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OSTEO-ARTHRITIS AND ITS CONCOMITANTS*

BY

R. G. GORDON, M.D., D.Sc., F.R.C.P.Ed.

PHYSICIAN TO THE ROYAL UNITED HOSPITAL, BATH, AND TO THE BATH AND WESSEX ORTHOPAEDIC HOSPITAL

Osteo-arthritis is such a common disease that we are apt to take it for granted that we know all about it, and so fail to expend on the individual case that careful thought and unbiased consideration which the Hippocratic tradition demands of us. This state of affairs is made all the worse in view of the fact that osteo-arthritis is usually included under the general heading of rheumatic diseases, a curious medley when we consider that it is made to include such diverse entities as gout and rheumatoid arthritis, osteo-arthritis, and acute rheumatism.

The result of this confusion of diseases whose aetiology and pathology are entirely different is that when a method of treatment is advanced which may be applicable to one of them, it is apt to be indiscriminately applied to all. Even in these days of comparative enlightenment we sometimes see salicylates given as a routine for osteo-arthritis and vaccines for gout.

It seems, therefore, that it may be worth while to consider certain aspects of osteo-arthritis about which I have found that confusion has arisen both in my own mind and in that of others.

Definition

In the first place we must distinguish between what is osteo-arthritis and what is perfectly natural strengthening of the ligaments and their insertions. Round the knee or the spine and in the neighbourhood of all joints a certain amount of calcification is apt to occur in the muscular insertions so as to form spurs and exostoses. These seldom give any trouble or cause any symptoms, yet it is not very uncommon for patients to bring x-ray photographs of such bony outgrowths with a message from their doctor or even the radiologist that they are suffering from osteo-arthritis.

The exostosis of osteo-arthritis is essentially a compensatory phenomenon. The osseous protuberances are thrown out to bolster up an osteoporetic bone—that is, one which has been weakened by previous local destruction of calcium. I agree with Dr. Thomson of Harrogate that the essential characteristics of osteo-arthritis are the osteoporetic areas which occur in or about the articular ends of the bone, together with the primary destruction of cartilage which distinguishes this disease process from that of the rheumatoid type of arthritic change.

Pathogenesis

Osteo-arthritis, therefore, must be regarded as fundamentally a degenerative disease. It usually occurs in people of middle or advanced age and, I believe, in those whose vascular system is beginning to deteriorate. This deterioration is not necessarily general, at least in the early stages, and may be more marked in the region of one joint or one limb. This vascular deterioration leads to a relative

malnutrition and consequent degeneration of structures whose blood supply is defective, and this is the primary cause of osteo-arthritic changes. Adjuvant to this is no doubt the fact that many joints the subject of osteo-arthritis have been previously inefficient as a result of congenital malformation, previous disease, trauma, or prolonged strain. It is not difficult to show the connexion between the type of damaged hip-joint occurring in such common childish orthopaedic disorders as congenital hip disease, coxa plana, and slipped epiphysis, and their correlates in osteo-arthritis of later life. Similarly, fracture within the capsule of a joint is frequently, if not usually, followed by some degree of osteo-arthritis. Secondary changes of a similar nature may be found as end-results of inflammations of various kinds occurring in joints, and should be regarded as not unexpected degenerative changes in a damaged joint rather than as an essential part of the original disease process. Thus it is not uncommon to obtain a history of previous trouble in an osteo-arthritic joint such as dysenteric arthritis in the hip, gonococcal arthritis in the knees, toxic arthritis in any of the large joints, and rheumatoid arthritis in the small joints.

In this connexion I may mention the menopausal or climacteric arthritis not uncommon in the knees and first metacarpal joints of middle-aged women on which Dr. F. G. Thomson and I laid stress.² Many people regard this type of arthritis as osteo-arthritic *ab initio*, but we believe that while it often does end in an osteo-arthritis, if properly treated by increasing the local synovial activity by heat and other means and by redressing the endocrine deficiency, especially that of the thyroid, the original arthritic process can be cured before any osteo-arthritis has supervened.

