difficulty, information was elicited that a mother had visited the nursery 34 days before the onset of the first case. She had recently had jaundice, and had only been discharged from hospital several days previously. She spent a short time one afternoon playing with the children at the nursery, and it would seem probable that all the cases were infected from this one source. This degree of infectivity, even associated with a susceptible child population, is most striking.

In the outbreak at Bownhill Farm Residential Nursery there was again a resemblance to a waterborne epidemic. It seemed probable that the children had received the pathogenic agent from a common source, but I was entirely unable to trace a contact, either direct or indirect, with a known case of infective hepatitis. On examination of the water and the source of supply a remarkable state of affairs was found to exist. The water was gathered by pipes to a collecting chamber from three sources—A, B, and C. Sources B and C were still active, but source A had practically dried up. At the collecting chamber a pumping engine had been installed which pumped the water from sources B and C up the pipe to source A, which was now used as a reservoir, giving the necessary gravitation for the house supply. Since this source A was situated in a midden it was not surprising that the water showed a considerable degree of pollution. The gathering-ground of all three sources was carefully examined; but no human beings lived there, and only cattle and sheep were pastured on the ground. All that could be discovered was that the water was badly polluted, and further evidence would be required to show that this was the cause of the outbreak. Although an outbreak of waterborne epidemic infective hepatitis has been described by Hallgren (1942), it would need far more evidence than mere pollution of the water to prove conclusively that the children at Bownhill Farm Residential Nursery were infected by the water supply. There is also the marked similarity to the outbreak at Stanley Park Residential Nursery, where the disease was shown to be introduced by an infected person.

Summary and Conclusions

A short epidemiological account is given of 246 cases of infective hepatitis which occurred in Gloucestershire in 1943.

An outbreak is described in an elementary school, where the infection ran its expected course.

This is contrasted with the outbreaks in two residential nurseries, which were explosive in type, infection probably being from some common source.

In one residential nursery the source of infection is presumed to be an infectious visitor, 34 days before the first case.

In the other residential nursery no such contact was found; the possibility of the infection being waterborne is discussed, but is rejected.

A brief clinical account is given of the children infected with infective hepatitis in two residential nurseries.

I am indebted to Dr. H. K. Cowan, County Medical Officer, for his help and for permission to publish the results of these investigations.

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The Surrey Hospitals Divisional Council, formed under the auspices of the Nuffield Provincial Hospitals Trust, has widened its area to include the county borough of Croydon, four of whose representatives now participate in the Council's work. This inclusion has eased the task of the Planning Committee, which has issued a draft scheme for the co-ordination and extension of the hospital services in the county. The scheme includes key, main, and local hospitals, specifying the proposed functions of each and suggesting the minimum services and departments which might reasonably be expected. The greatest shortage of accommodation is in the north-west section of the Council's area, where no hospital exists which could perform the functions of a main hospital. The draft plan has been sent to the constituent bodies—that is, the various hospitals in the county, the local authorities, and a number of voluntary organizations, central and local—for their observations. A survey of maternity accommodation and of special hospitals is now being undertaken.

EXPERIMENTS ON SCABIES' PROPHYLAXIS

BY

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With our present knowledge there should be little difficulty in treating and curing all cases of scabies as soon as these are diagnosed, but a great advance would be made if we could discover a method of scabies prophylaxis which would prevent infection from taking place. Farmers have long been faced with a similar problem, and infestation of sheep by mites is kept under control and has even been completely eliminated in some countries by universal "dipping." So far it has not been possible to devise anything so satisfactory that is practicable for use with man, though Percival (1942) has suggested that the whole population of Britain might be simultaneously treated with sulphur ointment to try to eradicate the disease. For prophylaxis some method is needed which is safe, efficient, simple, and cheap.

An experiment was made to try, against human scabies, a standard sheep dip supplied by the Cooper Technical Bureau, as this is inexpensive and could be made available in large quantities. Having previously determined that immersion for three minutes could be well tolerated by most individuals, two men suffering from scabies were immersed for that period in a bath of sheep dip at a temperature of approximately 20° C. and then the liquid remaining on their skin was allowed to dry. Less than 50% of the mites were found to be dead after re-examination 24 hours later. As this method will not cure human scabies satisfactorily it can hardly be effective as a prophylactic. No doubt the satisfactory results obtained with sheep are due to the quantity of dip which remains in the wool and so in contact with the parasites.

