

Section of Dermatology

President—MAJOR W. J. O'DONOVAN, R.A.M.C.

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DISCUSSION ON PREVENTION AND TREATMENT OF PARASITIC DISEASES

Some Recent Work on the Louse

By Professor P. A. BUXTON

It would be true to say that in any sort of applied biology one is always interested in the question of numbers of animals, that is to say, in populations. An agricultural entomologist does not want to know that a certain locust lives in a certain country; the question is a numerical one: are there enough locusts to eat the crops? Similarly the medical officer of health wants to know what part of his population is lousy, whether one race, sex, or age is affected more than another, or whether the incidence is higher at one season than at another.

When transmission of disease is involved this matter of populations is extremely important, because one does not get transmission of disease by biting insects if they are scarce. Take, for example, the disappearance of typhus. No one can pretend that the louse has disappeared from this country, but typhus has. Up to 1880 the deaths from typhus for England and Wales were round about 1,000 a year. By 1890 they had fallen to about 100. After 1910 they were never above 10 in the year, and the last typhus death was in 1918. A number of causes may explain this decrease, including better personal hygiene and a reduction in the numbers of lice, but not by any means their disappearance. The same kind of result has been observed in other places. If one has to deal with an epidemic of louse-carried disease one can bring it to an end by achieving a partial control of the insect.

Six or eight years ago in the London School of Hygiene and Tropical Medicine we began to study populations of lice. We knew that if hair were dissolved in alkaline solutions of sodium sulphide one could recover the cuticles of the lice. We applied that simple technique on a large scale to samples of hair received from a number of places in Africa and Asia. The kind of thing we wanted was unselected samples of the local population; the best material that we could get was from the people admitted to certain jails. The first fifty people admitted each month had their entire scalp shaved and the whole of the hair was sent to us in an envelope with a brief statement as to age, sex, &c. We boiled the hair down with sulphide and took out the infesting lice, if any were present. We have done that with more than 3,000 complete crops of hair, of which 800 or 900 proved to be infested with the head louse. One must admit that our sample comes only from the population admitted to jail, and it is not possible to get a fair sample of the whole population of a country. Nevertheless, if we have the jail figures for a couple of years one can at least say whether there is a seasonal difference in the distribution of head lice, whether members of one racial or religious group are more or less infested than members of another, whether young jailbirds are more infested than old ones, and so on.

What we discovered is that the most important factor influencing the distribution of head lice among people is the weight of the individual's crop of hair. We have shown

with hair from six or seven different places that there is a strong positive correlation between weight of hair and frequency of infestation. The people with heavier crops tend to be more often and also (though that is another story) more heavily infested.

Most of the other factors we have looked into, such as sex, religion, and occupation, seem to be quite unimportant, though at first sight they may appear to have importance. For instance, among people in jail in Colombo, Ceylon, we found differences between members of different religious communities in the matter of lousiness. But this is simply due to differences in customs in cutting the hair; within one group (e.g. those with 10 to 20 grm. of hair), the difference between religions disappears. Although women, in several countries, are more infested than men, that again is probably due to the greater weight of hair they carry.

In several places from which we have received material, children are more infested than adolescents and adolescents than adults. For instance, in Sokoto, in the north of Nigeria, of the boys from 6 to 10 years of age 21% were infested, of those from 11 to 15, 11%, of those from 16 to 20, 11%, and among the men from 21 onwards only 4%. With rising age there is a steady drop, and that is not correlated with hair weight; it is a separate phenomenon.

The abundance of the head louse among the school children in cities in Britain and its rarity in adults is remarkable. I cannot put that down to negligent school children or negligent mothers. I suggest that there may be some difference in resistance to the parasite, a resistance that increases as the host grows older.

Another very interesting point came out of all this work on the crops of hair. If the lice per infested person are counted, it will be found that the number of people who have from 1 to 10 head lice in the crop of hair is commonly about double or even treble the number who have from 11 to 100 lice. There may be a few who have over 100, or, in rare cases, over 1,000. The number of people who have no lice depends on local circumstances, but of those who are infested, about 1 to 10 is much the commonest value in the six or seven places where we have done this work. It is interesting to note that in the last war Peacock observed a similar distribution of body lice in the shirts of heavily-infested men in the trenches, among whom the individual counts were for the most part low. That is curious in a parasite which can multiply as fast as the louse; it means either that people succeed in exterminating their population of lice and then get reinfested, or that the primitive things a man does with brush and comb, though not quite adequate to control the infestation, yet keep it chronically at a very low level.

This work on the head louse as distributed among people in various parts of Asia and Africa has given us information also of a more strictly entomological sort. We know more now about the structure of the louse community, how many males to females, how many larvæ per female, and so on. It would not be suitable to go into that side of the work at this meeting, but it has afforded us information on the louse population considered by itself and without reference to the human host. Among other curious things we find that there are parts of the world in which there are about five larvæ per female on large numbers of heads, while in other parts of the world the number is 10 or 12. We do not know why this is, but it puts us on the way of further understanding the dynamics and growth of the louse population.