In other cases in which the osteo-arthritis is apparently primary it will be found that the joint has been subjected to a long succession of minor traumata or severe muscular strain. Witness the frequency of osteo-arthritis of the hips in those who hunt regularly, of the lumbar spine in gardeners, and of the fingers in tailors.

Pathology

The essential of osteo-arthritis is a defective circulation in the joint, and the result of this is that the centre of the cartilage begins to degenerate, becoming thinned and ridged (fibrillation of cartilage). Then the margins of the cartilage show proliferation and irregular lipping, and excrescences may form. These may become ossified and the outgrowths may become detached, so that loose bodies escape into the joint cavity. The synovial membrane may show signs of inflammatory reaction, but this is never so intense as in the rheumatoid joint, nor does proliferation occur with a pannus creeping over the cartilaginous surface. The bone, as has been said, shows

* Read to the Manchester Medical Society, October 2nd, 1935.

areas of degeneration often cystic in appearance, and compensatory osteophytes develop, while surfaces exposed by erosion of cartilage eventually become hard and shiny (eburnation). The capsule and ligaments are at first fibrosed, but in late stages may disintegrate and disappear. This leads to marked deformity of the joints, since the muscles may form new and unusual bony attachments and pull the bones out of position.

Symptomatology

The symptoms of osteo-arthritis are pain, stiffness, and limitation of movement, and in late stages marked deformity of the joint. Pain is very inconstant and sometimes difficult to explain, since a joint which is very obviously distorted in the x-ray picture is not the seat of specially severe pain, while a patient who complains of agonizing pain may show comparatively little change in the joint. Two factors would seem to determine pain. First, the exposure of soft bone by the destruction of the superjacent cartilage; this may explain why certain movements of joints are intensely painful while other movements are painless. In chronic cases eburnation may take place. The exposed bone becomes hardened and shiny like ivory, and movement on this surface is not apparently painful. The denudation of cartilage seems to be the result of pressure on degenerating tissue, and it is therefore more common in the weight-bearing joints than in the others.

The other factor in pain production is muscular spasm. That this is important is shown by the fact that occasionally a person who has suffered considerable pain may be entirely relieved of this after a hot bath, and walk away in complete comfort for a time. Such patients have even believed themselves cured, only to be bitterly disappointed an hour or two later by the return of the pain as the spasm reasserts itself. This observation would seem to throw doubt on the statement that muscle spasm is nothing but a reflex protective mechanism to guard the joint from undue movement and its resultant pain. In cases such as those described above movement is taking place, but there is no pain, and in hip-joint cases there may be intense spasm of the adductor muscles quite out of proportion to that in the other muscle groups surrounding and protecting the joint. This suggests that such spasm may be due to direct reflex irritation through the neuronic arc and segments associated with innervation of the joint quite irrespective of the function of protection against pain originating within the joint. These muscular spasms are, however, themselves painful, and may therefore contribute materially to the discomfort and distress of the patient.

The feeling of stiffness and the objective limitation of movement may be considered together. That either is due to the mechanical obstruction of osteophytic outgrowths or loose bodies in a joint may occasionally be true, but the relative freedom of movement of very stiffened joints under an anaesthetic shows the infrequency of this. Even where such movement is very restricted under anaesthesia, this is more often due to thickening of the capsule than to actual bony obstruction.

The chief causes of stiffness and limitation are the above-mentioned muscular spasm and the consequent fibrositis which develops in the affected muscles.

Fibrositis is either infective or metabolic, and in elderly people most often metabolic. The primary factor in metabolic fibrositis is the inefficiency of the circulation in removing the waste products of muscular action. It must be remembered that the efficiency of venous return depends in large measure on the contraction of muscles, and so when fibrositis starts, a vicious circle is established: more and more irritant waste material collects, more and more unelastic fibrous tissue is laid down to

localize this, and so the stiffer and more immobile do the muscles become.

