reduced, and the last state has been far worse than the first. This has not been so strikingly evident as in the case of tuberculin, but the principle has been the same. Dosage has been far too large, and the reactions have not been studied with sufficient care. The programme has been issued by the bacteriologist in the laboratory, and not by the doctor in charge of the case—another example of the dangerous modern tendency to exalt the laboratory worker and depreciate the clinician. In many cases the failures have passed out of sight, and the bacteriologist has only seen the successes. Without embarking upon a general discussion as to the value of vaccines, I would say that they are worthy of a trial, especially in the more acute cases in young people. It is essential, however, to start with minimal doses. I prefer to try 100,000 at first, and to increase or diminish in accordance with the reaction obtained. I insist on a chart being kept of the temperature, taken twice daily, while it is also desirable to record on the same chart the daily variations in local and general symptoms. By this means the effect of vaccines and of other measures can be watched and controlled, and by such a system alone can the treatment of arthritis be properly carried out. I do not deny that good results have been obtained by the old method of heavy dosage, but in such cases I believe the principle has been one of protein shock on a modified scale. This ought to be abandoned as too dangerous for use in any but the most expert hands.

The discussion of other methods of treatment is outside the scope of this paper. It must be admitted that the scantiness of our knowledge of the etiology and treatment of arthritis is a reproach which calls urgently for remedy, and I believe it would be a considerable blessing to all classes, and especially to the industrial, if this great Association would undertake the organization and co-ordination of research into this subject.

THE ETIOLOGY OF DYSIDROSIS*

BY

G. B. DOWLING, M.D., M.R.C.P.

ASSISTANT PHYSICIAN, SKIN DEPARTMENT, GUY'S HOSPITAL;
DERMATOLOGIST, WEST LONDON HOSPITAL

Dysidrosis, signifying "difficult sweating," was the name given by Tilbury Fox in 1873 to a condition which he defined in the following way.

"The disease is characterized especially by the retention, in the follicles of the skin, of sweat rapidly and freely secreted. The follicles are much distended, and the retention of the sweat and the distension of the follicles are followed secondarily by congestion of the sweat follicles, by the formation of bullae, maceration of the epidermis, and, it may be, more or less dermatitis. The disease bears the same relation in fact to the sweat follicles as does acne to the sebaceous follicles. . . . In its slightest form it is confined to the hands, occurring in the interdigits, over the palm and along the sides of the fingers, and on the palmar surfaces, some or all of these parts. The eruption makes its appearance in those who habitually sweat freely and generally in the summer, but oftentimes in the winter, and the patients attacked complain of feeling weak and depressed. The eruption is made up in the first instance of minute vesicles deeply embedded in the skin. The vesicles are at first isolated. They do not readily burst, and when they have existed for a few days, the affected part is just as though a number of boiled sago grains were embedded in the skin. There is always some itching and a good deal of burning present with the eruption. . . . Eventually the vesicles run together into the form of aggregated masses of small or large bullae. . . . If the vesicles and bullae be left undisturbed the fluid is partly absorbed, the cuticle then peels off leaving

a non-discharging reddened exposed derma, but the cuticle, especially about the roots of the fingers, may become sodden like wet chamois leather."

He goes on to say that the eruption may be complicated by a rash more or less general over the body:

"This eruption is similar to that of lichen tropicus or miliaria; it is hyperaemia of the sweat follicles. It is very itchy. The same state of things as exists in the hands may be present in the feet. . . . In some cases when the out-poured sweat goes, a red, dry, slightly scurfy, painful, sometimes awfully painful, surface is left behind and becomes chronic. Patients in whom this occurs are thin, pale, anxious-looking, depressed, and so on. The disease lasts ten days or so in some cases, but in others for two or three weeks."