I have little doubt that universal dipping with benzyl benzoate emulsion would prove completely successful in wiping out scabies. One experiment on these lines may be quoted. In a Midland mental hospital scabies presented a major problem among the female patients. Out of a sample of 183 which were carefully examined, 48 cases of scabies—i.e., 26%—were found. The treatment of scabies among these patients had presented a major problem to the staff for a long period. On two consecutive dates in September, 1942, the female patients (804 in all) were given a single treatment with benzyl benzoate emulsion, which was painted all over the body; the staff of the hospital were also very thoroughly examined and any positive cases treated. No bath was taken before the treatment. Since that date scabies has given no further trouble, and only a negligible number of cases had been found. This demonstrated conclusively that in a population showing a high incidence of endemic scabies a single treatment of *all* individuals will effectively wipe out the complaint; but, as will be shown below, it is essential that all the members of every household should be treated. Unfortunately there is available neither the benzyl benzoate nor the technical assistance to institute universal treatment, and, also, new legislation would be needed to ensure success.

We know that in human scabies the vast majority of the parasites are found on the hands and wrists (Johnson and Mellanby, 1942), and it was therefore thought that, instead of a universal programme of "dipping," it might be possible to obtain satisfactory results by treating this restricted area of the body with benzyl benzoate. Work on these lines was carried out among several groups, constituted as follows: (a) W.A.A.F. members of balloon crews; (b) school-children in a large county borough; (c) school-children in an urban borough; (d) school-children in what was technically a rural district but in which mining was the main industry. Unfortunately, Service requirements were such that the membership of the first group changed so frequently that no conclusive results could be obtained, but the school-children were all under observation for a considerable period.

Procedure with School-children

The same procedure was adopted for all the children concerned. On the first visit their hands and wrists were examined and those with *Sarcoptes* in burrows noted. In all these preliminary examinations it was possible to verify the diagnosis

by the removal of live parasites. The names of these children with scabies were reported to the School Medical Service, which took action regarding their treatment. Immediately after examining each child a quantity—approximately 1 c.cm.—of benzyl benzoate was placed on the palm of one hand, and this was rubbed into both hands and wrists without delay. This was repeated at approximately fortnightly intervals for twelve visits. Unfortunately for the possibility of assessing the experimental results in a simple manner, whenever a case of scabies was found it was necessary for it to be reported, and the child was excluded from school for treatment. This meant that the falling incidence might be due to two causes—either the action of the benzyl benzoate on the hands and wrists or the exclusion of chronic cases of scabies and the treatment of their families by the local health authorities. To try to get over this difficulty a “control” group of children was selected. Here the fortnightly inspections were made and infected children were excluded from school, but no prophylactic benzyl benzoate was used.

The results of this investigation, which incidentally necessitated over a quarter of a million individual examinations, are summarized in the accompanying Table. It will be seen that the incidence was reduced very considerably in every group.

Table showing Results of Visits and Treatment on the Incidence of Scabies

District	Number of Children Examined	Incidence of Scabies (%)		Final Incidence as Percentage of Original
		First Visit	Twelfth Visit	
(a) Benzyl Benzoate applied to Hands and Wrists				
County borough (industrial) ..	9,962	1.48	0.23	15
Borough (industrial and mining) ..	2,526	2.57	0.71	28
“ Rural ” district (mainly mining)	536	2.10	1.13	54
(b) No Benzyl Benzoate applied				
County borough	5,928	2.13	0.43	20

The most striking results were obtained from the county borough, and here the control group gives some further data. Considering the control group first, it is obvious that a great decrease in scabies was brought about merely by inspections, with subsequent treatment. A greater decrease took place in the group from the county borough where the hands and wrists were treated with benzyl benzoate. Dr. J. O. Irwin has kindly examined the detailed data of this experiment, and he finds that the decrease in incidence of the “treated” group was significantly greater than that of the “control”; but, even so, it is obvious that the extra trouble and expense of providing benzyl benzoate were very meagrely repaid.