As will be seen when we come to discuss treatment this fibrositic element is of great importance, since it can be in large measure removed. The limitation of movement is by no means the same in all directions. The best example of this is the comparative freedom of movement in flexion and extension of the osteo-arthritic hip-joint when contrasted with the extreme limitation of abduction, adduction, and rotation. While changes in the bony architecture of the femoral head and acetabulum are to some extent responsible, fibrotic changes in capsule ligaments and muscles are chiefly at fault. This is even more so in the case of the shoulder-joints, where the bony changes are much less obvious and later in development, but in which the thickening and contractions of capsule and ligaments cause much pain and restriction of mobility.

Diagnosis

The diagnosis of osteo-arthritis, while suggested by pain, stiffness, and limitation of movement in a middle-aged or elderly person whose joint has been subjected to previous arthritis or violent or long-continued trauma, can only be confirmed by radiography. Such radiographs must not only show outgrowth of bone but also areas of rarefaction. The diagnosis is made more likely if there are signs of arterial degeneration and circulatory deficiency, local or general, while the presence of fibrositis in the surrounding muscles is important, since it may mask an osteo-arthritis, and the latter should always be excluded, though it is probably more common to find a patient labelled as osteo-arthritic when he is only fibrositic than the other way about.

As has already been indicated the distortion of joints and deformity of the limbs which occurs in late cases is due to contraction, stretching, and even disintegration of the capsule and ligaments and tendons in and about the joint.

Prognosis

The prognosis of osteo-arthritis must eventually be bad, since it is a slowly progressive process which must in the end disorganize the joint. In spite of this gloomy outlook, however, there is no question whatever that much can be done to arrest or at least slow down the progress of the disease and to relieve the patient's worst symptoms. The achievement of medicine in the last hundred years has not been perhaps to prolong life to such a very great extent, but to prolong fitness, so that instead of a man being too old at 40 he is often hale and hearty at 70 and a really useful citizen at 65. This has been achieved by preventing, or at least postponing, the encroachment of physical and mental degeneration which must eventually rob us of all our faculties, including the power to live. Such an achievement is creditable so far as it goes, but it ought to go further, and osteo-arthritis is one of the diseases which may benefit by our advances in knowledge and in skill.

General Treatment

In my view the possibility of treatment of the osteo-arthritic lesion itself, once it has been established in anything like an advanced stage, is very strictly limited, but I believe that much can be done to prevent development to that stage.

The treatment of osteo-arthritis is general, local, and adjuvant.

The general treatment must be directed to preventing degenerative disease, especially arteriosclerosis and cardiovascular disease. To this end appropriate dietetic measures and drugs are indicated, while certain forms of physical

treatment are useful. These are directed to increasing the efficiency of heart and kidney, more particularly by decreasing their load by dilating the superficial capillary bed and increasing the action of skin and bowels. If the physician can persuade himself that a focus of infection is contributing to the general degenerative process, then such a focus should be removed so long as the strain involved in its removal does not prove too much for the frequently elderly and sometimes feeble person, so that he "dies of his cure."

Local Treatment

The local treatment must be directed to increasing circulatory efficiency in the joint, relieving pain, and reducing muscular spasm.

At one time protein shock, which by its pyrexial effect "shook up" the circulation, had a vogue in the treatment of osteo-arthritis, and often for the time being produced favourable results, but on the whole relapses were found to occur, and the last state of the patient was no better than the first. Derived from this type of treatment are many others—large doses of vaccines which produce definite reactions, sulphur injections, and, more recently, gold injections, the resultant reception of the precious metal being more obviously beneficial to the physician than to the patient, at any rate in the osteo-arthritic group.

Of more direct benefit is the local application of heat by means of diathermy, radiant heat, and hot douches, which latter, incidentally, should be given for their thermal rather than for their percussion effect, and consequently should not be too violent, since anything like trauma to the joint is to be avoided at all costs.

For the same reason massage, which is referred to below as essential in the treatment of the concomitant fibrositis, must not be given to the joint itself, although when given to surrounding soft parts it may have a direct use in improving both blood and lymph circulation.