As the cause Tilbury Fox supposed a disturbance of the innervation of the sweat glands, which might lead to a sudden influx of sweat, the flow being so rapid that it dilated the sweat duct and blocked it by pressure from below the spiral portion of the duct. Three years later (1876) Jonathan Hutchinson described, in his *Illustrations of Clinical Surgery*, a condition which he named cheiro-pompholyx. This was plainly identical with that already referred to by Tilbury Fox as dysidrosis. He did not consider it to be connected with the sweat apparatus. There followed a rather heated discussion between Tilbury Fox and Hutchinson in the *Lancet* and *British Medical Journal*, into which others, including Thin, Livsey, Radcliffe, Crocker, and Cummings of Edinburgh, were drawn. The last-named claimed that the condition had been known to him for thirty years, and attempted to settle the divergence of opinion by stating that dysidrosis was plainly a manifestation of gout.

The first histological examination was made by A. R. Robinson in 1877. In this the sweat glands were found to be perfectly normal, and there was no distension whatever of their ducts. The process was found to consist of an escape first of serum, and later of serum and white corpuscles, from the blood vessels of the papillae. The serum pushing its way upwards among the cells of the rete Malpighii and pressing them aside, collected in the form of vesicles either in the upper part of this layer or between the rete and the corneous layer. The subcutaneous tissue was found to be normal, but a considerable round-cell infiltration was found in the upper part of the corium.

A further careful histological study of dysidrosis was made by Winklereid Williams, who, as he suffered from the condition himself, had ample material to work upon. He made several hundred serial sections from five portions of skin. In no case was any connexion observed between the sweat pores and the vesicles. The appearance in several sections might have suggested that the vesicle was a dilatation of the sweat duct, but serial examinations proved that there was no communication between the coil and the vesicular cavity. In the majority of cases the sweat pores and ducts were at some distance from the vesicles. The changes Williams pointed out were those of vesicular eczema. A histological investigation by Darier also failed to demonstrate a direct implication of the sweat apparatus.

In 1919 Darier published in the *Lancet* an article setting forth his views on this question. He regarded dysidrosis simply as a vesico-bullous dermatitis, later on squamous in type, having as its essential character the limitation to the hands and feet. When they were not artificial, professional, or medicamentous dermatoses the dysidrosiform eruptions were mostly, and probably always, of mycotic nature and due to the epidermophyton. Thus Tilbury Fox's view of the anatomy of dysidrosis would appear to have been disposed of, particularly as he made no histological study of the condition and appears to have based his opinion purely upon naked-eye appearances and association with hyperhidrosis. Sabouraud and

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Brocq, however, both disagreed with Darier's views on dysidrosis, and in 1924 Sicoli, a pupil of Sabouraud, attempted by histo-pathological investigation to reaffirm Tilbury Fox's contention. Some of his sections exhibited dilatation and rupture of the intra-epidermal portion of an occasional sweat duct in cases of dysidrosis; the dermal portion of the duct and the coil glands were, however, undamaged. In these cases microscopical and cultural examinations had failed to reveal the presence of fungus of any kind, and the author regarded them as examples of true dysidrosis. It may, however, be argued that the intra-epidermal portion of the sweat duct would naturally be involved in the general disorganization of the epidermis that occurs in vesicular eczema, and this investigation cannot be said to have proved anything except perhaps the existence of a non-mycotic variety of dysidrosis.

To-day there are many who, like Darier, decline to admit the existence of true dysidrosis, believing that the condition is merely a special aspect of a number of well-known dermatoses. Of these, by far the most important is mycotic infection. The fungus is almost always the epidermophyton, which has a predilection for moist surfaces, especially moist intertriginous surfaces, and which is extremely prevalent in England nowadays. The interdigital spaces of the toes are very commonly attacked, and the infection may be present in that situation for years without causing much annoyance. The spaces are generally, though not always, lined with tough, dead-white, sodden epidermis, particularly between the little and fourth toes. This is sometimes regarded by patients as a normal state of affairs unworthy of notice; but they quite often seek advice for a dysidrosiform eruption of the hands, of the feet, or of the hands and feet. Microscopical examination in liquor potassae of a scraping of sodden epidermis from an interdigital space, or of the roof of a vesicle on the foot, reveals the presence of mycelium, often in abundance, but sometimes difficult to find. Conversely, a search for fungus in the hand is often unsuccessful. It has been demonstrated by experiment in the human subject that the epidermophyton secretes an endotoxin which, entering the blood stream, can give rise to a dysidrosiform eruption on the palms, fingers, and soles—an epidermophytid. The eruption on the palms and fingers, however, may, like that of the feet, be due to direct infection. Ringworm infection disposes of a very large proportion of the cases of dysidrosis; in fact, the fungus has been found in every case of dysidrosis that I have seen this summer. In one of these the interdigital spaces of the toes were quite normal. The thrush fungus (*Monilia albicans*) and other varieties of monilia are also capable of causing dysidrosis. These fungi are rather difficult to see in a direct examination, and though they may appear in cultures, it is generally recognized that they are capable of thriving on dermatoses that they have not themselves created. Further work will be necessary to establish the role of fungi of the monilia group in dysidrosis.

