TRANSACTIONS

OF

The Epidemiological Society of London.

CONSIDERATIONS IN RESPECT TO "RETURN" CASES OF SCARLATINA.

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Mr. President and Gentlemen,—I propose to ask your attention this evening to the subject of so-called "return" cases of scarlatina, by which I understand fresh cases of scarlatina occurring in previously invaded households under circumstances which lead to their being attributed to the return thither of recently discharged patients from Isolation Hospitals.

The circumstances attending the so-called "return case" appear to be somewhat as follows:—

A household becomes newly invaded by scarlatina, and the person first attacked is removed to hospital. During the eight or so weeks of his detention there, the household frequently, though not invariably, remains free from further invasion by scarlatina. A few days after his return home, however, a fresh case, the so-called "return" case, occurs, and is regarded as being due to the arrival in the dwelling of this patient from hospital. In a certain proportion of instances—though by no means in all—the recently returned hospital patient is now found, upon examination, to exhibit some evidence of desquamation, or to be suffering from discharge from the nose or ears; a discovery which is naturally held to strengthen the belief in his having reintroduced infection into the household. Such, then, is a brief outline of the history of the ordinary "return" case.

Theoretically, no doubt, the subject should be dealt with upon a wider basis, since it constitutes a branch of the more general subject of the dissemination of infectious

diseases by discharged hospital patients. For not only do "return" cases probably occur in connection with other diseases, at all events, it would seem, in connection with diphtheria, but it sometimes doubtless happens that discharged hospital patients initiate disease in households other than their own, and that they are also the means, perhaps, of introducing disease into schools and kindred institutions. Practically, however, there will, I think, be advantage in confining our attention this evening to "return" cases of scarlatina; for while on the one hand it is in connection with this disease that we have most experience in regard to cases of the sort in question, on the other hand the subject, even as thus limited, will, I think, afford us as many etiological problems as we shall be able to consider profitably in the time at our disposal.

In regard to the subject I have selected—a subject which appears to be daily attracting increased attention, both among those engaged in public health administration and also among those responsible for the administration of Isolation Hospitals—I venture to hope that I need offer no apology. That it is one of some importance will, I anticipate, begenerally conceded; for if it is true that the return home of patients from Isolation Hospitals results, in any appreciable number of instances, in the re-introduction of scarlatina to their households, to that extent it would seem are we at present failing to obtain what, on theoretical grounds at all events, is to be regarded as the full benefit of our isolation procedures. It is clearly of importance, then, that we should endeavour to ascertain the extent of our failure in this respect, and, if possible, the means by which it may be remedied.

In regard to my treatment of the subject, however, I feel that some apology is called for, since I must at once confess that I am not prepared to put before you the results of anything approaching to an exhaustive statistical or other study of the matter. My purpose, indeed, is rather to seek information than to give it. Having upon one or two occasions been brought into official relations with the subject, I have become impressed with the need for its more systematic study, and it seemed to me that the mutual deliberations of those interested in the matter would form a valuable preliminary to such study in the sense at least of tending to clear the ground, and of thus leading, perhaps, to some approach to agreement as to the general aspect from which so-called "return" cases should for the most part be regarded. And this appeared to me

the more desirable in view of diverse mental attitudes from which the subject has hitherto often been approached.

Lastly, it seemed to me that, of all societies, the Epidemiological Society should be especially fitted to throw light upon the matter, comprising as it does among its members not only many Medical Officers of Health, some of whom must have been brought into contact with "return" cases of scarlatina in their public health aspect, but also not a few Medical Superintendents of Isolation Hospitals, who have had experience—and doubtless anxious experience—of such cases from the hospital standpoint; while the Society also, of course, numbers many members who, having paid special attention to general etiological questions, might be expected to throw light upon some of the more obscure problems which, as I venture to think, are not improbably involved in the subject under consideration.

So far as I am concerned, therefore, my main purpose is to endeavour to set out, as a basis for discussion, the several considerations which have occurred to me as being probably bound up with this matter, and to indicate, by the way, the particular points which have appeared to me as being specially deserving of attention.