In a condition which is in many cases largely due to major or minor trauma, anything like forcible manipulation can have no place, although careful passive movement, especially if carried out in hot water such as can be provided by the large pool bath, may be of great service. For the same reason many of the surgical operations proposed for the relief of osteo-arthritis have proved disappointing or even harmful. The enthusiastic surgeon must remember that the osteo-arthritic patient is too often elderly and arteriosclerotic, and so a bad subject for prolonged and extensive operations which involve much shock. If one hip only is involved arthrodesis (if it can be brought off) is far the most satisfactory operative procedure, but sometimes the unhealthy bone refuses to unite, while in other cases the other hip rapidly becomes as bad as was the first, and a double arthrodesis is not practical politics. In a recent paper Mr. McMurray advocates the relatively simple Lorenz operation,³ and there seems to be much to commend it.

Splinting may give much relief and effectually prevent further destruction of the joint, and for hip and knee cases a well-fitting walking calliper is of great service. It is, however, often difficult to persuade the conservatively minded and short-tempered old lady or gentleman to harness themselves with this "piece of damned iron-mongery."

Adjuvant Treatment

Apart from this direct treatment of the osteo-arthritic joint I believe that osteo-arthritis is almost always accompanied by fibrositis in the muscles surrounding the joint. This is noticeable in cases of hip-joint disease, but still more so in cases of reputed osteo-arthritis of the spine. I use the word "reputed" deliberately because so-called spondylitis osteo-arthritica is so often no more than a

mild degree of lipping at muscular insertions inevitable in those whose occupation has subjected their back muscles to severe and continual strain. Many such subjects, however, present themselves with really severe pain and stiffness of the back and a diagnosis of osteo-arthritis of the spine with a correspondingly gloomy prognosis. In many such cases the osteo-arthritis is minimal and the accompanying fibrositis maximal, and the chances of successful treatment of the fibrositis, and therefore of the patient's disabling symptoms, are eminently favourable if the condition is understood and the correct methods used.

If the pathogenesis of fibrositis is appreciated as frequently due to the failure of elderly patients to eliminate their metabolites then it becomes clear why it is so often found in conjunction with osteo-arthritis; and since fibrositis is an essentially treatable condition, the outlook for the alleviation of the patient's worst complaints and disabilities, when the arthritis is not too far advanced, is correspondingly rosy.

I believe that the theory that fibrositis is dependent on infective foci has been much overstated. I do not wish to suggest that such foci should not be sought for, or that when they can be removed without too much consequent disturbance of the patient that they should not be extirpated for the benefit both of the osteo-arthritis and of the fibrositis. I do believe that they may be directly responsible for fibrositic reactions, and also that the whole metabolic balance may be upset by such foci, but in other cases the metabolism may be deranged and fibrositis initiated as a result of entirely different causes. It is true that inflammatory reactions of the synovial membrane are met with in osteo-arthritis, and these may indicate a secondary low-grade infection, but such reactions are not nearly so constant or obvious as in the rheumatoid type of arthritis. Hence, in osteo-arthritis and in the fibrositis of elderly people I would most strongly deprecate the wholesale clearing of a mouth without due care and consideration, and I cannot say that I have been much impressed by the ultimate results of removal of tonsils in persons over 35 as a means of "cure" for either of these conditions. With regard to fibrositis I believe that in the majority of cases of fibrositis in middle-aged and elderly people the fault is primarily metabolic, and due to impaired circulation and faulty elimination, and that this is specially the case in muscular fibrositis.