Exogenous irritants may produce a condition objectively identical with dysidrosis of the hand. The subjects attacked are chiefly those who suffer from hyperidrosis of the palms and soles. Again, it may be a manifestation of seborrhoeic eczema. It is well recognized that seborrhoeic eczema of the scalp and other parts may be accompanied by an eruption of the palms and soles identical with dysidrosis. Dysidrosis may complicate eczema of any type—for example, lichenified eczema of any part, chronic varicose eczema, and pruritus ani with eczematization. In such cases dysidrosis is probably due to sensitization of the skin generally by the products of tissue autolysis derived from the primary foci. Dysidrosis may

complicate seborrhoea, or seborrhoea with pityriasis of the scalp. Here the important factor would appear to be the hyperidrosis which generally accompanies this state.

Having thus considered the cases of dysidrosis complicating other dermatoses, it is necessary to inquire whether any cases may be regarded as idiopathic, or true, dysidrosis. Evidently the conception of Tilbury Fox must be completely abandoned, for it has been demonstrated beyond reasonable doubt that dysidrosis is vesicular eczema. Nevertheless, the fact remains that there are many who, in the apparent absence of any of the causes already mentioned, develop dysidrosis regularly every summer or at intervals throughout the year. The only obvious cause would appear to be hyperidrosis, from which the patients invariably suffer. Mild cases, affecting only the lateral aspects of the fingers, are more common than severe cases. In some, the vesicular phase is lacking, and here the early lesions resemble air bubbles, some of which become confluent to form polycyclic figures.

The association of dysidrosis with hyperidrosis, and the occurrence of the attacks at times when sweating is particularly profuse, suggest that the sweat itself is perhaps the causal irritant. Patients may conceivably become sensitized to their own sweat. Unfortunately, owing perhaps to the difficulty of collecting sweat in adequate quantity, its composition in pathological disturbances of the skin such as dysidrosis has not yet been the subject of research. Future study will no doubt determine the precise relation of the sweat to the condition which we now regard as idiopathic or true dysidrosis.

Memoranda

MEDICAL, SURGICAL, OBSTETRICAL

SCLEROSING SOLUTION FOR INJECTION OF VARICOSE VEINS

A number of solutions are to-day being used for sclerosing varicose veins; some of them are dangerous, and have caused serious, and even fatal, after-results. The safest injections for the purpose, and perhaps the most effective of all, are the NaCl solutions; pure, they have a marked proclivity to sloughs should any of the fluid become perivascular, otherwise they are perfectly safe in any reasonable amount.

THE SOLUTION

For over a year I have been using a 20 per cent. NaCl combined with an active material from saponified cod-liver oil. It is free from the disadvantages of pure NaCl solutions, and is most effective in sclerosing the veins. In salting out special solutions from various unsaturated fatty acids, the filtrate invariably had a low surface tension. Eventually the solution was standardized to a surface tension of approximately 0.80, as ascertained by the drop method. The pH of the solution lies between 9 and 9.3, and there is present a small quantity of a substance which appears to be the sodium salt of some resinous compound; the amount of the latter is only about 0.15 per cent.

RESULTS

I have now given some 2,000 injections with the solution, and have yet to record a single case of local or general complication, either immediate or remote. These results may be accounted for by the fact that the solution is almost a physiological one, containing as it does less than 0.2 per cent. of the sodium resin referred to above. This small amount is, however, enough to change the physical and chemical properties of ordinary salt solutions. It has a