Some Observations on General Paralysis. By Isaac Ashe, M.D., T.C.D., Medical Superintendent of the Londonderry District Asylum.

(Read at the Annual Meeting of the Medico-Psychological Association, held at Dublin, August, 1875.)

Although we have, for some time past, begun to emancipate ourselves from the idea that insanity is a disease of the mind, and admit, in theory at least, that it is strictly a disease of the body, as much so as typhus, or any other disease involving perturbed mental phenomena, yet we have scarcely hitherto begun to investigate the pathology of insanity from this point of view. Even yet we classify the forms of the disease by the mental manifestations it presents, and speak of mania, melancholia, dementia, &c., when our aim ought to be to differentiate the physical or chemico-vital somatic conditions; we describe the insanity of fear, of pride, of exaltation, &c., much as if we should classify ulcers as those of the hand, the arm, the leg, and the trunk, instead of attending to the more important characters of ulcers in general with their true specific differences. For, I venture to think, that Professor Ferrier's researches point strongly to the view that the differences in direction, so to speak, taken by the mental phenomena depend to a great extent upon the differences in the portion of brain-tissue principally affected. The investigation of the physical causation and conditions of insanity will doubtless be laborious and tedious work, but there can be no doubt that the results to be obtained will more than repay the labour which must be expended in the investigation.

It seems to me that in General Paralysis we have, as it were, a portal to such an investigation—a sort of basis of operations from which our future explorations of unknown territory may with advantage be commenced; in fact, that the key of the unknown region lies in a knowledge of this disease, its causes, pathology, and conditions.

As regards the causes of this disease, two are usually assigned, and have almost been accepted, namely—1st, Excessive use of alcoholic liquors; and 2ndly, Immoderate sexual indulgence.

But as regards the first of these assigned causes, I have to call attention to a very remarkable fact regarding the distribution and statistics of the disease which bears very strongly

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on this point, and is perhaps very little known. It is this: that General Paralysis is scarcely to be found in Ireland, though so common in England and Scotland. The remarkable absence of the disease in the Irish asylums with which I am acquainted, as contrasted with those of Great Britain, has long since pressed itself on my mind; but I have recently endeavoured to procure as far as I could some exact statistics on this point. As an illustration of the vast differences existing between England and Ireland in this matter, I may direct your attention to one or two particular instances. Thus, in the Twenty-ninth Report of the English Commissioners in Lunacy, just published, at p. 207 we find the inmates of the West Riding Asylum put down as numbering 1404; and on the next page, the deaths from General Paralysis during the year are—males, 26; females, 9—total 35, which will probably give 70, or 5 per cent., as the number of cases at any given date. Per contra, my friend Dr. Merrick, having charge of the Belfast Asylum, containing 400 patients, writes to me—"We have no case of General Paralysis in the Belfast Asylum at present." Dr. McCabe, of the Central Criminal Asylum, with 163 patients, writes—"I regret that there are no materials here; I have not had a case of General Paralysis since I took charge, three years ago." Dr. Atkins, the Assistant Physician of Cork, with 700 inmates, writes—"One spurious case at present in the asylum." In my own asylum at Londonderry, with 250 inmates, I have at present only one case; but I was fortunate enough to have another well-marked case some time ago, and I have also met the disease in private practice.

I cannot but think that such a disproportion in the frequency of the disease in the two countries must be held at once and entirely to negative the theory that its development is due to excess in the use of ardent spirits; indeed, I might add that it equally negatives the view that it is due to venereal excesses either; for, certainly, neither in the one direction nor in the other can it be asserted that the Irish peasant is more abstemious than his English neighbour. And, moreover, as regards the use of ardent spirits, any one of us in Ireland could at once count up 10 per cent. of our asylum population whose insanity has been caused by the abuse of distilled liquors; but the disease does not take the form of General Paralysis.

