

had been dead at least 48 hours, and post-mortem changes had taken place, but was not considered to have suffered from "grouse disease"—i.e., the form of epidemic disease described by Professor Klein in the grouse. No fresh blood films were examined but only dry films stained either with Leishman's or Giemsa's stain.

The protozoal organisms found were fully grown and sexually differentiated sporonts of a leucocytozoon. They were fairly abundant but in a state of degeneration and

the female sporonts, with hyaline cytoplasm which stains very faintly or not at all and rarely contains vacuoles. The nucleus is considerably larger than in the macrogamete.

The parasites are contained in oval or spindle-shaped elements with the extremities usually drawn out into fine long threads not unlike flagella. The nature of these elements is not quite clear; they appear to be blood cells greatly altered by the parasites they inclose. They present a deeply stained

FIG. 1.



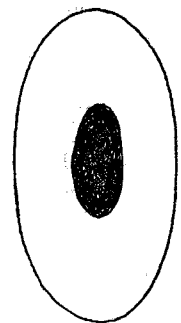
Leucocytozoon lovati; figures from drawings by A. J. E. Terzi. Macrogamete. (\times about 2000.)

FIG. 2.



Leucocytozoon lovati, microgametocyte. (\times about 2000.)

FIG. 3.



Normal red corpuscle of grouse. (\times about 2000.)

stained badly. The following is a brief provisional description: Macrogametes of an oval shape, more or less elongate, 19μ to 25μ in length by 12μ to 16μ in width. The cytoplasm has a coarse alveolar structure, stains intensely blue, and usually presents one or more clear spaces or vacuoles. Nucleus either rounded or oval and placed as a rule about the middle of the parasite. It stains very faintly and contains as a rule near the periphery a compact, deeply staining chromatin mass. Microgametocytes slightly smaller than

nucleus pushed to one side and flattened by the parasite which entirely occupies the short diameter of its host-cell; at either extremity are numerous chromatoid granules. This leucocytozoon of the red grouse appears to differ from the leucocytozoa parasitic on the turkey and guinea-fowl described by Laveran and Lucet and by Neave respectively, and since we consider it to be a hitherto undescribed species we propose to call it *Leucocytozoon lovati* after Lord Lovat, chairman of the Commission upon Grouse Disease.

THE CLINICAL SIGNIFICANCE OF ALLOCHIRIA.¹

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DURING the past two years I have had the opportunity of making a detailed investigation of some cases of allochiria, a complete study of which will shortly be published, together with a full discussion of the pathogenesis of the condition. The fact that this paper is therefore merely a preliminary communication containing a summary of the results of the above study is advanced as an explanation of any appearance of dogmatism in the remarks that follow. Only the clinical significance of the condition will be considered, as the subject of pathogenesis would need a lengthy exposition.

In spite of Professor Janet's remarkable essay, which has not yet received the attention it deserves, it may be said that the views held on the subject by most neurologists can be summarised in the following statement, which is taken from the most complete modern text-book we have—namely, Nothnagel's "Specielle Pathologie und Therapie": "Allochiria is a defect in localisation, whereby a patient refers a

cutaneous stimulus to the corresponding contralateral point; it occurs in a large number of diseases, notably tabes and hysteria, and is of no value in diagnosis." How inexact is this account of the condition will be seen presently.

The symptom first described by Obersteiner under the name of Allochiria refers to two entirely different conditions, which hitherto have not been differentiated from each other by any writer. The one, which may be called "false allochiria," is an instance of the localisation defect known as alloesthesia. The other, for which I have proposed the designation "Dyschiria" or "Dyschirognosis," is an instance of psychological disaggregation and comprises three distinct varieties, of which true allochiria is one. In addition to these the terms "electromotor allochiria" and "reflex allochiria" have been applied by Weiss to conditions in which a unilateral stimulus evokes either a bilateral or contralateral motor response. There is no reason whatever why the term "allochiria" should be used in this connexion and I shall not mention the conditions further. One might just as soon call the consensual reaction of the pupil to light allochiria, particularly if the direct response is abolished, as happens in lesions of one third nerve.

I shall first give a brief description of false and true allochiria with their distinguishing characteristics and shall then consider their clinical significance. In alloesthesia there is erroneous localisation of cutaneous stimuli, which are referred by the patient to points more or less distant.

¹ A paper read at the International Congress of Neurology and Psychiatry, Amsterdam, on Sept. 5th, 1907.