It will be seen, therefore, that the same sort of bodily condition as is apt to be associated with osteo-arthritis may form the soil on which fibrositis is grafted. Moreover, the two disease processes play into each other's hands. The muscles round a joint which is the seat of disease are required to act as splints. This involves increased tone, increased strain, decreased mobility, and decreased circulatory efficiency, all of which promote the development of fibrositis. With the fibrositic involvement the muscles become less efficient and tire more easily. As a result the splint from time to time gives way, and so the joint is subjected to minor but recurrent traumata, with a resultant intensification of the osteo-arthritis. This vicious circle may continue till all the muscles round the joint are affected both by the increasing fibrositis and by the increasing spasm. It is true that the greater the postural tone of the muscle the more efficiently will it act as a splint; but increased tone soon passes into spasm, and the decrease of its efficiency arising from the resultant and accompanying fibrositis means that postural tone has got to be bolstered up by fibrositis, and this may lead in the end to severe contractures and deformities. As has already been said, the spasm and contractures themselves are responsible for a great deal of pain, and if these have not been prevented in the early

stages division of such contracted muscles, as, for example, in the adductors of the hips, may give enormous relief and restoration of mobility to the joint even in late cases, at least for the time being.

From these considerations it is clear that all the disability of the osteo-arthritis does not depend entirely on the condition of his joint, but that, as in many other diseases, processes which have begun as Nature's effort to relieve the patient have gone too far and themselves become disabilities. The chief of such secondary disabilities is undoubtedly fibrositis, and in every case of osteo-arthritis this condition should be sought for and treated.

Fibrositis may be recognized by the presence of "nodules." These are hard nodes or bands which can be felt against subjacent bone when the muscle is relaxed. The examining finger requires a certain amount of education to detect these, but once the physician really recognizes the feel of them there is little or no difficulty. The nodules may or may not be tender, and if not tender they are a potential, if not an actual, source of distress to the patient. In the cases under discussion, however, the nodules are usually exquisitely tender, and the patient will squirm and contract his muscle when they are pressed, and will often complain of pain referred down the distribution of an adjacent nerve trunk.

The objects to be aimed at in the direct treatment of fibrositis—that is, irrespective of promoting general health or removing septic foci with due precautions—are threefold:

1. To break down the fibrous nodules and liberate the imprisoned toxin.
2. To promote local and general circulatory efficiency so that these toxins may be cleared from the muscles and fibrous tissue and conveyed to the excretory organs.
3. To encourage elimination, especially by the skin and kidneys.

The first object can, I believe, only be efficiently attained by massage, but just any massage will not do. The masseuse must first of all have trained her fingers to discover the nodules in the muscles. She must then have learnt how to manipulate them against subjacent bone so as to rub them away, and she can only do this if she knows how to get the particular muscle which she is treating properly relaxed. She must realize that at any rate at the beginning of treatment this massage is painful for the patient, and so she must temper the wind to the shorn lamb. At the same time she must persevere, and have the tact to make her patient persevere, because he will not get better until the nodules are removed. Neither the patient nor the physician should be unduly alarmed by the appearance of bruising as a result of the massage, since with the brittle condition of small vessels this may be inevitable if the breaking down of the nodules is efficiently carried out.

The massage may be given "wet" or "dry." Wet massage, generally given by the Aix or Vichy method, has the advantage that the continuous application of hot water in the form of a douche or rain helps to reduce muscular spasm and relieve pain. If, however, a really skilled masseuse is prepared to devote time, patience, perseverance, and sympathy to her patient, I believe that dry massage is preferable, since more time and care can be given to locating and removing individual nodules.

The improvement in circulation is best brought about by the combined thermal and percussive action of hot douches applied locally to the muscles but not to the joints, while similar results may also be induced by radiant heat, diathermy, etc. Similar methods may be used to promote elimination by the skin, and, in my

opinion, the deep pool bath with the undercurrent douche of water hotter than the main bath is the most generally useful treatment. Since this has been mentioned as a good rational treatment for osteo-arthritis it is doubly useful for the treatment of such patients as we are at present considering.

Renal elimination may be promoted by fluids, especially by certain of the natural waters.

A word may be said, in conclusion, as to diet in osteo-arthritis and fibrositis. There is no specific diet for either of these conditions, yet diet is important. Each individual must be considered on his own merit. If he weighs too much he must be rationed in his carbohydrates, for overweight must be very bad for a damaged weight-bearing joint. If he is plethoric and shows a tendency to hyperpiesis, he must be rationed in his purines, because arteriosclerosis and cardio-renal degeneration must be checked at all costs. Similarly, protein and salt in the diet must be considered in relation to renal function.