I have spoken of the subject of "return" cases of scarlatina as daily attracting increased attention, and that such is the fact is, I think, sufficiently evident from the comparative frequency with which communications respecting it have recently appeared in the medical journals, and in the Annual Reports of Medical Officers of Health. I do not infer from this fact that the hospital isolation of cases of scarlatina was in earlier years unattended by mishaps of the kind; and, indeed, it appears certain, from such inquiries as I have been able to make, that such was not the case. Nor does it seem likely that any general increase has of late years occurred in the proportion of cases of a kind that might be regarded as "return" cases, to the number of patients isolated. It may, I think, therefore be surmised that the increased attention which the matter is now attracting is due partly to the absolute increase in the number of such cases consequent upon the general growth of isolation procedures, and partly to the closer scrutiny into the origin of new cases of scarlatina which has resulted from more complete sanitary organisation, and which has been especially facilitated by the compulsory notification of infectious diseases —the result being that not only are "return" cases now

absolutely more numerous, but such as do occur are more likely to be brought to light.

With respect to the growth of hospital isolation as a method of dealing with scarlatina, it appears from a return made to the Local Government Board, in the year 1879, that only some 18 per cent. of the sanitary authorities in England and Wales had at that time made isolation provision of any sort; and I learn from Dr. Thorne Thorne's Report upon the "Use and Influence of Hospitals for Infectious Diseases", that the provision made, even by such authorities, amounted in many instances to provision only in name. According to a further Return made to the Board in 1893, it appears, however, that the proportion of the total sanitary authorities then in possession of isolation accommodation of one or another kind was practically double that of 1879. During recent years, moreover, considerable improvement has taken place in the character as well as in the amount of isolation accommodation available, and it is certain that this has largely contributed to the more general use of Isolation Hospitals by the public.

As a general result, then, of the increase in the number of Isolation Hospitals, and the improvement in their character, a considerably larger proportion of the total cases of infectious disease occurring in the country are now removed to hospital than was formerly the case. And that this is especially true in regard to scarlatina is, I think, evident from the fact that, whereas the earlier hospitals mostly owed their origin to the occurrence of, or to the fear of, epidemics of small-pox, typhus, or cholera, the isolation of scarlatina has, it appears to me, most frequently afforded the primary object of the more recently erected permanent hospitals. As regards London, which is, of course, of especial importance for our present purpose, it was not until recent years that any systematic provision was made out of the public funds for the isolation of non-pauper cases of infectious illness, though it is true that, owing to one or another cause, a progressive increase from year to year had, prior to this, occurred in the proportion of the cases of London scarlatina which had been removed to the hospitals of the Metropolitan Asylums Board.

With respect to the increased resort by the London public to Isolation Hospitals, the Registrar-General, in his Annual Report for the year 1891, points out that whereas, during that year, 62 per cent. of the total deaths from scarlatina occurred in the Metropolitan Asylum and London

Fever Hospitals, during the year 1878 the proportion was not more than 7 per cent. And according to the Annual Report for 1894 of the Statistical Committee of the Metropolitan Asylums Board, it appears that the proportion of the total notified cases of scarlatina admitted to the hospitals of that Board increased from 42.6 in 1890, to 62.9 per cent. in 1894. And the Committee further estimate that a few years previously the proportion of persons suffering from "fevers and diphtheria" admitted to their hospitals was not more than 11 per cent.

From what has been said, then, it appears to me that the greater use now made of Isolation Hospitals, coupled with the greater facilities for the detection of apparent "return" cases when they occur, afford an adequate explanation of the growing attention which the subject is attracting.

The real importance of the matter for us, however, must, of course, depend upon the frequency with which these so-called "return" cases occur relatively to the number of patients isolated. In the 1894 Report of the Statistical Committee of the Metropolitan Asylums Board, to which reference has already been made, it is pointed out that such cases "are not insignificant in number"; and attention is called to the statement of Dr. Birdwood, the Medical Superintendent of the North-Eastern Hospital, to the effect that at that hospital alone it was reported on sixty-one occasions, presumably during the year in question, "that a recovered patient had returned home from one of the Board's hospitals before the outbreak of illness amongst the other members of the family or household". If it could be assumed that the proportion of such cases heard of at the North-Eastern Hospital to the number of patients discharged therefrom represented approximately the proportion heard of to the patients discharged at the other hospitals of the Metropolitan Asylums Board, it would appear that, during the year in question, some $3\frac{1}{2}$ per cent. of the dismissals from those hospitals were followed by—though, as Dr. Birdwood clearly shows, by no means necessarily the cause of—fresh cases in the households to which they returned.

