etc.—but to these must be added another very important one—namely, the so-called eczematous reaction, which it is agreed always indicates cell sensitization. As to the relation of this reaction to that of true eczema opinion is still divided, but we may assume that for clinical purposes the results of both are much the same. With regard to the site of growth we find that certain organisms appear to have a special predilection for definite structures of the skin. For example, the pityrosporon and the aspergillus confine themselves chiefly to the stratum corneum, the *Streptococcus longus* to the deeper layers of the epidermis, even extending to the dermis, whilst the acne bacillus, *Staphylococcus albus* and *Staphylococcus aureus* favour the pilo-sebaceous follicle. In turn the defence reactions of the epidermis to the first group of above-mentioned micro-organisms may result in such clinical manifestations as a simple scaliness or dandruff, a more intensive desquamation, or as a definite cuticular inflammation, primarily perifollicular, so that the affected part takes on the appearance of a seborrhoeic dermatitis. When the deeper layers of the epidermis are invaded by the *Streptococcus longus* the resulting lesion may then be the subcorneal vesicle of impetigo, the streptococcal fissure, or the ecthymatous ulcer. Finally one must mention the defence reactions of the pilo-sebaceous follicle to invasion by the acne bacillus, and *Staphylococcus albus* and *aureus*, a group of organisms referred to by some dermatologists as the seborrhoeic triad. Of this group the *Staphylococcus aureus*

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is by far the most potent, and it tends to invade the deeper parts of the follicle, giving rise to that distressing lesion known as the boil or furuncle. Furthermore, should the cutaneous cells become at any time sensitized to one of these infective agents the lesion will assume the well-known characteristics of an eczematous eruption.

Some other points in the aetiology of these affections must be indicated. Besides the obvious factors of debility and bad hygienic surroundings there are others that make certain persons specially liable to infections of this kind. In the view of most dermatologists the seborrhoeic subject is particularly susceptible, and herein doubtless heredity and habits play their respective parts. Whereas the skin of a person in perfect health is remarkably free from germs, in the case of the seborrhoeic person the wide-open lumina of sebaceous follicles generally teem with the *acne bacillus*, the *pytiosporon*, and the *Staphylococcus albus*. Although these are usually benign in character they undoubtedly prepare the soil for invasion by more active organisms. The scalp is a region particularly affected in this manner; hence infection can readily spread by contact from it to the external ear. Again, in my experience the fair-skinned person is more liable to skin eruptions than the dark and to exhibit any allergic manifestations.

Another factor is the initial lesion in the skin surface that allows the entry of organisms. This can be brought about in many ways—for example, from irritation caused by dirt about the crevices and folds of the auricle, wax in the meatus, or a chronic suppurating discharge from the middle ear. Direct injury also plays its part, and we have all seen the result in a perichondritis of the pinna or a spreading erysipelas after plastic operations on the cartilaginous meatus. Perhaps, however, the commonest cause of the initial lesion is the imprudent use by the patient himself of a finger-nail, a match-stick, or some such implement to remove wax from his ear or to allay an irritation set up by the latter or consequent upon the local congestion produced by a chronic tubal and middle-ear catarrh, themselves the result of some irregularity in the nose or nasopharynx. The medical attendant, too, may be to blame, as when he uses too irritating a fluid or makes unskilful attempts to extract a foreign body from the meatus and without due care for aseptis. Finally, let us mention in passing, since we cannot discuss them here, such obscure aetiological factors as age incidence, heredity, environment, immunity, cell sensitization, the allergic condition, and the virulence of the invading organism and its saprophytic or parasitic qualities.

Varieties of Otitis Externa

We can now enumerate the commoner clinical varieties of otitis externa and mention a few of the more important details which help us to recognize them.