All this work that I have mentioned, taking a crop of hair and counting the lice in it, has this against it, that it only tells us the state of affairs at a certain moment; it does not tell us how Nature led up to that state of affairs. One could—and perhaps some day we shall—study that experimentally. Some progress has been made in a different direction. We have placed lice in a box with a gauze bottom, held tightly against the person by some sort of bandage: this is worn and the insects feed through the gauze. Under these conditions we obtain information about the normal length of life of the larvæ and adults, whether the male lives longer than the female, how many eggs the female lays if kept in contact with the surface of the body the whole time; in fact, a considerable body of vital statistics about the louse has been accumulated under these rather unnatural conditions.

I have spoken so far about what might be called scientific work. We have also done some rather interesting work on methods of control—practical applied work. Very shortly after the outbreak of war medical entomologists were much exercised as to what was the most suitable thing to do, and some of us thought that an advance in the way of controlling the lice was one of the things most necessary. A group of us from several

institutions, discussed what could be done ; it seemed that the centre of the problem is that if people are living in a lousy environment (as the troops who were up the line were doing in the last war) then no matter how good the control, one can hardly deal with the situation. In the last war nearly everybody in the front line was infested. A battalion was taken out, rested, cleansed, and sent back. Within two or three days of their return the men were already lousy, and within a few more days they were as lousy as they had ever been. What seemed to be needed was something, applicable to head or garments, which would not only kill lice but remain active for a considerable period. The most promising thing so far available was worked out by two entomologists, Dr. McLeod and Dr. Craufurd-Benson, who started a louse clinic in East London. The agent applied is a finely-ground powder, and a formula has been arrived at, which on national grounds must be kept secret : the material is called A.L.63. If some of this powder is put on the garment and rubbed in it takes an extraordinary amount of shaking to get it out. If one wears a garment so treated not only will the lice die on it, but it will remain lice-free for about a week ; that break of a week might be of great importance if we had to treat people in the shelters. The interruption in the continuity might prevent the louse community from increasing and getting out of hand.

We in the London School of Hygiene and Tropical Medicine started out on a different line, searching for a liquid insecticide, a small quantity of which could be put inside garments. An effective material has been found (again we do not wish to publish the formula) : a small dose of this material applied to a shirt renders it lice-proof for about a month.

Dr. A. M. H Gray : The two groups of animal parasites which concern us most as dermatologists are pediculi and scabies. Problems connected with both of these groups constantly confront us in times of peace, but in war-time they may assume serious proportions and become a menace to the health both of those serving in the armed forces and of the civil population. In this war not only is the civil population faced with death and injury from military weapons, but also with the risk of those diseases which were specially prevalent in the Army in the last war, and of these pediculosis corporis is the most formidable, not in the main because of the skin conditions it produces but because it may transmit typhus, relapsing fever, and trench fever.

Infestation by head and pubic lice raises no new problems to-day. I propose therefore to compare the conditions under which infestation by the body lice and by scabies occur.

In peace-time pediculosis corporis is almost entirely found in the very lowest stratum of society, such as in tramps and the occupants of common lodging-houses. In the last war, under conditions of trench warfare, it became rife in the Army. It was, however, only when men were in the line for prolonged periods that infestation was at its worst ; in rest periods the condition improved, and at the end of the war, when troops were in comfortable quarters, the trouble disappeared with remarkable rapidity. Nor during the war was there any appreciable increase in pediculosis in this country, though men were constantly returning on leave.

Two conditions are necessary for lice infestation : (1) contact with persons or articles already infested ; and (2) conditions favourable for breeding on the person. Where persons in all strata of society congregate together, such as in the trenches or in air-raid shelters, it is possible that one or more persons may be infested and if conditions for breeding are favourable infestation may soon spread. The body louse is a fairly hardy insect and nits can survive for several weeks in clothing, blankets, &c., and will hatch out when temperature conditions are favourable. Once infestation begins in favourable surroundings it tends to spread in geometrical proportion. It is clear, however, from the experience of the last war that conditions favourable for breeding are of far greater importance than chance infestation, otherwise pediculosis would not have died out with the rapidity with which it did at the end of the war and there would have been a great increase among the population at home during the war.

The two factors which favour breeding of lice are : (1) the continuous wearing of clothes for days on end, so that the lice are kept at a constant favourable temperature ; and (2) the failure to wash the clothes at frequent intervals, so that any stray lice or nits may be killed or removed mechanically. It would therefore appear that if persons liable to infestation, such as those who spend their nights in shelters, were to change their clothes at night and have their underclothing regularly washed, the chance of the lice obtaining a

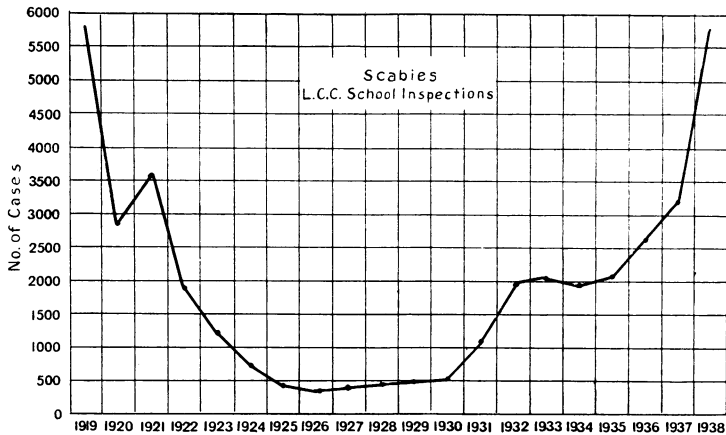
foothold would be small, and that instruction of the public on these facts is most likely to avoid what might become a serious danger to the health of the community.