But it seems to me that there is a form of alcoholic indulgence in which the Englishman and Scotchman markedly

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distance the Irishman, and this is the consumption of malt liquors, of which the Irishman uses but very little, but the Englishman and Scotchman a great deal, particularly those whose occupations compel them to undergo severe and continuous bodily labour, such as the colliers and ironworkers; and it is, I believe, the experience of those who have seen most of General Paralysis that it is especially among these hardworking operatives that this disease is to be found. Whether such a result should be regarded as due to the use of pure and unadulterated malt liquors, or is rather to be considered as the effect of some adulteration thereof, is an open question. I should be strongly inclined to think that the latter is more likely to be the case; and of the various adulterants, I should think that Cocculus Indicus is the one that should most probably be credited with this dire result, since observation has shown its power of producing paralysis when administered in too large quantity. It seems to affect both the nervous and muscular systems. Pereira says that it causes staggering, trembling, tetanic convulsions, and insensibility, and that it appears to act on the voluntary muscles. I need not remind you how frequently convulsions, though rather of an epileptoid character, are found in the disease under consideration. Pereira states that it seems to be frequently added to malt liquors, and refers to a book containing trade directions for so doing.

I think the remarkable absence of the disease in Ireland is quite sufficient to prove further, that even immoderate sexual indulgence is not a *vera causa* of the disease. Were it so, we should undoubtedly have our share of it here. But the presence of strong sexual proclivity during the course of the disease is undoubted, and I have myself observed it in every instance. If, then, statistics forbid us to regard it as a cause, it is clear that we are bound to regard it as a consequence of the disease; and this is a matter of importance to be borne in mind in our investigation of the physiological conditions and causation of the disease, a matter to be distinctly separated from the toxic causation already referred to.

I have recently sent a circular containing queries regarding the statistics and distribution of General Paralysis to nearly every physician superintendent of an asylum in the three kingdoms, whether private or public, asking for information regarding the disease as found at present in his asylum. I had hoped by means of the answers to these queries to be able to draw contrasts based upon large averages

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between—1. The inhabitants of each of the three kingdoms as such. 2. Between the Celtic population of these islands and the Saxon. 3. Between the upper classes and the lower. 4. Between the town populations and the country. 5. Between the artisan and operative classes, miners, ironworkers, &c., and the purely agricultural classes. The value of such an analysis in investigating the causes of General Paralysis will, I think, be obvious. I regret to say, however, that only about 25 out of 200 of these circulars have been returned to me. I am thus only able to give you statistics based upon illustrative cases rather than on a complete average. I have, however, to thank several gentlemen for their kind assistance, and particularly those who were not deterred from replying to any queries by the fact that they had no information to give me, since this was the very point that I wished to elicit with regard to their asylums, namely, that General Paralysis was almost unknown therein. The returns which I have actually obtained shew that Ireland is almost entirely free from this disease, whether in its public or private asylums; while in the private asylums of England it is as rife as in the public. Thus, one gentleman, a high authority on the disease, writes to me that in his private asylum eight cases out of the last fifty admitted have been cases of General Paralysis. Another gentleman returns me three out of fifty-five; another one out of fifteen. I am sorry that I have no returns from the Scotch private asylums, but we have here sufficient proof that social position has nothing to say to it. Again, its absence in the large town of Belfast, numbering 200,000 inhabitants, and by far the most industrial town in Ireland, proves that town life as such is not a cause, not even when accompanied by excessive use of spirits, for which Belfast is notorious. Again, its absence in the country district belonging to the Belfast Asylum, namely, the County of Antrim, proves that it does not depend on any difference between the Saxon and the Celtic race; for Antrim is as purely Saxon as Lanarkshire, and much more so than Cornwall or Glamorganshire, both of which are indeed Celtic counties of Great Britain, and exhibit rather a proclivity towards the disease. The non-manufacturing districts of Scotland are pretty free from the disease, if we may judge from the return of the Inverness Asylum, where Dr. Aitken gives one doubtful case out of an asylum population of 337, and the counties of Argyll and Bute, which give us three out of 300. Perth, again, gives two out of 232. I have no reason to believe that these

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districts of Scotland are specially abstemious as regards the use of whiskey, which seems to be pretty freely used everywhere throughout Scotland. In Cambridgeshire, again, a rural population, there are but three cases out of 275. We may compare this with the North Riding, where out of 230 males we have fifteen cases; or Lincoln, where we have four out of thirty.