OTITIS EXTERNA CIRCUMSCRIPTA, OR FURUNCLE

A furuncle begins in a pilo-sebaceous follicle; hence this lesion is confined to the outer or fibro-cartilaginous portion of the meatus. The causal micro-organism is usually the *Staphylococcus aureus* or *albus*, although occasionally a pneumococcus may be found. It is an acute condition beginning as a tender spot, quickly followed by pain and tenderness which may become of an excruciating character. There may be one furuncle or more than one, and there is a great tendency to recurrence. If we can see the actual localized swelling or swellings in the meatus and at the same time a tympanic membrane

that shows little or no acute signs of inflammation the diagnosis is easy and certain. This, however, is not so in severe cases or in those associated with an eczematous condition, when the swelling may be so great as to close the canal and prevent a view of the tympanic membrane. Then the case may be mistaken for one of acute mastoiditis with perimeatal oedema or, especially if the inflammation has spread to surrounding structures behind the ear, oedema or even an abscess over the mastoid region. In such cases an anaesthetic may be necessary to allow of adequate inspection of the drum-head, or of an incision being made over a post-auricular swelling in order to determine whether the pus is superficial or deep to the periosteum. Furthermore, we must not forget that a furunculosis may coexist with an acute mastoiditis or be confused with a parotid abscess that has discharged into the meatus.

OTITIS EXTERNA DIFFUSA

This also is an acute condition, and comprises a number of different infections. The signs and symptoms resemble those of furunculosis but are generally more severe, and the canal in its entire length is more or less inflamed. The invading organism is usually a streptococcus (sometimes the erysipelas variety), or it may be the *Bacillus pyocyaneus*, the Plaut-Vincent organism, or very rarely that of diphtheria. In many of these infections the acute diffuse meatitis affects the surface of the tympanic membrane as well as the walls of the canal, and may be recognized in its various stages—namely, first a stage of desquamation with superficial swelling and serous discharge; secondly, a stage of deep swelling involving the perichondrium; and, thirdly, a stage of suppuration. Many textbooks still mention a croupous form of otitis externa in which a coagulated fibrinous membrane is repeatedly thrown off in the form of casts of the inner part of the canal and drumhead. Its aetiology was never definitely known, and it is doubtful if it is now ever seen. A true diphtheritic membrane, however, remains a possibility, and although exceedingly rare it should be borne in mind whenever a diffuse otitis externa appears without obvious cause in a child who has a diphtheritic affection in the nose or throat.

OTITIS EXTERNA MYCOTICA (OTOMYCOSIS)

Various fungi may gain entrance to the external auditory canal and there set up inflammatory reactions. Among them may be mentioned the *pytiosporon* and the *aspergillus*. The former is said to be perhaps the commonest cause of an infective meatitis. This may appear clinically as no more than a non-inflammatory scaliness comparable to ordinary dandruff of the scalp. It may, however, be followed by a definitely inflammatory seborrhoeic dermatitis. Its importance lies in the fact that it seems to prepare the way for further invasion by other organisms—for instance, by the *Staphylococcus albus* and *aureus*, which may lead to meatal boils, or by the streptococcus, which is likely to produce impetiginization with fissures at the angles of the meatal orifice (Barber). Eczematization also readily occurs.

In the case of the *aspergillus* the fungus may simply inhabit the meatus without causing any morbid changes in the tissues upon which it grows, thus giving rise to no symptoms except perhaps a slight impairment of hearing. If, however, the tissues become invaded, the mycelia perforating the lining membrane of the bony canal and the skin covering the drum membrane, an acute inflammatory process arises. The germ appears to require warmth and

moisture for its growth, and oils and fatty matter form a suitable nidus for its development. No doubt this explains why the condition is most frequently met with in tropical and subtropical climates such as that of the Hawaiian Islands.

ECZEMATOUS OTITIS EXTERNA

This affection should not be confused with that of true eczema. Dermatologists to-day generally agree that the majority of cases of so-called eczema of the external auditory meatus are really examples of infective meatitis. It has been shown that the eczematous reaction occurs when the tissue cells of the skin become sensitized to any of the infecting micro-organisms or their antigens. Hence it may superimpose itself upon any of the simple infections such as are produced by the pityrosporon, *Staphylococcus aureus*, *Streptococcus longus*, or even the tubercle bacillus. Two types can generally be recognized—an acute and a chronic. In the former an initial stage of redness, itching, swelling, and smarting pain is followed by a stage of exudation and crusting. The area involved may finally become denuded of its epithelium and present a raw and bleeding surface. In the chronic form the appearance of the meatus may vary from a dry scaliness due to exfoliated epithelium to a sclerosis of the skin, leading to great thickening and stenosis of the meatus. Here again itchiness is the most prominent symptom, and it leads the patient to cause further irritation by scratching.