It is satisfactory to note that, though we have had four months of shelter life, no great increase in pediculosis has been reported, which suggests that the public are keeping up a high standard of cleanliness without any special advice on the matter, though this scarcely absolves the authorities from their responsibilities of making known the facts.

It is, of course, equally important to remove sources of infestation by the compulsory cleansing of persons known to be infested and by the cleaning of shelters and bunks.

It is better and easier for people to change and wash their clothes than to apply to them substances which will kill lice, and if, as I suggest, such simple sanitary measures are capable of preventing lice infestation then use of anti-lice agents should not be required for persons using shelters. The position is entirely different in the case of troops who are compelled for military reasons to wear their clothes continuously for long periods. Here anti-lice agents should be of the greatest value and we all appreciate the valuable work Professor Buxton has done and is doing in this connexion. When I wrote this I had not available to me the full particulars of the extremely interesting method of applying anti-lice remedies which Professor Buxton has just given. I see no reason why these remedies should not be used, provided the ordinary sanitary measures which I have suggested are also carried out.

I now turn to the question of scabies. This disease, although it causes a great deal of skin sepsis, with consequent loss of working time, fortunately does not give rise to serious



Incidence of scabies. Figures from school inspections of children in the London County Council area, 1919-1938.

general disease as does the louse. There is no doubt that it increased enormously during the last war, not only among the troops but also among the civil population. The cases treated in the Cleansing Stations of the L.C.C. during the last war illustrate this: 1914, 589; 1915, 1,059; 1916, 3,213; 1917, 6,940; 1918, 9,624; 1919, 8,371.

MacCormac states that in 1915 it was noticed that many men in drafts arriving in France were affected with scabies and my own observations point to the fact that in the forward areas a great deal of scabies occurred in men returning from leave and in drafts, and that it was not spread extensively in the line. The most striking confirmation of this is shown during the early days of the Army of Occupation in Cologne, when the older troops were being replaced by battalions of young soldiers from England. During February and March 1919, the number of cases of scabies per month rose from about 250 to 900, at a time when pediculosis had practically disappeared.

I have naturally been interested to see how the incidence of scabies has varied since the last war. It is impossible to get figures for the whole population, but it seemed that if one took the figures of scabies as found in school inspections of children in the L.C.C. area it might give some clue to the incidence of the disease among the general population.

Starting in 1919 (the first year in which scabies is shown separately from other skin diseases), the figure is 5,794. This is the first post-war year, when one would expect the figure to be high. After this the number of cases fell, rather rapidly at first, then more slowly, to the lowest figure of 339 in 1926. Since then there has been a rise, first rather slow and then more rapid, to reach 5,768 in 1938 (the last year in which the figures have been published). This is practically the same figure as in 1919. If these figures are any criterion, and they are borne out by those of other education authorities and by the experience of most of us in our hospital clinics, then we are faced with a problem which requires a good deal of thought. What are the possible explanations of this large rise in peace-time? Is it due to better diagnosis? Diagnosis of some cases of scabies can be quite difficult to experienced dermatologists, much more is it, therefore, to the average medical man. No matter how much medical education has improved it is impossible to believe that better diagnosis can have been responsible for such an enormous rise. Is it due to the inefficiency of some of the modern methods of treatment? It is true that many "rapid cures" have recently become popular and many who have little real experience of the pitfalls associated with the treatment of scabies have advertised them freely in the medical press. Some methods, however, are efficient; for example, I have satisfied myself that one-day benzyl benzoate treatment carried out in children under in-patient conditions at Goldie Leigh Hospital, gives as good results as the ordinary three-day sulphur ointment treatment, but it does not follow that equally satisfactory results can be obtained in adults attending out-patient departments. Successful treatment depends more on the way it is carried out than on the preparation used. Further, during the period under review there has been an increasing tendency to report cases to the local M.O.H. so that contacts can be examined and the bedding, &c., properly disinfested: this should tend to diminish the incidence of the disease. I do not think, therefore, that new methods of treatment can be responsible for the increase in scabies.

Has scabies a periodicity? Does its development depend on climatic or environmental conditions? These questions can only be answered by a search into statistics for long periods past. Crocker records an increase in the disease in the United States in the eighties of the last century, but whether this was followed by a fall I am unable to discover.