Altogether, therefore, these statistics seem to point out that as regards the lower classes the disease is principally developed among the manufacturing and operative classes, particularly among those who undergo severe bodily labour, and that the agricultural populations are comparatively exempt; but though I think that this points very distinctly to the use of malt liquors rather than to that of spirits as a cause, yet there seems to be still a residuum of unexplained causation behind, which I shall endeavour to reach from other considerations farther on.

I have referred above to the presence of strong sexual proclivity during the progress of the disease—a fact which everyone has probably observed in general paresis, though it would seem to be absent in locomotor ataxy, according to some observations with which Dr. W. H. O. Sankey has favoured me. I think we are fairly entitled from the above statistics to regard this as a consequence rather than as a cause of the disease. Another well-known consequence is the marked tendency to fatty degeneration of all the tissues. Several of my correspondents—in fact, I think all who seem to have been in the habit of making post-mortem examinations—bear testimony to this. In a case of which I recently made a post-mortem, and of which I am able to shew you some sections, microscopical examination shewed distinct evidence of this everywhere.

The post-mortem was made eighteen hours after death. There was no rigor mortis, probably, in part at least, owing to the amount of destruction of muscular tissue that had taken place; a layer of fat an inch and a-half thick existed over the whole chest and abdomen; the liver was a mass of oil globules; the muscular fibrillæ of the gastrocnemius pale and fatty; the heart similarly affected; in the bony structure of the ribs the Haversian canals seemed almost obliterated by a mass of degenerate deposit containing oil. There were gangrenous spots on the toes and heels; these had appeared a couple of days before death. The brain was in a very soft and almost creamy or diffluent condition.

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This is, of course, no new observation with regard to the fatty degeneration of the tissues in cases of general paresis. Thus Dr. E. L. Ormerod, in a paper published in the "Journal of Mental Science" for January, 1871, writes on his examination of the bones of a patient who died of this disease under Dr. Williams' care:—"The bones were dark, singularly wet and greasy, and, considering the short time that had elapsed since death, unusually advanced in decomposition. On any pressure of the ribs dark blood oozed from the comparatively large vessels on their surface. A section of the right thickness to display the structure of a healthy bone shewed nothing at all, the field was so clouded. By one means or other, at last, the oil was removed. Then . . . there were minute oil globules floating all about the field. The process was essentially one of absorption of the internal structures of the bone; the osseous tissue being replaced by an excessive deposit of the fatty matter normally existing in its interior. Besides, a change seemed to have crept over the whole bone, shewing itself in the loosening of the mutual connections of the laminæ, and in an obscure disintegration of the osseous structure itself. And this was accompanied by a general infiltration of oily matter into the substance which had intruded itself within the Haversian canals."

You are all familiar with the alternations of excitement and depression in this disease, and with the epileptoid convulsions so often present. In seeking, therefore, the pathological cause or condition of general paresis, we have the following indications of causation:—

1. Fatty degeneration of all the tissues, the voluntary and involuntary muscles, the bones, glands, and brain alike giving evidence of this condition.
2. A considerable removal of the earthy constituents of the bones, to which, along with the above-mentioned fatty degeneration, the great tendency to fracture of the bones in this disease is due.
3. Considerable increase of sexual proclivity.
4. Epileptoid convulsions.
5. Alternations of excitement and depression.