These stimuli are referred usually to points on the same side of the body but, for a reason that we cannot consider here, a certain number are referred to the corresponding point on the opposite side. The symptom of false allochiria does not need any special designation other than the general one of *alloesthesia*, for its significance and pathogenesis are identical with those of the latter condition. It differs clinically from true allochiria in respect to seven precise features. 1. In *alloesthesia* only a certain number of the stimuli are referred to the contralateral side, usually less than 50 per cent. of them; in allochiria the stimuli are invariably referred to the contralateral side. 2. In *alloesthesia* the symptom in question is merely an instance of the erroneous localisation that takes place in every direction, so that the error in transverse localisation bears an exact relation to the error in vertical localisation; in allochiria there is no error in localisation apart from the mistake in the side. In *alloesthesia* a touch on the inner side of the ankle might be referred to the outer side of the ankle, to any point on the foot or leg, or to the opposite ankle; in allochiria such a touch would invariably be referred to the inner side of the opposite ankle and nowhere else. 3. In *alloesthesia* there are disturbances of common sensibility—particularly *hypoesthesia*—which are important factors in bringing about the erroneous localisation; allochiria bears no relation to any defect of cutaneous sensibility, though such defect may sometimes be present independently. 4. In *alloesthesia* there may be *hypoesthesia* or *paræsthesia* but there are never present the peculiar attributes that we shall consider in connexion with allochiria under the name of *Phrictopathic Sensation*. 5. In *alloesthesia* hallucinatory sensations and *polyesthesia* frequently occur; in allochiria this is not so. 6. In *alloesthesia* there are no corresponding motor manifestations, except perhaps *ataxy*; in allochiria motor manifestations are at least as prominent and characteristic as sensory ones. 7. In *alloesthesia* there are no corresponding mental symptoms and the patient's error is due solely to the fact that, on account of the peripheral defect, the mind receives imperfect information about the stimulus; allochiria, on the other hand, is essentially a mental manifestation in which there is a deficiency of the power of apprehending the feeling of "sidedness."

I shall add nothing to this brief account of the false or *alloesthetic* allochiria beyond a few remarks later on the subject of diagnosis. *Dyschiria* however demands a fuller description. As was first pointed out by Janet, there are three distinct varieties of this condition, and these must be separately considered. There are, further, three manifestations of each variety—sensory, motor, and mental.

For the *first* variety, called "simple allochiria" by Janet, I have proposed the designation "*Achiria*." This term indicates that its essential feature is a defect in respect to the feeling of "sidedness" or "handedness," which may be called the *chirognostic sense*. The three manifestations of this variety are as follows. First, sensory stimuli are perfectly appreciated and correctly localised with the exception of their side. They give rise to no feeling of "sidedness" whatever. It is not accurate to say that the patient is in doubt as to the side of the stimulus; he is quite sure that he has no idea on the subject and refuses to make any guess. The sensation experienced has certain peculiar qualities that will presently be mentioned. Secondly, if the patient is asked to carry out any movement with the limb in question he is unable to do so unless the limb is indicated in some other way than by the use of the words right or left; the reason for this is that he has lost the knowledge of the meaning of these words, either altogether or at all events when they are applied to the limb concerned. Thirdly, he is unable spontaneously to conceive the feeling of this limb and declares that he has no such part of his body.

For the *second* variety, called "complete allochiria" by Janet, I shall simply use the term "*Allochiria*," for it resembles the condition commonly defined under this term. The three manifestations of this variety are as follows. First, sensory stimuli applied to the affected side are invariably referred to the corresponding point on the opposite side of the body. This is done with an air of absolute conviction, so that, for instance, a patient affected with allochiria on only the right side feels no more certain that a touch is on the left side when it is applied on this side than he does when it really is applied on the right side. Secondly, if the patient is asked to carry out a movement on the affected side he invariably does so with the corresponding part of the opposite side, fully under the impression that he has carried

out the movement correctly. This phenomenon has been given the name of "*allokinesia*," rather unfortunately, as I think, for so doing serves only to create an artificial separation between two aspects of what is essentially the same condition. *Allochiria* is neither a motor nor a sensory phenomenon, but a psychical phenomenon that has both motor and sensory manifestations. Thirdly, the *chirognostic sense* is altered as follows: In a bilateral case the patient can conceive of a given feeling of "sidedness" only when the opposite side is moved or stimulated. In a unilateral case he can conceive of the feeling of "sidedness" of an affected part only when he moves the corresponding part on the opposite side under the impression that he is moving the part in question; if he really moves the affected part, or if this is stimulated, he invariably gets the feeling of "sidedness" of the opposite part.

The *third* variety has been given the appropriate name of "*Synchiria*" by Janet. The three manifestations of it are as follows. First, a sensory stimulus evokes two simultaneous sensations, which are referred to the corresponding points on both sides of the body. Secondly, when the patient is asked to carry out a movement on the affected side he does so on both sides, though in so doing he gets only the feeling of "sidedness" of the affected part. Thirdly, the patient is unable, either spontaneously or when cutaneous stimulation is applied, to conceive the affected feeling of "sidedness" alone apart from the feeling of the corresponding opposite side, though he can conceive it when he moves both limbs under the impression that he is moving only the affected one.