Lastly, how is the present war likely to affect the incidence of scabies? Under the conditions under which many have to live, one would expect a further increase in the disease, though there is no reason to expect that it will reach unmanageable proportions. It is important, however, that efficient arrangements should be made for treatment and in this connexion the examination and, if necessary, the treatment of contacts and the sterilization of clothing and bedding is essential. It would probably add to efficiency of municipal cleansing stations if the treatment given there was supervised by those who have expert knowledge of the subject.

I have dealt very shortly with two of the subjects which caused us most worry in the last war. Our aim to-day should be to prevent the appearance of pediculosis corporis which at the moment is practically non-existent, but in the case of scabies, which is already with us, early diagnosis and efficient treatment should do much to prevent the secondary skin sepsis, which was another serious worry in the last war.

Dr. H. MacCormac: The Report of the Medical Research Committee and American Red Cross Commission on Trench Fever quotes McNee as having pointed out that 90% of all sickness in one of the British Armies was due to scabies, infections of the skin, and pyrexia of unknown origin, of which trench fever constituted the great majority of cases: or expressed differently, this 90% sickness-rate was attributable to the louse and the *Acarus*. We are asked to believe that history repeats itself, but this can only be true where circumstances are similar, and it is clear that the present conditions of the Army do not lend themselves to any threat of an epidemic of parasitic skin disease. The repetition of past events may, however, not seem so improbable if we remember that the civilians are now in the front line, and that the conditions of the civilians in the public shelters approximate in some degree to the trench life of the last war, and are, therefore, likely to encourage, among the civilian population, infestation and the consequences of infestation, similar in kind, if not in degree, to those met with among the troops in 1914-18. In a meeting of dermatologists it is perhaps natural that our attention should turn primarily to the condition of the individual and his treatment. There is, however, the far more important public health problem, the threat to the community, and here we are equally concerned, because

the methods of frustration to be employed are closely linked with established dermatological principles. Scabies and pediculosis have little in common in the manner in which they are contracted and spread. Each must therefore be examined as a separate and independent problem.

It is unnecessary to say that pediculosis takes a threefold measure of the human frame, the head, the pubic and axillary regions, and the body. The head louse is usually stated to affect children rather than adults, and although the medical inspection of schools and the fashionable shortening of the hair of women have gone a long way to reduce the incidence, it is, nevertheless, still found by no means infrequently in women of the working and lower middle orders. The degree is usually light, causing little or no inconvenience, so that the infestee is, as a rule, quite unaware of the situation. Every dermatologist is familiar with instances where contamination has taken place by direct contact, or indirectly through caps, hair brushes, or by such things as the cushions of railway carriages. It would seem, therefore, that we have in shelter life ingredients favourable to the spread of this kind of lousiness, which, although more disgusting than dangerous, can in certain circumstances be complicated by impetigo and suppurative adenitis with their sequelæ. This is purely a civilian, not a Service problem, for soldiers do not acquire head lice; and I have always understood that the practice in the German army of shaving the soldier's head was a preventive measure. In this connexion it should, however, be remembered that this parasite is also capable of conveying typhus and trench and relapsing fever, a quality which may in certain circumstances create for it a very considerable importance. In contrast the pubic louse is the aristocrat of the tribe. Once hatched out it hardly troubles to move from its original position. It is rarely encountered in women, except among strumpets, which may explain its not infrequent venereal origin. It is notorious that in men the pubic louse is more often met with among the better and cleanly classes, leading to a common pitfall in practice, the diagnosis of pubic eczema, the practitioner perhaps forgetting that social eminence is not an exclusive quality, because the louse has no clear apprehension of these human distinctions. A venereal origin has been mentioned, but epidemic infestation may, and often does, result from a community water closet, as in office buildings. Inferior hotels or lodgings, where the cleanliness of the sheets is neglected, provide another source. Whether the lavatory accommodation in the public shelters lends itself to contamination or not I am unable to say, but since the pubic louse rather favours a class higher in the social scale than those using the shelters, on this ground it may be argued that epidemic pubic infestation is improbable. In any case, unless the individual is unusually hairy, delousing is easy, because, among other reasons, the insect soon dies when deprived of human companionship, in a matter of some forty hours. Treatment of the head and pubic louse is more concerned with general principles than with meticulous details. The selected parasiticide should be capable of killing the insects, and the potential insects in the nits, without risk to the human infestee. Paraffin oil, or carbolic lotion 1 : 40, satisfies these requirements: the subsequent toilet of the hair with a fine comb is a complementary and necessary addition. Shaving the pubic hair is probably an unnecessary measure against the crab louse, but, paradoxically, called for in many cases of body louse infestation.