Now, I suppose, there are few persons accustomed to the investigation of the inductive sciences who would be disposed to deny that if there be any toxic agent whose presence in the system is known to produce these effects, the presence

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of that agent may, with the utmost probability, be set down as the immediate cause and pathological antecedent of general paresis. Now it appears to me that in the above summary we have an exact picture of the effects of an excess of phosphorus in the system.

Thus, Pereira mentions its tendency to cause gangrene and convulsive affections. Its aphrodisiac properties are well known, and also its effect in causing temporary stimulation with subsequent depression of the entire nervous system. The well-known caries of the jaw which is found in the workers in phosphorus very well illustrates its power of removing the earthy constituents of bone; it probably finds access, as Pereira suggests, to the jaw during life through carious teeth; to the bones in general paralysis it would, of course, have universal access if diffused through the blood.

Cases of poisoning by phosphorus in a diffused form are very rare; in general it is taken in a concentrated form, and causes death by its irritant properties before its general effects have had time to develope themselves; but I believe that experiments on animals have proved that when its administration is so managed as not to kill rapidly, but after the course of a few days, universal fatty degeneration of the tissues, both muscular and glandular, is found.

A remarkable illustrative case occurred about three years ago in the practice of M. le Prof. Crocq of Brussels, and was published by him in the "Presse Medicale Belge." I shall give some extracts from a translation of this paper which appeared in the "Medical Press and Circular" for May 8th, 1872. The case was that of a girl, æt. 23, who stated that she had drunk the phosphorus of an entire box of matches diluted in an infusion of coffee; the fatty degeneration of muscles, heart, and liver was well marked. M. Crocq says—"The liver was of a pale yellow, well marked on the exterior as on the interior; the kidneys were yellowish, slightly red; the heart's muscular tissue was marbled of a yellowish tint; the right heart was evidently fatty; the diaphragm presented a yellowish colouration. I examined with the microscope the tissue of the liver and the heart, in order to know if they were really fatty; the heart presented a great quantity of fatty granulations in the muscular canaliculi themselves—this is fatty degeneration of the second degree; the liver cells were very much altered, going plainly to destruction—this, again, contained at the same time a great quantity of fat; in the peripheral muscles was also a certain degree of fatty

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degeneration, but much less advanced than in the tissue of the heart."

As regards the condition in which the phosphorus in this case existed in the system, M. Crocq says—"I believe it passes into the circulation in the state of phosphorus; first, because of the neutral reaction of the liver tissue, and the alkalinity of the liquids contained in the pleura and the meninges of the brain; secondly, because of the slight effect of lime water in its treatment. This poison," he says, "had not determined any lesion before its absorption which could cause death. These two considerations," he continues, "make me consider that phosphorus thus absorbed is not transformed into phosphoric acid." As a parallel to this, in general paralysis, we have Dr. Merson's analyses of several cases, in the West Riding Reports of 1874, who finds that phosphoric acid is decidedly diminished in quantity in the urine of the insane.

The brain in M. Crocq's case is reported as slightly injected; similarly it is found somewhat congested and vascular in cases of general paralysis. I was not able to investigate this point in the case of which I have shewn sections of the other organs, but may refer to Dr. Franz Meschede's paper in the "Quarterly Journal of Mental Science," No. 59, who finds the brain congested, vascular, and even violet in colour, with fatty degeneration of the nerve cells.

M. Crocq considers that poisoning by phosphorus induces fatty degeneration by means of de-oxidation of the tissues; in fact, he says, "if the albuminous substances of the economy suffer, by whatever cause, an arrest in their process of oxidation, or a deoxidation, they will be transformed into fat and not into fibrin." Without offering an opinion on this point, I may, perhaps, suggest that the actual deposit of fat, which has been well marked in all my own cases, may possibly be due to the fact that the muscular tissue, in consequence of its structural disorganisation and degeneration, is no longer able to discharge its function of a furnace—an apparatus for combustion of the hydrocarbons of the body in the development of muscular force—a function of muscle which is, I believe, tolerably well recognised in these days—and hence the unburnt fat is simply deposited as such on the surface of the body. This is, of course, to be distinguished from the tissue degeneration spoken of above. The temperature is reported as somewhat higher than normal in cases of