Since metabolic disturbances are largely responsible for the conditions under discussion, indigestion must be prevented if at all possible, and in this respect diet may be of the greatest importance. In fine, do not treat the joints of an osteo-arthritis, treat the patient.

Conclusions

1. Osteo-arthritis is a degenerative disease occurring as a rule in elderly patients with failing circulation and elimination, and affecting joints previously damaged by strain, trauma, or disease.
2. The essential pathology is a degenerative change in the central cartilage leading to thinning, ribbing, and finally disappearance, with exposure of underlying bone. The bony changes consist of formation of exostosis and eburnation of exposed parts. The capsule and ligaments are at first fibrosed, but may eventually disappear, leading to new muscular attachment.
3. The pain in osteo-arthritis is due to pressure on exposed bone and muscular spasm.
4. Stiffness and limitation of movement are only occasionally due to exostoses and loose bodies, but generally due to fibrositis, muscle spasm, and fibrosis of the joint capsule.
5. Deformity is due to changes in bony architecture and to new attachments of muscles pulling the bones out of position.
6. Prognosis, though eventually bad, should not be too gloomy, since much can be done to stop or delay progress and to remove the concomitant fibrositis.
7. General treatment consists of measures to arrest cardiac, renal, and vascular degeneration, especially those which will dilate the capillary bed and promote elimination by skin, kidney, and bowels.
8. Local treatment is directed to increasing circulatory efficiency of the joint, relieving pain, and reducing muscular spasm.
9. No trauma must be applied to the joint, therefore manipulation must be carried out with the greatest care, and operative procedure is only applicable to carefully selected cases.
10. Splinting is often very useful, especially the walking calliper in hip and knee cases, if the patient can be persuaded to tolerate it.
11. Adjuvant treatment is chiefly directed to the accompanying fibrositis. In the elderly subjects of osteo-arthritis this will consist of the right kind of massage and eliminative methods, chiefly in the form of physical and hydrotherapeutic procedures.
12. Removal of septic foci will only have a secondary place, since both the osteo-arthritis and the fibrositis are chiefly due to metabolic changes consequent on vascular degeneration and faulty elimination.

13. Diet in fibrositis and osteo-arthritis is not specific, but is often of importance in so far as it may reduce obesity, prevent cardio-renal degeneration, or preserve the patient from metabolic disturbances due to indigestion.

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SEA BATHING IN THE TREATMENT OF SURGICAL TUBERCULOSIS*

BY

SIR HENRY GAUVAIN, M.D., M.CHIR., F.R.C.S.

MEDICAL SUPERINTENDENT, MORLAND CLINICS, ALTON, AND LORD
 MAYOR TRELOAR CRIPPLES' HOSPITAL, ALTON AND
 HAYLING ISLAND

It is strange that while the value of properly planned sun bathing in the treatment of surgical tuberculosis is now universally recognized and applied, comparatively little attention has recently been paid to sea bathing in this disease. Yet it has a very real claim on our consideration.

Two Pioneers of Sea-Bathing Treatment

It is unnecessary to go at length into the history of sea bathing from its therapeutic aspect, but mention must be made of two of the pioneers in its use: one Lettsom, a physician of great distinction, who was a founder of the Medical Society of London and of the Sea Bathing Infirmary at Margate; the other, now almost forgotten, a certain Dr. Richard Russel, generally called "Seawater Russel," who was born in 1687 and died in 1759. Russel wrote two books on the efficacy of sea bathing and sea-water drinking in the cure of various diseases, more especially in tuberculosis of the glands, bones, and joints, and scrofulous diseases generally. He claimed that he wrote from the outcome of years of observation. He said that he had noticed that fishermen rarely had scrofulous diseases, and that their women had good complexions, beautiful teeth, and sound gums. He described how children who were delicate and pale, overclad and glandular, when sent to him for treatment, had been returned to their parents after sea bathing, bare-necked, bare-headed, tumours of the neck cured, and countenance healthy. He supports his claims with convincing details of many cases successfully treated. Doubtless a measure of his success was due to necessarily synchronous sun bathing, but the value of sunlight appears to have escaped him. He practised at the little village of Brighthelmstone, now Brighton, which owes to him its popularity, and it is worthy of note that Russel's first book made him famous at the advanced age of 63. His success was instantaneous and amazing. Sea bathing became a popular and fashionable cure, and its devotees soon turned it into a national pastime. Everyone who was anyone essayed cure by dipping into the brine.