Finally comes the consideration of the body louse, the sinister figure in this unpleasing trinity. In the case of the other varieties, the eggs are attached to the individual, to the hairs on the head, pubis, axilla, &c. The body louse has developed a different technique, it chooses the seams and crevices of the clothing for the precious eggs which are to provide a new generation, and since one female is capable of laying about 300 eggs, it will readily be appreciated how rapidly a pronounced degree of lousiness can develop. The insects are of an adventurous nature, and will leave the original host to seek new or perhaps more refreshing sustenance in another individual. Medical men are well aware of this habit of the insect, and some, more agreeable to the louse's taste than others, will relate the discovery, not infrequently made, of lice on their clothing after a long day in the casualty department. All lice are obligatory parasites, being entirely dependent on man's blood for their nourishment. The body louse can, however, live alone for some ten days, a fact disconcerting to the imaginative who picture the nooks and crannies in the bunks and platforms where the sleeping thousands of men and women take their nightly repose. We have then, it would seem, reason to anticipate the growing menace of infestation from the body louse without, as I shall venture to suggest, the probability

of a parallel increase in the other forms of pediculosis. Scabies will no doubt also increase, but for other reasons. If this view, based upon inferences which I have given or shall give, is substantially correct, then it follows that it is upon the body louse that our particular attention should be focused. What effects are likely to result from an increase in the verminous? Perhaps inconvenience rather than disease, and, therefore, of quite a different order from the ills likely to follow the introduction of the organisms of diphtheria, pneumonia or tuberculosis among an overcrowded shelter community. While one may hope that epidemics of typhus and relapsing fever are improbable, trench fever is a possibility, and pyoderma is at least to be expected. Prevention of pediculosis relies on two measures: prevention of the contamination of cleanly or relatively cleanly people, and the destruction of the eggs on garments, &c. For the first part to be effective we must, I suppose, rely upon voluntary and confidential notification by the individual to the local Public Health Authority, notices to this effect being posted in the shelters. A voluntary system is always abused, nevertheless enough would be gleaned to indicate foci of special infestation whereupon appropriate measures could be enforced. Disinfestation of bedding and clothing thus becomes an indispensable part of routine treatment: the local authority can be relied upon to do this, and in a manner very different from the improvisations of an army in the field. The mobile steam disinfector for clothing as used in France in the last war purveyed a most misleading sense of security. The contents were almost always packed too tightly into the container, consequently the garments in the centre harboured living and active lice, easily demonstrated and easily seen by anyone whose curiosity led him to investigate. The patient must also be treated: not so much for the few lice present on his body, which a bath will destroy, but to remove the ova attached to the hairs. Although more than forty years ago Allen Jamieson described ova from the body louse on the lanugo hairs, this lesson was forgotten until the last war, indeed until 1917, when H. Bouillard repeated the observation and noted the frequency of the eggs on the pubic hair nine times out of ten. In the latter situation they had been attributed to the crab louse: to H. W. Barber belongs the credit of exposing this mistake, by hatching out the eggs, thus demonstrating the variety from which they came. A technique had long been perfected in the Skin Hospital in France for treating a dozen men in a group with barium depilatory, mass destruction which just gave time for the hair of the first to be ready for removal with a paper-knife after the application of the depilatory to the twelfth had been completed. This simple procedure may not be convenient for civilian life, but mention of it serves to draw attention to disinfestation of the person as being as important as, and complementary to disinfestation of clothing and bedding. Shaving of the pubic area may even be called for, as already mentioned.

I shall conclude with some observations on scabies, based upon three points taken from Radcliffe Crocker's well-known textbook.

(1) *The disease, he tells us, is propagated by prolonged contact with infected people or objects; it is rare for ordinary contact, like shaking hands, to be a cause of contagion.* With this opinion dermatologists will agree. It means that, unlike pediculosis corporis, mere proximity does not spread scabies. Of this there was ample confirmation in the Skin Hospitals at Harelbot and Etaples during the last war. There scabies was never isolated: the patients were treated and housed with the other skin diseases. Nevertheless, cross-infection did not occur. Therefore, any increase in the number of cases should implicate something outside shelter life, possibly a venereal origin, or carelessness with clothing and bedding in family or communal surroundings.

(2) *The diagnosis of scabies may be very easy or very difficult.* Nothing has occurred since Crocker wrote these words to disturb their exactness. The secondary impetigo may prove especially confusing. It will be remembered that the impetigo of scabies tends to be grouped over the elbows, knees, and lower buttocks, whereas in pediculosis linear excoriations and impetigo occur on the shoulders, lumbar regions, and thighs, and by this variation in pattern a key is provided by which the two conditions can be differentiated. Nor should we forget the obvious, namely, that the discovery of the louse or its eggs is unequivocal evidence of its activities.

(3) *There are two evils to be avoided: treating the patient too little and treating him too much.* This admonition has a special significance to-day in relation to the rival parasiticides and the claims made for their peculiar merits. I have always favoured the classical three-day treatment with sulphur ointment, because I believe it cannot fail if all the details are exactly observed; nor is it liable to produce a dermatitis. Further, it

occupies seventy-two hours, a period corresponding to the interval between the laying and the hatching of the eggs, which means that eventually insects only, not insects and ova, are being attacked. The one-day treatment of scabies is no novelty: it has long been the traditional practice of the St. Louis Hospital in Paris, where the thorough preliminary soaping and bathing are essential parts of the ritual. The proportion of failures is considerable, no doubt in part attributable to the neglect to disinfect the bedding. In this country the Danish ointment was at one time a popular short cut, and recently a compound containing benzyl benzoate has been advocated. My criticism of a one-day treatment is that it may come within Cröcker's third evil, that of treating the patient too little, and in this connexion it is a significant fact that the eggs take three days to hatch.