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poisoning by phosphorus, and the same thing is also observed in general paralysis. In the case I have referred to of my own it was 100° to 101°; and this is a marked difference between this disease and the more usual forms of insanity, in which the temperature is very seldom more than normal, sometimes much less—indeed, the lowest temperatures on record are probably those given by Lowenhardt (*vide* "Journal of Mental Science," January, 1870), who has recorded 74·75° F. in an insane patient.

Quite in accordance with this view of the pathological causation of general paresis is the well-known fact that its victims—in the better classes, at least—are generally men of more than average mental endowments; that is to say, according to the views generally adopted, men of more highly phosphorised brains than usual. It is found, I believe, usually in men who have spent a life of active brain exertion in a narrow and limited direction, men of intense application rather than wide culture and numerous interests; and among such persons it is found after their withdrawal and retirement from the interests that have perhaps too completely engrossed them. The merchant retired from business is, perhaps, the type of this class; and the explanation of the phenomenon is, to my mind, of the following nature, namely, that during an active life of mental energy the phosphorus of the brain is oxidised, or burnt off into phosphoric acid, by volitional thought-processes; but that on retirement from business, when the intellect, not having a wide cultivation or broad range of interests, has but little to engage itself with, the phosphorus is discharged into the circulation in an unoxidised condition, and general paralysis is the result. It may be asked how do we account for its non-appearance in the urine in the shape of excessive phosphates? I reply that probably it passes off in the shape of hypophosphorous acid gas from the lungs, which is the method by which phosphorus when taken internally appears to be got rid of. The occurrence of the disease among persons of this class is, I believe, a common observation. Thus Griesinger says it is most frequent among the educated classes, and repeats that it is very frequent among mentally excitable persons, such as poets, musicians, and learned men.

I think we have got a hint as to that residuum of unexplained causation which I referred to above as being indicated by the difference of frequency of the disease in England and in Ireland. As a rule, England feeds on a more highly

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phosphorised diet than Ireland. Where England consumes cereals, a phosphorised diet, Ireland consumes the potato, a non-phosphorised. Hence the sum total of the causation would stand as the product of a predisposing cause and a predisposed nervous system, in both of which elements of causation—if they are what I have here propounded—Ireland has the advantage of England. And I confess I am not able to discover, either by statistics or reflection, any other elements of causation in which the two countries differ.

CLINICAL NOTES AND CASES.

The Treatment of Hæmatoma Auris. By George J. Hearder, M.D., Medical Superintendent of Joint Counties Asylum, Carmarthen.

The "Insane Ear" has recently had a large share of attention accorded to it by various writers, who at least agree in this that they abstain from recommending any procedure whereby we may hope to check the disease, or prevent the withering and shrivelling which generally remain as a permanent local record of grave cerebral disturbance.

Five of the cases here recorded occurred in males; one, in a female who had both ears affected. In each case the tumour involved the left ear; and the right auricle became diseased in the woman after the left othæmatoma had terminated. The form of mental disease was:—

In 3 cases—Melancholia.
In 1 case—Mania chronic.
In 1 case—General paralysis.
In 1 case—Dementia.

In two instances the development of the tumour was probably assisted, or perhaps caused, by local injury.

1.—S. D., female, aged 33. Congenitally weak. For 12 months restless, violent, melancholic and suicidal. On the 27th August, 1874, a hæmatoma auris of the left side was observed; it increased steadily, became very tense and painful, and was evacuated by free incision eleven days after it was first noticed. Result—ear shrivelled, thickened, and its normal markings obliterated. On the 1st October, a hæmatoma on the right side was progressing rapidly, the effusion filling up the concha and fossa of antihelix. The inner surface of the pinna was painted over with a few drops of the acetum cantharidis.

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