The value of the summer holiday by the seaside is now such an accepted fact in English life that it is difficult to remember that it was unknown until the reign of George II, and only became really popular when George III made Weymouth "Royal." Before Russel died he had made the reputation of Brighton, and it has continued to rise steadily in favour and popularity. Russel's works had an enormous vogue both at home and on the Continent. But in England the pleasures of sea bathing became so overwhelming that its therapeutic

effects were soon forgotten. On the Continent Russel's books were still read well into the nineteenth century, and Michelet, in his poem, *La Mer*, calls him "Inventeur de la Mer"; there seems no doubt that he was the father of all seaside pleasure resorts.

Lettsom, much impressed by Russel's work, founded the Sea Bathing Infirmary, now the Royal Sea Bathing Hospital at Margate. As Johnston Abraham says in his delightful *Life of Lettsom*, from which I have freely quoted, Lettsom's fame is made secure by the fact that he is the father of all the open-air sanatoria throughout the world, because he founded the Sea Bathing Infirmary. Continental observers have grasped this, and it does not matter in the least that it was thought that sea water rather than sunlight effected cures at Margate. From the start this hospital had an open-air solarium for the patients, suggested and insisted upon by Lettsom, who had a passion for sunlight and fresh air.

An Experiment in France

Following the Napoleonic wars an increased and virile population became an essential requirement in France. Tuberculosis was rife in both its pulmonary and its surgical forms. Measures to combat and, if possible, to cure the disease engaged active attention. A commission appointed by the French Government heard rumours of the success of a fishwife at Berck-sur-Mer, a tiny fishing village near Boulogne. Her methods were investigated, and it was found that she cured scrofulous and deformed tuberculous children by the simple method of merely exposing them to sun, air, and sea water on the wide beach at Berck. The hint was taken, and a large municipal hospital was erected at Berck, to be followed by numerous other institutions. These continue their beneficent work to this day; but a point of great interest, common both to Margate and to Berck, is that while the value of heliotherapy is increasingly admitted and utilized, sea bathing has been neglected and as a therapeutic measure almost forgotten and abandoned. It is my purpose to emphasize its value and explain the technique of its practice.

My own interest in, and love of, sun and sea bathing dates from childhood, and I attribute much of the good health which I have enjoyed to long summer holidays, both as schoolboy and as student, spent on or in the sea. When it fell to my lot to start the Cripples' Hospital at Alton in 1908 I immediately practised sun treatment on the children under my care, and I would remind you that sun bathing for therapeutic purposes was at that time unknown in England. Similarly, as soon as the hospital was able to secure a marine branch, I started sea bathing as a therapeutic measure.

The Marine Hospital in Treatment of Tuberculous Cripples

It is well established that during a long and trying illness climatic change and altered environment may often be utilized with advantage. For the children of the well-to-do that is a simple matter, but the need exists equally for the hospital patient. It was to meet this need that we established a marine branch at Hayling Island. The advantage of having two institutions, the one inland and the other at the seaside, under the same management and control, so that continuity of treatment as well as climatic change may be satisfactorily ensured, must be obvious. But there are certain desiderata in the site selected that should be fulfilled. The climate should be mild and equable; there should be abundant sunlight of high actinic value; the rainfall should be low; there should be absence of mists and fogs, and there should be no atmospheric or water pollution. The hospital should be situated right on the beach and in the closest proximity to the sea safely attainable. It should be remote from a town, so that patients have unrestricted

* Presidential address to the Section of Public Health at the Annual Meeting of the British Medical Association, Melbourne, 1935.