More than this I am not entitled to say, as I have not had sufficient experience of benzyl benzoate: others who are better qualified will give us the benefit of their views.

Dr. F. A. E. Silcock: I have been interested in Dr. Gray's reference to the fact that during the two years previous to the present war there was an increase in scabies. Could that not be accounted for by the sociological conditions in the distressed areas, due to overcrowding, or poor hygienic conditions? People went from these areas to London and other towns, in search of work, with the result that there was an increased rate of infestation. This was certainly true of my own city, Leicester, where we had many young fellows and girls from South Wales, Newcastle upon Tyne, and other areas, coming to learn a new trade or to go into domestic service. That fact might explain a good deal of the pre-war increase of scabies. At the beginning of the present war Leicester was considered "a safe area", and people were evacuated to it from many parts of the country (mainly from big industrial towns), with the result that scabies became, and still is, an absolute nightmare. Scabies used to be comparatively rare in out-patient clinics, but now it is common. Frequently a mother will come with two children, or with a baby, and all will be infected. She will say that several other members of the household, whom you do not see, have also got the same complaint.

Many cases of scabies, particularly in clean people or those who are frequently washing themselves, are not at all typical in the signs. I have mistaken many for other conditions, until I myself am beginning to acquire "scabies phobia" from seeing it so often. The best way to make sure of the diagnosis in these difficult cases is to find an *Acarus* and/or ova from one of the lesions. One atypical case was that of a woman who kept a high-class hairdressing saloon. In this work she was always washing her hands and forearms. These parts showed no signs of trouble, but there were suggestive lesions on the thighs, hips, and a few on the abdomen. When asked about her husband, she replied that he had an irritable rash on his fingers, wrists, &c., and this was confirmed by finding the *Acarus* in his lesions. A similar case was also seen by me recently, in which the woman kept her fingers and hands very clean and well manicured, and her forearms frequently washed. These parts again were clear, but the *Acarus* was found in her husband's lesions.

Dr. MacCormac mentioned the benzyl-benzoate treatment. All these treatments for scabies, however, either start with the vigorous application of soft soap and water, or the soft soap is combined in the prescription for the medicament used. (This is the case in the benzyl-benzoate treatment.) From my experience I believe that the soft soap and scrubbing is probably the main factor, and that the rest of the prescription does not much matter. This was accidentally demonstrated to me a few days ago, by the following incident. A well-marked case of scabies in an adult man was seen by my partner, Dr. F. S. Airey, and myself. He was given the usual prescription for benzyl benzoate and soft soap to take to his local country medical practitioner to have dispensed. The latter, never having heard of benzyl benzoate, did not bother to give him this, but only gave him the soft soap. The patient scrubbed himself with it and water for five days and nights—I had told him only three days. At the end of that time he was just as clear as anybody I have ever seen. The only thing was that he had scrubbed rather too hard and a little scaliness had resulted, which cleared in a day or two. Some people use soft soap, water, and a nail brush, and it seems to work as well as all the other prescriptions combined.

Dr. H. J. Craufurd-Benson: I had not intended to take part in this discussion, but at the President's request I will add a word or two to what Professor Buxton has said about the work on which Dr. McLeod and I were engaged. In working in rather a closed com-

munity in the East End of London, among the inhabitants of common lodging-houses and Salvation Army hostels, we found that the degree of lousiness of the men is to a considerable extent correlated with their personal hygiene. Those who have few lice are those who wash their shirts once a week; others with 30 to 50 lice change their undergarments when they think they will, and yet others are always lousy and do not care. This seems to indicate that public education might do a great deal towards preventing lousiness, though it would not entirely prevent it, because some of the individuals in this community who do all they can to prevent themselves from becoming lousy invariably harbour one or two lice.

Professor Buxton has mentioned the study of lice which are confined in small cells attached to the body. I myself am a member of a team working on parasitic diseases of animals, not humans. We have learned that the moment the parasite is confined, either to a small area on its host, or off its host, its reactions are liable to be misleading.

In this work on the louse we examined a wide series of insecticides, testing them on lice confined in little boxes of the type which Professor Buxton has described, but we found that an insecticide which would kill lice in the laboratory will not necessarily kill them when used on a verminous person. An insecticide may work successfully in the laboratory and be quite hopeless in the field.

Another thing brought out in this work was that if an insecticide affording good protective properties could be obtained and put on the body or the clothing, it would solve one's difficulty supposing one could not kill the louse eggs. I have often tried to kill the eggs of cattle lice and sheep lice and have found that effective agents are liable to cause dermatitis in the host. But if one uses an insecticide which will kill the adult louse or the louse in the young stage and that insecticide can be left there until all the eggs have hatched, then those newly-hatched lice will be killed by the insecticide.