On the introspective side there are many interesting matters in connexion with *dyschiria*, but the above-mentioned clinical features are sufficient to enable the condition to be recognised. As regards the distribution of *dyschiria* it may be general and bilateral, it may be unilateral, or it may concern only certain regions of the body. In a given part it may relate to all the functions of the part or to only some. Thus in the *allochiric* stage only painful sensations may be referred to the opposite side and not other sensations. These three varieties of *dyschiria* are three grades of the same pathological process, *achiria* being the most severe and *synchiria* the least. Probably any one may occur without the others, though it is true that *achiria* and *synchiria* have not hitherto been observed except in cases that at another period presented *allochiria*.

The last point that must be mentioned in this connexion is the peculiar nature of the sensation that a stimulus applied to a *dyschiric* part evokes. There are six characteristic features about such a sensation. First, it is abnormally persistent; a momentary touch evokes a sensation that lasts half a minute or longer. Secondly, its reaction time is delayed, being usually more than a second longer than that of a normal sensation arising under the same conditions. Thirdly, it is prevented by a simultaneous stimulus applied to any normal part of the body and is at once abolished by the subsequent application of any such stimulus; thus, if two touches are simultaneously applied, one on a *dyschiric* part and the other on a normal part, only the touch on the latter part is felt; and, again, if a normal part is touched while the patient is still feeling the persisting sensation that follows a touch on a *dyschiric* part he at once ceases to feel the abnormal sensation. Fourthly, it has a strong tendency to evoke an immediate motor response. Fifthly, it has a peculiar quality that the patient describes as a diffuse shuddering or tingling; this is always unpleasant, usually very disagreeable, and sometimes constitutes a horrible shudder. On account of this quality I have described it under the name of *Phrictopathic Sensation*. Sixthly, the feeling of personal ownership of the part stimulated is more or less gravely compromised. All these features are most marked in the *achiric* stage and least in the *synchiric*, as may be illustrated by considering the last one. In the *achiric* stage the patient can describe all the features of the stimulus as correctly as a normal person, but he is convinced that the point touched is not on any part of his own body and cannot understand how all the information about the stimulus reaches him. For instance, he might say "You are touching the back of a thumb with a blunt pin; it isn't my thumb and I have no idea where the thumb is." In the *allochiric* stage the part touched feels dead and as if belonging to the patient in only the vaguest way. In the *synchiric* stage two points seem to the patient to have been touched; the homolateral one feels strange, foreign and as if it were asleep, and the sensation has the other peculiar attributes mentioned above; the contralateral one feels

obviously a natural part of his own body and the corresponding sensation has no abnormal attributes.

Coming now to the question as to the value of these symptoms in diagnosis, let us first consider the false or alloæsthetic allochiria. This can be distinguished with certainty from true allochiria by means of the data given above. The only other matter I wish to refer to in this connexion is the fact that allochiria may be simulated by a peculiar irritable condition of the lowest afferent neuron system. In this hyper-excitabile state, which is not very rare in tabes and in certain affections of the peripheral nerves, the patient experiences an indefinite number of hallucinatory sensations which he refers to various precise points on the surface of either limb. The condition is easily recognised by the fact that sensations are experienced independently of objective stimulation and are increased in vividness when the element of expectant attention is added, but, if the possibility of its presence is not borne in mind, it is equally easy for the condition to be mistaken for allochiria or at least for alloæsthesia. The clinical significance of this form of alloæsthesia is that of erroneous localisation in general so that I need not discuss it here. There is no doubt that the symptom is most marked in affections in which the articular excitations are impaired, and this is probably the reason why it is so often and so well seen in tabes.

The relation of dyschiria to diagnosis must be discussed from two points of view: first, the diagnosis of dyschiria; and secondly, the significance of dyschiria as regards diagnosis of the affection present. It is convenient to discuss separately the sensory and motor aspects of the former problem.

When it is observed that a cutaneous stimulus is referred to the opposite side it can readily be determined, as stated above, whether allochiria or alloæsthesia is present by a knowledge of the distinctive features of those conditions. The observation of the transference of sensation may not be made however and in this case the condition will be overlooked. Even when a patient's localising capacity is being tested it may not occur to the observer expressly to inquire as to the side on which the sensation is felt; this is especially likely in true allochiria when the patient localises every stimulus with exactitude and certainty. Further the allochiria may be present only in connexion with certain kinds of stimuli. The other two varieties of dyschiria are overlooked still more easily, especially as they are less known. In the achiria variety there is no transference of sensation and even if the patient is questioned as to its side he replies simply, "I don't know," so that the state of affairs will not be correctly interpreted unless the observer is aware of the existence of this variety of dyschiria. In the synchiria variety three sub-varieties occur, all with their special fallacies of observation. In the first and most advanced of these three the contralateral sensation is appreciated most distinctly, and if the patient mentions only this one the condition may be mistaken for allochiria, a serious prognostic error. In the second subvariety the sensations on both sides are appreciated with equal distinctness; the patient usually says that he was touched on both sides, but if he thinks only one touch has been applied he sometimes says he does not know which side was touched, and in this case the condition may be mistaken for achiria. In the third subvariety the homolateral sensation is the more distinct and if the patient mentions only this one the state of affairs may be thought to be normal.