According, however, to a notice in one of the medical journals, which I have only this afternoon seen, of a Report which has been presented to the Metropolitan Asylums Board by a sub-committee appointed to inquire into cases of illness alleged to have been caused by the premature discharge of patients from that Board's hospitals, it would appear

that the assumption to which I have referred is not borne out by facts, since it is stated in this notice that cases of the kind occurred only in the proportion of one to every 285 discharges. Unfortunately, I am unable to gather from this short account whether the percentage is calculated only upon cases heard of in the sense of complaint, or upon all secondary cases occurring in households shortly after the return of patients from hospital, as ascertained from notification returns. In any case it would seem that the rate was a low one, for in a paper on "'Return' Cases of Scarlet Fever", published in the *Lancet* of June 22nd, 1895, by Dr. Chalmers, Medical Officer of Health to the City of Glasgow, it will be seen that scarlatina reappeared in 2.6 per cent. of the households to which, during the year 1894, the 2,953 scarlatina patients who were discharged from the three Glasgow Fever Hospitals returned. There appear to me, moreover, reasons for thinking that this Glasgow experience compares favourably with that of some other well-appointed and apparently well administered hospitals. There can thus be little doubt that the rate will be found to vary in different times and places, and that where the figures are small the variations will be considerable.

And now, what is the meaning of these so-called "return" cases of scarlatina? How are they to be explained?

Among the members of the reinvaded families, the explanations which perhaps not unnaturally seem to find most favour are based upon an assumed negligence on the part of the hospital authorities; either, and perhaps most commonly, it is concluded that the recently returned patient from the hospital was, owing to want of care on the part of the hospital officials, allowed to leave that institution while still exhibiting indications of infectiveness, which might have been, and ought to have been, detected; or it is taken for granted that, owing to defective arrangements at the hospital for disinfection, or to some other form of defective administration, infection was allowed to be carried from the hospital to the dwelling by the clothing or the hair of the patient, or in some other mechanical fashion.

On the other hand, among those who regard the matter more especially from the hospital standpoint, the tendency seems perhaps rather to rely for explanation of "return" cases upon circumstances other than the direct infectiveness of the recently discharged patients themselves, and independent also of the conveyance by such patients of

infection from the hospital, in any preventable ways. Thus stress may be laid upon the possibility of the fresh case having resulted from some independent source of infection; its time relation to the return of the patient from hospital being regarded as probably a mere coincidence. Or the fresh case may be attributed to defective disinfection of the dwelling and its contents by the sanitary authority, after the removal of the primary case to hospital. And the likelihood of this last cause accounting for a proportion at least of the so-called "return" cases, is often emphasised by reference to the fact that a fresh case of scarlatina not very infrequently occurs in a household, on or about the date upon which it had been arranged that the primary case should return home from the hospital, notwithstanding that, owing to one or other cause, that patient's return was unexpectedly postponed until after the occurrence of the fresh case in the dwelling. Such experiences, it is contended, and apparently not without reason, suggest that the fresh case in the dwelling probably owed its origin to the unpacking, in preparation for the home-coming of the hospital patient, of some garment which had been worn by that patient prior to his removal to hospital, and which had, upon his departure from home, been packed away in a drawer or box out of reach of any aerial disinfectant which might have been subsequently employed.

Another explanation often given attributes a not insignificant proportion of "return" cases to the alleged infectivity, for a certain period, of the breath of recently discharged patients from fever hospitals; the lungs being regarded as mechanical carriers of the infective material with which they have become charged during the prolonged residence of the patients in an infected atmosphere.

That each of the explanations to which I have referred may, and probably does, correctly account for some uncertain number of so-called "return" cases is likely enough, but that they either severally or collectively account for them all appears to me open to considerable doubt.