Dr. H. W. Gordon : With regard to scabies, how long does the *Acarus* live when not in contact with the human body? I have never been convinced of the necessity of disinfecting clothes which are not constantly worn, and likewise bedding.

I have recently had one case where a patient appeared undoubtedly to be infected from bedding since she had taken the precaution of going to the hotel where the infection had occurred, with her own bed linen. In the same connexion, I have no doubt that everybody has come across what I might call latent cases where scabies has made its clinical appearance after a patient has been in hospital for some five or six weeks and no obvious source of contact can be found. If we rule out what must be the faintest possibility of a visitor affecting such patients, one can only suppose that the condition can remain dormant or latent, for a long time. In two such cases, patients were seriously ill and as their general condition improved, scabies became apparent.

I have found the benzyl-benzoate treatment satisfactory; I have seen two or three cases of acute dermatitis arise when sulphur has been used previously or subsequently to benzyl benzoate.

Dr. F. F. Hellier : Speakers have mentioned that scabies was on the increase before the war. I can quote Leeds figures in this connexion showing a percentage in 1934 of 2.1 among those attending the clinic, rising to 5.8% in 1938. I mentioned this in a paper read last year, and Professor Oppenheim of Vienna, who was present at the meeting, said that exactly the same thing had occurred in Vienna, and that it was obviously a European-wide occurrence. Professor Oppenheim attributed it to the greater impoverishment of living conditions in Vienna during those years, but in this country there was no impairment of living standards between 1934 and 1938, and yet the figures have almost trebled.

I do not think a sulphur-resistant *Acarus* has been found. Once scabies gets on the increase there is for everyone a greater chance of becoming infected unless some immunity develops. No personal immunity to scabies will develop until people learn to keep themselves free. I can only regard the increase as cyclic.

There is one little point with regard to treatment. If one advises an out-patient to have a hot bath for three nights he will answer "Yes" in the delightful way that out-patients have, but the following week it may be discovered that he had in fact no bath in his house. The practice at my hospital now is to refer every such case to the lady almoner, who has full details of the treatment. She will go into the whole question with the patient, including the question of contacts, and possibly arrange for the use of a neighbour's bath if the patient has none.

Lt.-Col. G. B. Mitchell-Heggs : I have had the opportunity of seeing these cases first of all from the point of view of a regimental medical officer, then as an officer in charge of a division of a hospital and finally as a dermatologist. A number of different points arise.

When the war started a number of doctors joined up who found themselves for the first time in khaki looking after men in the mass. Dermatology was a mystery to many of them. They were quite at sea when shown conditions common to all of us. They were unable to recognize a case of atypical scabies and unfamiliar with a method of obtaining the *Acarus* for microscopic diagnosis. In suspected pediculosis they were often searching for the pediculus and ignoring the nit on a hair.

The so-called latent case one meets with in a unit or ward is a real difficulty and I think it very unwise to pass a man as clear on the strength of a single examination. One must recognize an indefinite incubation period and realize that some men infested with pediculi complain of no itch.

I do not think that parasitic diseases can be quite the problem they were in the last war. One very sound Army practice is the weekly examination of troops, which has revealed many a latent or symptomless case. Compulsory examination of shelter cases would be an excellent plan if an increase in infestation became noticeable.

Dr. Gordon has raised the question as to how far disinfection of clothing should be carried out ; this is a real problem. I insist on the disinfection of tunics because an *Acarus* may lurk in the sleeve cuff.

Dr. Louis Forman : I have been interested to hear that, in spite of the conditions under which many people have been living in shelters, pediculosis, including pediculosis capitis, has not increased in incidence. In a very small experience of examining children in shelters, I have been rather struck by the proportion showing pediculosis. They have not come up complaining of itching of the head, impetigo, or cervical adenitis but of other things, and I took the opportunity of looking at their heads. Although the number sampled could not be considered representative, I had the impression that pediculosis is common. The question should be settled by somebody examining all the children in one or other of the large shelters.

Dr. MacCormac's remarks on the infectivity of scabies are interesting. Some superintendents of hospitals regard scabies as being dangerous and infectious to the nursing staff.

In my experience at the out-patients' department with benzyl benzoate over a period of three years, it was found to be quite satisfactory, or at least as satisfactory as treatment with sulphur ointment, and there has been no greater liability to produce dermatitis.

Mr. A. Murray Stuart : Scabies in my district has increased very rapidly since air raids became intensified, owing, I think, to the greatly increased use of air-raid shelters. As I was not quite content with the usual sulphur ointment treatment and as benzyl benzoate was unobtainable, I have, for the past few months, been using 40% sodium thiosulphate lotion followed by 4% hydrochloric acid and have found this method to be successful. Nascent sulphur is generated on the skin surface. No case of sulphur dermatitis has as yet occurred. After hearing Dr. Silcock I am in some doubt as to whether the good results may not be largely due to the soft soap bath with which the treatment commences.