On the motor side the possible errors in observation are much more important. The motor manifestations, unless analysed carefully, are easily interpreted as clumsiness and weakness. In a unilateral case, when the face, arm, and leg are affected, the resemblance to incomplete hemiplegia is very considerable. All the signs of supranuclear facial paralysis may be present, the gait is typically hemiplegic, and in direct tests of strength, such as with the dynamometer, the conscious effort produces such disproportionately slight results that the presence of paresis may readily be concluded. Again, in the synchiria variety the movements bear a decided resemblance to the synkinesic phenomena of hemiplegia.

It is hardly necessary to remark that all these fallacies can be avoided if the various conditions with their characteristic features are borne in mind.

The significance of dyschiria is totally different from that of alloæsthesia. Although the majority of writers have held that dyschiria, like alloæsthesia, is due to a defect in the excitations that reach the mind from the periphery, the

evidence is overwhelming in favour of the view that it is due rather to an incapacity on the part of the mind to appreciate these excitations, which are themselves unimpaired. The following three arguments may be advanced in support of this view.

In the first place, no case of dyschiria has ever been recorded in which the presence of hysteria was excluded. 19 cases have been published of true allochiria; in 16 of these hysteria was the only nervous affection present; in the remaining three there was every reason to suppose, from the other symptoms shown, that hysteria was present in addition to the organic nervous affection. As hysteria is purely a mental affection and certainly is not associated with any defect in the peripheral afferent system, we therefore have strong grounds for supposing that dyschiria is likewise a mental phenomenon. In two cases of hysteria allochiria has been artificially produced during hypnosis, so that here we have positive evidence of its mental origin.

In the second place the remarkable specificity of the phenomenon is most suggestive of its psychical nature. The complete failure of the patient to apprehend the appropriate feeling of "sidedness" in connexion with a cutaneous stimulus contrasts sharply with his power of correctly appreciating all its other attributes, its quality, exact locality, &c. This failure on the one question of "sidedness" stands out absolutely in contrast with the retention of all the other capacities in the same connexion. Never in the hypoæsthesia of organic disease do we find a patient able to differentiate two pieces of cotton-wool of different degrees of coarseness, and localising a touch exactly except for the one fact that he feels it invariably on the opposite side of the body (allochiria), on both (synchiria), or on neither (achiria). The whole picture reminds one irresistibly of the other specific and highly specialised losses that are so characteristic of hysteria.

In the third place, the phenomenon exists only so far as conscious mental processes are concerned. Though the correct feeling of "sidedness" cannot be apprehended in consciousness in the normal manner, so that the various conscious defects occur as described above, nevertheless its presence in the mind is proved by its influence on habitual and automatic processes. The more conscious and volitional is the mental process concerned the greater is the dyschiria defect, while the more subconscious and automatic is the process the less is the defect.

We may therefore conclude that the phenomenon is always of psychical origin and that its presence is almost certain evidence of hysteria. Finally, the recognition of the dyschiria process may aid greatly in the analysis of the defects present and serve as a valuable guide to the discovery of the ultimate basis of the affection, thus proving an important step in that exact psychological diagnosis that underlies all scientific treatment of hysteria.

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A PRELIMINARY NOTE ON BOMBAY SPIRILLAR FEVER.

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Morphology.—The length of the spirillum varies within wide limits; forms from $7.0\ \mu$ to 80 or $90\ \mu$ are met with. The length of the ordinary individual cell is from 10 to $16\ \mu$, the next most common length is from 26 to $32\ \mu$, and the increase in size goes roughly in multiples of from 10 to 16 . Very rarely smaller individuals, as short as 6 or $7\ \mu$, are seen, but whereas this is the rule in the American spirillum (q.v.) it is exceptional in the Bombay form. The width is not greater than $0.5\ \mu$ and is generally less. The individual from 10 to $16\ \mu$ long may possess as many as six or seven curves, but there is no regularity in the number or excursion of the curves.

In fresh blood the organism is always of corkscrew shape but in films it appears in open curves and is often not more curved than a strand of cotton which has fallen to the ground. The aster or rosette arrangement generally depicted is never seen in natural blood or in vitro. Agglomeration readily takes place but is in the form of wisps or masses of tangled threads. Division takes place transversely, and in deeply stained specimens the dividing line between two daughter spirilla is