Practical Conclusions from Experiment

The conclusion which may be drawn from this work with school-children is that frequent inspections by persons well-used to recognizing scabies will serve to reduce the incidence of the disease very greatly provided that cases, when found, are treated speedily and efficiently, and provided that the whole family of each case is also treated. Even quicker results would be obtained, and many children would be saved from ever having scabies, if regular inspections could be made throughout the whole population. This may not be possible, but propaganda which will make people scabies-conscious and willing to seek proper treatment for themselves and their families as soon as they suspect scabies can have a similar result. Incidentally, the majority of the population seem still to rely on self-treatment with widely advertised “remedies” that are either quite useless or improperly used, so that no cure is produced and the spread of the disease continues (Graham, 1944).

One further point which emerges from this investigation is that it is very unlikely that children often contract scabies inside the school buildings. A statistical analysis of the incidence in the various classes reveals that cases were scattered entirely at random throughout each school without any significant concentration in any class. Furthermore, it was very rare indeed to find two cases of scabies in adjacent desks. There seems no doubt that scabies is caught out of school, mainly in the home, so that exclusion from school for this complaint is only essential because it is usually a necessary preliminary to ensuring proper treatment. If there is any delay

in starting the treatment then the child is unnecessarily deprived of a period of education.

The occurrence of scabies in the Services may give some clue to the possibility of preventing the spread of the disease in the rest of the population. Early in this war a great deal of scabies was found in the Army in Britain, and the incidence appeared to be higher than that among the civilian population. Further investigations showed that this was not in fact the case, and the discrepancy was due to the frequent medical inspection of soldiers, so that their scabies was discovered while civilians harboured the disease undetected. Furthermore, it seemed likely that most of the scabies in troops was derived from civilian sources and that little actual spread took place inside the Services. This view is supported by consideration of what happens among troops when abroad. Among British troops in North Africa, where there was very little contact between them and the civilian population, scabies was practically non-existent and only to be found among recent arrivals from this country. Among isolated troops with efficient treatment of cases as they arise the disease rapidly disappears. It must be remembered that scabies may have an “incubation period” of nearly two months (Mellanby, 1943).

The facts described in this paper indicate that prevention of scabies is by no means a simple problem. If we could treat the whole of any population with benzyl benzoate we could wipe out the disease, but this is practicable only among limited and isolated communities where the incidence is substantial. On the other hand, if we can treat only part of the population—e.g., soldiers on service without treating their families, or school-children without any treatment in the home—then complete control is impossible. Frequent inspections among a population aware of the danger of this disease, followed by proper treatment of the cases and all their contacts, seem the only universally satisfactory method. There is no short cut to the successful control of scabies.

Summary

Experiments necessitating a quarter of a million inspections of school-children suggest that scabies prophylaxis is not practicable, apart from the normal treatment of the disease. But frequent examinations by personnel experienced in the diagnosis of the disease will reveal numerous cases; their treatment and that of all contacts can rapidly reduce the incidence of scabies.

It is necessary to allow the districts in which this work was done to remain anonymous; therefore I cannot acknowledge personally my gratitude to the various local authorities, medical officers, and teachers whose co-operation made the investigation possible. Most of the examinations of children were carried out by pacifist volunteers who were subjects for various medical experiments at the Sorby Research Institute. The expenses of the investigation were met by the Ministry of Health and the Medical Research Council.

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Medical Memoranda

A Case of Pneumococcal Meningitis Treated Successfully with Sulphathiazole

Although the recent literature contains records of the cure of pneumococcal meningitis by sulphonamides with or without serum, it was thought that the following case, successfully treated with sulphathiazole alone, might be of interest.

CASE RECORD

The patient, a postmaster aged 56, was in his usual good health when he retired to bed at 10.30 p.m. on May 8. At 2 a.m. next day he vomited, and at 4.45 a.m. was found in the lavatory in a dazed condition. He was put to bed, but became very restless and irrational, and at 6 a.m. was seen by his doctor and given morphine gr. 1/4. At 9.30 a.m. he was admitted to hospital, unconscious. On examination he was lying curled up on his left side, deeply stuporous and incontinent. His temperature was 100° F., there was slight neck rigidity, Kernig's sign was positive, and the pupils were small and equal and did not react to light. Apart from slight weakness of the right external rectus muscle, the cranial nerves appeared normal. The upper limbs were hypotonic but showed no paralysis; tendon-jerks were absent. The lower limbs were flexed, tone poor, knee-jerks diminished, and ankle-jerks present; the plantar response was extensor on the left side and flexor on the right. His pulse was 100, blood pressure 120/60; the apex beat