Dr. F. S. Airey : I suggest that the reason for this cyclical change in the incidence of scabies is not so much the factors which have been mentioned as the training of the individual practitioner. I am of the post-war generation so far as the last war is concerned, and during the last war many doctors became scabies-conscious, and remained so for some time after the war. Then followed a period during which scabies seemed to decrease, and many young practitioners who entered practice were unfamiliar with scabies. Due to this much scabies is now missed, and there appears to be an increased incidence in consequence. Now, when scabies is again on the increase, doctors are waking up to the condition. Under treatment scabies again appears to decrease. I suggest, but I may be wrong, that this may account for the cyclical variations.

The President (Major W. J. O'Donovan) : Since I have been a member of this Section I have never listened to such a keen discussion on man's historic parasites ! There is not a professional dermatologist amongst us who does not claim *ex professo* to speak on the question of scabies at any time or any place, and it is worth noting that many have been so continent this afternoon.

I had the privilege once of carrying out a post-mortem examination on a patient aged 18 who had died actually from pediculosis corporis. The cold, bitten, pallid body was a carapace of parasites. When the heart was opened a condition of early ulcerative endocarditis was found. The condition was due to lack of care on the part of the parents, the patient, and then of the authorities.

My next point is the singular continuance amongst us of scabies even in cleanly people ; in spite of good community hygiene it does not disappear. It will be agreed by those who have listened closely to this discussion that the Army to-day is clean while the civil population threatens to become unclean. Soldiers frequently contract scabies on leave. Where I work now, in the centre of some 90,000 troops, I see over 300 skin cases a week, and there occur about 13 new cases of scabies and 15 cases of venereal disease amongst the cutaneous mass. Scabies, therefore, in the Army as I now see it, is a small matter. But I remember one village area from which there came over months a continual supply of scabies cases. Then, after an inspection by the sergeant-major—not by a medical officer—there came one heavily infested man with signs of scabies all over him, and the unchanging story that he had never itched. There are people who are scabies-carriers, heavily infested, who have never, in the lay sense of the word, suffered from scabies.

There was one extraordinary experience among miners. A new intake came to the camp, and among these there were a dozen, who, when they lifted their arms, showed their armpits to be black with pediculi.

On the question of treatment I would offer a caution. I had, recently, to handle a claim from a woman who sought damages from her doctor because his treatment, which included flowers of sulphur, had blackened her newly-painted bath!

The question of contagion through close and constant proximity to scabies is of great medico-legal importance. Those who wear garments which are also on occasion worn by other people, such as usherettes and porters, may be inclined to ascribe any trouble of this kind which befalls them to the garment. To establish a dubious claim the contact should have been undelayed and prolonged.

As to the disinfection of clothing I had not done it for fifteen years until the war. In the Army I have seen no return cases, but it seems hard that a soldier should have his kit and blankets put into the hands of an anonymous hygiene employee, who proceeds at times to destroy them in the name of pure and applied science.

Among remedies let me mention the Marcusson ointment, invented by a pharmacist, but more mobile and easier to rub in than the historical sulphur ointment—not more effective, but more convenient.

The Sister at the St. Louis Hospital, Paris, cured scabies with sulphur ointment in one day, twenty years ago. She watched all the patients rub in the ointment until they perspired. The treatment of scabies needs supervision, for it must be continued, in effect, until perspiration does take place. In that event a one-day cure will be achieved, but not if it is left unsupervised to the orderlies.

Professor P. A. Buxton, in replying, said: "On the question of the spread of lice dermatologists have expressed very divergent views. The question of lice spreading in shelters is difficult. We have no information as to whether the head louse is spreading or not, and such information is difficult to obtain in view of the evacuation of school children ; in peace-time we should have the evidence of school medical officers and nurses, but we cannot get information from them now. As to the body louse, work has been done in shelters by several people in different parts of London : they have spent evenings and nights in the poorer parts trying to find out by indirect methods, such as talking to shelter marshals and nurses in shelters, as well as to doctors who see a good many people stripped. At present we have no evidence that the body louse is increasing in London.

As to the detachment of nits from the hair, we know no way of doing it. Cannot we impress on the public that we are not hairdressers, and that while the question of looks and cosmetics may be important it does not matter from our point of view? Is it not sufficient if we can tell a person that there are no live nits or lice in the hair, and that that is all that interests us?

Dr. Gray and others pointed out that if people were hygienic in their habits, if they changed and washed their underclothing, there would be no body lice. But what is going to happen in a badly bombed area, in which perhaps many houses have no gas or other means of heating and only a small supply of water? Moreover, in times of peace better

ways of killing the louse and its eggs are very badly wanted, and the new agents which I mentioned will have their use then. A.L.63 is so convenient because it does not smell and does not make the hair wet, so that it can be used on the young woman with a permanent wave. She will not willingly have her hair wetted, but she might use a powder. The other agent has the valuable property of killing the nits as well as the lice. If we are to get rid of the body louse it is no use instructing a person to go to a cleansing station, and we need something more convenient and more easily applied in the out-patient department. With these new insecticides we might get completely rid of the louse, perhaps within a few years.

The substances I have mentioned cannot at present be obtained commercially.