In regard to the explanations of the first class, it is evident, of course, that any carelessness on the part of the medical superintendents of hospitals, in respect of the discharge of patients, would obviously be not unlikely to contribute to the occurrence of genuine "return" cases. The whole principle of isolation implies the need for the detention of patients in hospital so long as they are subject to any detectable condition which, in the present state of knowledge, must be regarded as indicative of infective-

ness; and it is impossible to deny that a want of proper regard for this principle may, in particular instances, have led to the premature discharge of patients from hospital, and the consequent reintroduction of disease into their households. But the view that culpable negligence in this respect affords an adequate explanation of "return" cases in general, is difficult to reconcile with what I take it will be conceded as a fact, that "return" cases occur in the practice of the most experienced and careful hospital physicians. Moreover, even if it were proved that "return" cases were mostly due to infection directly given off from the recently returned hospital patient, the attempt to fix the whole of the blame for such occurrences upon the hospital officials takes it for granted:

1. That the processes by which, and the circumstances under which, infection is given off from a scarlatina patient are fully and certainly known.

2. That it is possible, by the exercise of due care, to determine precisely and without doubt the period at which those processes have ceased to operate; in other words, the exact time at which a person has ceased to be infective.

3. That patients who are capable of disseminating infection a week or so after their return home were necessarily, and in all cases, also infective at the time of their leaving hospital.

These, however, appear to be very large assumptions—assumptions, indeed, which involve certain important but difficult considerations in regard to the natural history of scarlatina, to which I propose to refer presently.

Similarly, notwithstanding that "return" cases have doubtless sometimes been due to imperfect arrangements at hospitals for the disinfection of the patients' effects, or to the fact of patients having been allowed, through careless administration, to take with them, on returning home, some infected book or toy, yet the fact that "return" cases occur in connection with hospitals which, judged by our present standards, must be regarded as efficiently equipped and administered, makes it impossible, so it seems to me, to ascribe all cases of the sort to culpable negligence in these respects.

The practice, indeed, of allowing patients, on admission, to bring nothing with them but a night garment—which is destroyed at the hospital, fresh clothes being sent from the home on the day of, and for the purpose of, their discharge—does not seem to entirely prevent the occurrence of "return" cases, even though such fresh clothes are sent

direct to a suitably constructed discharging home, or "outbathing place", and every practicable precaution is apparently taken, short of the absolute sterilisation of the discharge nurse, to prevent these clothes becoming infected on the hospital premises. Further, so far as I am aware, no relation has at present been made out between the character of the procedures adopted at different hospitals in regard to the discharge of patients therefrom and the occurrence in connection with such hospitals of so-called "return" cases. Indeed, so far as importance can be attached to a single observation extending over a comparatively short space of time, the experience of Glasgow in this respect is of some interest. For it appears from the paper of Dr. Chalmers, to which I have already referred, that, during the year 1894, the percentage of "return" cases to dismissals was practically identical at the two principal isolation hospitals in Glasgow, notwithstanding that, as Dr. Chalmers shows, "while patients dismissed from Belvidere are subjected to a carefully designed system of bathing, in a separately constructed 'clearing house' . . . . at Parliamentary Road Hospital there are no discharging-rooms, and the ward bath-rooms (which are to some extent liable to harbour infection) have to be used." It would by no means be safe to infer from this experience that a properly arranged discharging house involves a needless expenditure, and that it does not in some measure tend to diminish the occurrence of "return" cases. I have quoted the experience only as being consistent, as far as it goes, with the view that defective administration of the sorts in question hardly afford an adequate explanation of any large proportion of the total of "return" cases met with.

The kindred suggestion which ascribes "return" cases to insufficient bathing of the patients during the later weeks of their detention in hospital, or to the omission of the frequent application to their bodies of solutions believed to possess disinfecting quality, must for the present, it appears to me, be put aside on similar grounds. I am not aware of any sufficient evidence that the occurrence of "return" cases has been prevented by the use of any particular applications of the kind; and it can hardly be suggested that the generally admitted need for frequent bathing is systematically neglected at our best fever hospitals, or that the employment of any practicable means of ridding the surfaces of the body of infective material would not be adopted were any such means known of.

Coming next to the explanations of the other class to which I have referred, there can be little doubt that the occurrence of a fresh case of scarlatina in a household shortly after the return of a patient from hospital is sometimes a mere coincidence, the fresh case being really due to other causes, such as defective disinfection of the dwelling by the Sanitary Authority, or to some outside source of infection. And that such may be not infrequently the case seemed to me to be indicated by an experience which recently came under my own notice. In that instance a relatively serious number of so-called return cases of scarlatina occurred during a particular period in connection with a country Isolation Hospital—so many indeed as to at first sight represent hospital isolation, as there carried out, in a very unfavourable light, in regard to the limitation of the spread of the disease, as compared with home isolation.