OTITIS EXTERNA HAEMORRHAGICA

This condition is often seen in patients after an attack of influenza. Earache is severe and the onset sudden, as in an acute middle-ear infection. Otoscopy reveals one or more purple blebs (or blood-filled blisters) situated upon the tympanic membrane or close to it on the meatal walls. This as a rule requires little if any local treatment beyond avoidance of a mixed infection.

In concluding this part of the subject it may be permissible to mention certain lesions of the auricle and surrounding parts which, although they may occur independently, are very often associated with a diffuse inflammation of the external auditory canal. Those which most concern us are perichondritis, erysipelas, impetigo, intertrigo, fissures, and the various eczematous conditions. Of these intertrigo and fissures deserve special mention. They affect the natural folds and angles of the auricle and are examples usually of a chronic streptococcal invasion often preceded by an infection with the pityrosporon. Intertrigo is most frequently seen in the retro-auricular fold, whilst fissures are likewise found here and also beneath the lobule and in the angles of the meatal orifice.

Treatment

In the treatment of skin infections the three principal measures are: (1) cleansing of the affected part as thoroughly as possible; (2) the application of some form of non-irritating germicide; and (3) protection from further irritation and infection. In treating a relatively inaccessible region such as the meatus we are necessarily limited in our choice of methods and medicaments. In cleansing the meatus I still prefer, in spite of many opinions to the contrary, the old-fashioned method of syringing. The simplest and most suitable lotion I have found for this purpose is a warm boric acid solution. The softening and hence adverse effect of water upon skin infections, especially those of an eczematous nature, can be easily

overcome by the subsequent instillation of a few drops of 60 to 70 per cent. alcohol, used as a dehydrating agent. The latter also acts as a germicide and readily penetrates right down to the fundus of the canal, where ointments obviously cannot be conveniently applied. Ointments, however, can be used for the outer portion of the meatus, and here the cotton wound-applicator is of most service. Protection can be afforded to the meatus very simply either by a pledget of cotton-wool in the region of the concha or by narrow ribbon gauze inserted into the meatus itself. The latter, if kept moist with drops, may also serve as a means of applying a continuous antiseptic to the walls of the canal.

The choice of a suitable non-irritating germicide presents the most difficult problem in the treatment of all types of otitis externa. There is also the personal factor to be considered, a certain germicide being found efficacious in one type of patient but not in another. Hence in any individual case we may have to find out by actual practical experience what sort of germicide will produce the best results. Of the many ointments suggested preference should be given to those containing a zinc basis. Cream of zinc and Lassar's paste I personally have found most useful. These act probably more by reason of their protective nature rather than their germicidal qualities. Sulphur and mercury ointments more often than not appear to be too irritating. When a stimulating ointment is required it will be found convenient to add liquor carbonis detergens (or its successor, liquor picis carbonis) to the zinc preparation. When desquamation is present, salicylic acid, 10 grains to the ounce, is essential.

Local treatment will also include that of a coexistent lesion of the auricle and surrounding parts, especially an infected scalp, or incision of a furuncle or a diffuse suppurative meatitis, or possibly a retro-auricular abscess.

As regards general treatment many different methods have been tried, but as yet their true value has not been determined. They include vaccine and serum therapy (intra-dermal or subcutaneous); injections of colossal manganese, stannoxyl, etc.; various diets (especially in the eczematous affections); treatment of the seborrhoeic patient; light therapy; and x rays. Upon their value I can offer no useful opinion beyond the statement that each in turn has proved successful in certain cases, but none is really specific in all.

The new maternity unit of the Southampton General Hospital makes provision for fully one-third of the number of births in the borough, taking as a basis the 1933 figure of 2,854. The accommodation comprises forty-two lying-in beds, four pre-labour beds, and three isolation beds, and it is expected that between 900 and 1,000 cases will be admitted each year. Preference will be given to patients suffering from abnormalities of pregnancy or labour, to those requiring ante-natal observation, and to those whose domestic conditions are unsatisfactory. The unit has been constructed entirely on one floor, permitting the addition of one or even two stories in the future without interference with the existing walls. Among modern improvements is a signalling system, whereby red and green lights over the door of the ward and in the duty room inform the nursing staff of the requirements of individual patients, and electrical equipment attached to the poison cupboard which operates a red light and a buzzer that come into action immediately the cupboard door is opened and continue until it is closed. There is also an incubator with thermostatic control.