The information obtained, however, sufficed to show that during the period in question the households within this hospital district, from which patients were sent to hospital, suffered as a class much more heavily from secondary invasion, apart altogether from the so-called "return" cases, than the households in the same district in which patients were retained at home throughout the whole period of their illness: a fact no doubt partly due to the circumstance of the former being households of a less well-to-do kind than the latter, and in part also to the further circumstances that the hospital class of households comprised on the average a larger proportion of persons at susceptible ages than the home isolation class. Certain facts, however, appeared to indicate that neither age distribution, nor social condition, sufficiently accounted for the greater incidence of secondary invasion, of kinds independent of hospital operations, upon the hospital class of households than upon the home isolation class; the suggestion from which would seem to be that some other factor or factors of scarlatina production had operated more actively upon the former class than upon the latter. And, so far as the information went, it afforded suggestion that one factor of the kind in question had perhaps been furnished by attendance at particular schools. On the whole it appeared to me probable that some unknown proportion of the so-called "return" cases had, in this instance, been due not to the return of the patients from hospital, but to the cause or causes which had contributed to the excessive incidence of secondary invasion generally upon households of the hospital isolation class. This, I venture to think, is an aspect of the matter that is worthy

of further study as opportunity offers, and, in this connection, the possible influence of school attendance in its relation to alleged "return" cases is, perhaps, especially deserving of attention. The possibility of alleged "return" cases being part and parcel of a milk outbreak, should also of course be borne in mind.

Proceeding with my review of the several explanations to which I have referred, it may, I take it, be concluded that some few of the so-called "return" cases are attributable to the unpacking of some imperfectly disinfected garment in preparation for the return of the patient from hospital; perhaps, as has been suggested, some comparatively new garment which had been intentionally withheld from disinfection lest it should be damaged by the process. But, so far as my experience goes, it has not appeared to me that variations in the occurrence of "return" cases are so closely related to variations in the efficiency with which the disinfection of dwellings and their contents is carried out as to suggest that such cases account for a large proportion of alleged "return" cases. Thus, in the instance to which I have just referred as having recently come under my notice, the largest number of "return cases occurred during the first of three succeeding years. At the end of this first year considerable improvements were adopted in one of the constituent districts of the joint hospital district concerned, in regard to the measures adopted for household disinfection. A steam disinfecting apparatus was provided, and, as I was informed, very special care was taken to secure the thorough disinfection of all articles which could be thought of as having possibly been infected by patients prior to their removal to hospital. Subsequently to the adoption of these precautions a considerable diminution occurred in the number of "return" cases heard of in this constituent district, which might certainly at first sight have been attributed to improved household disinfection. But that the whole of this diminution was not so brought about seemed clear from the fact that a diminution in the number of "return" cases occurred coincidently in the other constituent districts, where similar improvements in disinfecting procedures had not been carried out.

On the whole, then, there can, it appears to me, be little doubt that a proportion of alleged "return" cases are really due to infection in some way re-introduced into the dwelling by the returned hospital patients themselves. And I must confess to some doubt whether the view that such patients operate merely as mechanical carriers of infection by

lodgment of infective material in the hair, or by retention of such material in the lungs, or the aural or nasal passages, can be regarded as sufficient explanation of the facts as observed. At all events, at the joint hospital I have just alluded to, I was assured that special care was taken in regard to frequent washing of the hair; and in order to minimise the risk of recently discharged patients infecting other persons by means of infective material mechanically carried in their lungs, or elsewhere, it was the practice for all patients to pass a fortnight, prior to their leaving hospital, in a detached convalescent block specially provided for the purpose, except in cases where arrangements could be made for sending them to reside for a period in cottages in which there were no children. Finally, when they did return home, a printed notice was given to their relatives warning them that the patients should for a time, as far as possible, be kept apart from other persons.

No doubt the "infective breath" theory presents difficulties, since it is impossible in the present state of knowledge to estimate its influence. But while admitting its probable operation in an unknown proportion of cases, it would, I venture to think, be straining it unduly to regard it as a sufficient explanation of "return" cases generally.

If I am right in the views I have expressed, it follows that some share of so-called "return" cases owe their origin to the actual infectiveness of recently returned patients from isolation hospitals; though it seems to me unlikely, for the reasons I have stated, that the fact of such patients returning home in an infective condition can, as a general rule, be attributed to culpable negligence on the part of the medical officers of such institutions. And if that is so it indicates very clearly our need for further knowledge in regard to the pathology of the infectiveness of scarlatina. Only in proportion as we clearly understand the processes by which infection is given off, will it be possible for us to recognise the termination of those processes. According to a time-honoured and widely distributed belief, the infectiveness of scarlatina is mainly associated with the process of desquamation. This belief, which is still generally held by the medical profession, was recently endorsed by the report of the committee appointed, by the Clinical Society of London, to investigate the periods of incubation and contagiousness of certain infectious diseases, in which it is laid down as regards scarlatina that, "Infection certainly persists as long as there is any desquamation." That a belief so widespread, not only among the public, but also

among those specially trained to the observation of disease processes, is without foundation, seems in a high degree unlikely. There appears, however, to be a growing tendency among certain experienced observers to attach less importance to this source of infection, especially during the later stages of convalescence. That apparently susceptible persons do not necessarily contract disease upon being associated with desquamating scarlatina patients is well illustrated by the significant experience recorded by Dr. Priestly, in a paper read by him before this Society in March last, from which I learn that, owing to an outbreak of small-pox at Leicester, "not less than 120 children, in various stages of desquamation after scarlet fever, were sent to their homes"; and that "no single second case occurred at any of these houses", although Dr. Priestly, in his capacity of Medical Officer of Health, "carefully watched them for three months." And many of us have probably met with experiences of an allied character, though on a smaller scale. It would be rash indeed to conclude from such negative evidence that the process of desquamation is never attended by infective property, especially in view of the weight of opinion and experience on the other side; and I would not for a moment countenance any relaxation in our present custom of urging isolation so long as any desquamation exists—pending at least a fuller knowledge of the pathology of infectiveness in this disease. But it does appear to me that the whole matter requires very careful study; and it seems at least likely that whatever may be the part played by desquamation in this respect, we have hitherto underrated certain other modes by which the infection of scarlatina is disseminated. I refer especially to catarrhal conditions of the nose, ears, and especially of the throat. In so far as it is safe to attach importance to the analogies between scarlatina and diphtheria, it would appear not improbable that the throat plays an important part in the spread of the former disease; and the fact of this channel of infection not, apparently, being more prominently kept in view, may possibly be due to an exaggerated importance attached to desquamation. For instance, it is not unlikely that in endeavouring to trace the origin of fresh cases of scarlatina, the discovery of traces of desquamation upon a recently recovered patient is often in itself regarded as a sufficient explanation of infectivity, and no further sign is sought; whereas, had examination been extended to the throat, other evidence of infectiveness might have been detected.

This appears to be a matter that should be carefully borne in mind in connection with the study of "return" cases of scarlatina.

In view, also, of recent researches in connection with enteric fever, the possible infectivity of the urine of scarlatina patients would appear to be deserving of attention.

As regards our practice, it is easy, however, to say that infectiveness must be presumed to exist so long as any desquamation, or any catarrhal condition of the nose, ears, or throat remain. But, so far as the prevention of "return" cases is concerned, this dictum is by no means altogether satisfactory. For not only are some of the lesions in question apt to become so chronic that the continued isolation of the patient is obviously impracticable; but experience, unfortunately, seems to show that they sometimes recur, and may not, perhaps, even then be without powers of infectivity. This possibility of a recurrence of lesions which may possess infectivity is one of considerable importance in connection with the subject of "return" cases, and is one which should be carefully held in view in passing judgment upon questions of hospital administration in this connection. Whatever may be the significance of the fact in regard to the infectiveness of scarlatina, there can, I think, be little doubt that the process of desquamation, although apparently completed, may be again renewed. And the same appears to be true in regard to the other lesions enumerated. Unfortunately there seems little immediate prospect of bacteriology affording us that measure of assistance in determining the infectivity or otherwise of such recurrent manifestations in the case of scarlatina that it promises in regard to diphtheria; but that appears to be an additional reason for close study of the matter in its clinical aspects, and the subject is one upon which I would especially invite the opinions of members of this Society.

I should next wish, by way of suggestion, to briefly direct your attention to certain considerations which may perhaps have a bearing upon the occurrence of "return" cases of scarlatina. In the series of cases to which I have already on several occasions referred, there appeared to me some indication of the operation of a seasonal influence; the "return" cases occurring most frequently, relatively to the number of dismissals, in connection with patients who were discharged during the latter half of the year. I also noted that, relatively to the number of dismissals, such

cases occurred most frequently during the rise of the epidemic. It would be unsafe, of course, to draw definite conclusions from experiences of so limited a character, but, so far as they go, they are not inconsistent with the notion that the occurrence of "return" cases may be in part regulated by variations in the infectivity of scarlatina, or the receptivity of individuals, at different times, including, perhaps, cyclical variations extending over considerable periods, such as those to which Dr. Whitelegge has so ably directed attention in respect of certain of our indigenous diseases. In any case, these appear to be questions worthy of attention in the future study of "return" cases of scarlatina.

A matter of more immediate practical importance, upon which also we require more extended observation, is the possible operation of over-crowding of hospital wards as a factor in the production of "return" cases. As a result of his investigations in Glasgow, Dr. Chalmers appears to have been led to the conclusion that prolonged over-crowding of wards does conduce to the occurrence of such cases, and I have myself seen reason to regard over-crowding with suspicion in this respect. Whether its operation, if it does operate in the direction suggested, is due merely to the circumstance that the lungs of patients leaving overcrowded hospitals are charged with more highly infective air than would otherwise be the case, or whether the surcharging of the ward atmosphere with infective material tends in some way or other to prolong the period of infectiveness of patients residing therein—owing, perhaps, to their undergoing slight reinfections, as suggested by Dr. Boobbyer—is a difficult question. In regard to the matter, Dr. Chalmers remarks that "it would appear that apart from the possible return of readily recognisable conditions such as desquamation, etc., after dismissal, there is a constitutional effect produced which renders the discharged convalescent a danger to susceptible persons who may be brought into close contact with him. That this results from saturation of the system is, I think, clear; but whether it is due simply to delayed elimination, or to constant breathing of a saturated atmosphere by the convalescent, is matter for conjecture."

Dr. Chalmers further refers to the fact brought out by Dr. Sweeting as to the increased frequency in the occurrence of albuminuria which results from the aggregation of acute cases of scarlatina, as perhaps bearing on the point in question.

Before concluding, there is one point in regard to the investigation of "return" cases upon which the opinions of members of this Society would be very helpful. I have frequently referred to such cases as occurring shortly after the return of patients from hospital. In statistical inquiries into the matter, however, it will usually be necessary to fix some time limit within which cases occurring after the return of patients may be reasonably classified as possible "return" cases: cases occurring later being excluded on the ground of their being more probably due to fresh sources of infection. And the question is as to the time limit that should be adopted. This has sometimes been fixed as twenty-one days, and I think it will be agreed that if we err in adopting that period we err on the side of liberality; for I observe that 9.3 per cent. of Dr. Chalmers's cases, which seemingly included all cases heard of, occurred within a fortnight after the dismissal of the patients from hospital. It has also to be remembered that the period of incubation of scarlatina is usually less than three days, and practically always less than eight. On the other hand, it of course by no means follows that a fresh case was infected immediately on the arrival of the hospital patient in the dwelling, especially if such case resulted from a recurrence of infectivity on the part of the hospital patient. On the whole, therefore, I am disposed to think that the period of twenty-one days, if somewhat liberal, is perhaps a not unreasonable one for statistical purposes. But besides what I may call this far time limit, a near time limit will also be required. In this respect it would, perhaps, be sufficient to exclude all alleged "return" cases occurring upon the day of the arrival of the patient from hospital.

And now, Gentlemen, briefly summarised, the view which I have endeavoured to put before you is, that although a certain proportion of "return" cases may of course at divers times and places be due to carelessness in the discharge of patients, or to other form of culpable maladministration, whether on the part of the hospital officials or those responsible for the disinfection of the patients' dwellings and effects, there are, nevertheless, in all probability some more obscure factors at work—factors, perhaps, closely bound up with the natural history of scarlatina.