

to the accommodation they received. In another hospital this system of admitting these patients had the effect of converting a second class hospital into a first class, with consequent increase of personnel and equipment, and even in the salary of some of the staff. It has been and will be argued that none of these patients operated on and detained for a few hours should be shown as in-patients. Pending the decision of a central authority, the author is of the opinion that these patients should be shown as in-patients if they:—(a) are taken into the wards, or (b) remain in the out-patient department for more than two hours.

LEFT-HANDEDNESS.*

By PRAKASH CHANDRA DAS, M.B.,

Medical Officer, Ranchi European Mental Hospital.

THE subject of this evening's paper is left-handedness, which is also termed sinistrality or mancinism. At the outset it is important to state what this term really means. Hugh Gordon¹ describes a left-handed person as one who would use the left hand in preference to the right in all actions which are usually done by the right hand in the case of a right-handed person. Moutier (quoted by Hugh Gordon) also states that a left-handed person is one who habitually does with the left hand a series of professional and customary acts generally done by the right hand in the case of the right-handed, and that the ambidextrous are those who do these acts with either hand indifferently.

In the popular mind there is a universal idea of inferiority, awkwardness or unfavourableness associated with left-handedness. For example when we speak of a left-handed compliment, which is worse than damning with faint praise and is disliked by all. Again we call it a left-handed marriage in which the bride-groom gives his left instead of his right hand to the bride as in a morganatic marriage, which is an inferior form of marriage of a male member of a royal family with a woman of inferior rank—hence a left-handed wife, a left-handed son. Again we Indians use the left hand in performing unclean actions, as for example, washing ourselves after answering the calls of nature. Similar examples can be multiplied. On the other hand, the right hand has been given the place of honour,—as when we speak of a company's right-hand man, or even of an error or the like, we say "too great generosity is a right-handed fault." We Indians, whenever we offer anybody

anything, generally do so with the right hand. The act of blessing is universally performed with the right hand. Many other examples might similarly be mentioned.

Now let us turn our attention to some experiments made and conclusions drawn from them by scientific men in this connection. In an investigation by Hugh Gordon in the elementary schools in Middlesex and London, he found the following:—Out of 3,298 pupils examined, he found 241, that is to say 7.3 per cent. left-handed; whilst in the mental defective schools, out of 4,620 students 843, that is to say, 18.2 per cent. were found left-handed. There appear, therefore, to be more than two and a half times as many left-handed children in mentally defective schools as in ordinary schools. Ballard² notices a higher percentage of left-handed children in mental defective schools than in ordinary elementary schools, i.e., 6.5 per cent. against 4.1 per cent.; whilst

Miss. T.

Right hand. a b c d
e f g h
Left hand. i j k l
m n o p

Mrs. H.

Left hand: Corrects mirror writing - a b c
Left hand: writing fairly rapidly - 1 10 9 8 7 6 5 4 3 2 1

Mr. B.

Right hand - P d d d d
Left hand - b b b b b
Right hand. 1 2 3 4 5 6 7 8 10
Left hand. 0 1 8 9 P d 2 4 6 8 10

* An abridged form of a paper read before the Ranchi Medical Society on 2nd August, 1924.

others, e.g., Franklin Jones, Josefa Ioteyko, etc., put down the percentage in ordinary schools at a still smaller figure than the above. Again out of 374 boys in special schools, Hugh Gordon found 61, i.e., 16.6 per cent. left-handed, while out of 355 girls 76, i.e., 20.7 per cent. were found left-handed, thus showing that left-handedness is more common among girls than among boys. J. Jackson³ refers to the opinion that the insane have a great percentage of partial ambidexters in their ranks, and that there is a high percentage of left-handed among criminals. Mayet found a high percentage (16 to 30) of ambidextrous and left-handed among idiots and epileptics. Prof. Lombroso⁴ says "Left-handedness is a sign of degeneracy."

Out of 9,176 boys in 407 lower primary schools in the Jamui subdivision of the Monghyr District there were 8, i.e., 0.09 per cent. left-handed, and of these 8, 3 were stammers. Again out of 276 patients at the Patna Mental Hospital 12, i.e., 4.3 per cent. were found left-handed (cf. this 4.3 per cent. with the above 0.09 per cent. in elementary schools). Out of 345 pupils in the Hazaribagh Reformatory School, 5, i.e., 1.4 per cent. were found left-handed, (cf. again this percentage with 0.09 per cent. in elementary schools). Out of 205 inmates of the Juvenile Jail at Monghyr only one, i.e., 0.4 per cent. was found left-handed. In the Ranchi European Mental Hospital out of 151 patients of whom 76 are males and 75 females, 10, i.e., 6.6 per cent. were found left-handed. And of these 10, 8, or 10.6 per cent. were females and 2, i.e., 2.6 per cent. males, thus showing a much higher percentage of incidence in females.

All these figures clearly show that the percentage of left-handedness is much higher in an abnormal class of people, e.g., mentally defective, insanes, truants, incorrigibles, criminals, etc. Hence left-handedness can hardly be considered as a normal variation. On the other hand very rare cases can be cited of left-handedness associated with an extraordinary degree of intelligence or capability. Minute inquires in many of these cases may show either that they are forced to be left-handed owing to circumstances, e.g., loss of the right arm, hand, even right thumb, injuries to the nervous or muscular systems, or various degrees of functional disorders of the mind, e.g., psychoneurosis, neurosis, psychosis, etc.

Besides what has been said above, left-handedness has been found to be very commonly associated with mirror writing. Mirror writing is a form of writing in reversed letters which can be easily read with the help of a looking-glass. Hugh Gordon⁵ says "Early in the investigation it was noticed that there was a much higher percentage of mirror writers among children, who, although they

wrote with the right hand, were evidently left-handed in many other of their activities." Ballard⁶ says about mirror writing "With rare exceptions it is done by the left-handed people only, and with the left hand only. The subject does not recognise at first the word as he writes it down. A. L. Beely, Instructor in Psychology, Utah University, after investigation in the schools of Chicago in 1918, says that mirror writing is a characteristic of extreme left-handedness. Ireland⁷ also mentions that mirror writing is common among the left-handed. The specimens of mirror writing shown here were produced by the patients when they were asked simply to write with the left-hand and without any suggestion of any kind, but it was interesting to observe them writing thus without detecting their own mistake and correcting it. L. G. Fildes and C. S. Myers⁸ report an interesting case of extreme left-handedness and reversal of letters. This was a markedly left-handed boy of about 7 years of age. His maternal grandfather, his maternal uncle, and a son of that uncle were also left-handed. The boy knew some, but not all of the letters of the alphabet, and all the ten Arabic numerals. He had just begun to be taught to write with his right hand, but he found the greatest difficulty in doing so, owing to the coarseness and the want of co-ordination of the movements of that hand. For these reasons and especially because he began to *stutter*, he was soon allowed to write with his left hand only, whereupon the confusion of the positions of letters and the disturbance of speech rapidly disappeared. Another interesting case of a left-handed child has been mentioned by a correspondent, H. A. Clowes.⁹ She is a decidedly left-handed child and all movements requiring skill, such as threading, a needle, drawing, and attempts at writing, are performed with the left hand. When writing the capital letters of the alphabet without a copy, the letters which should turn to the right are turned to the left and vice versa as in B and E, and when drawing a face in profile the face is made to turn to the right, which is quite unusual with right-handed children. Attempts to use the right hand for drawing, etc., are very unsuccessful and are made with painful efforts. She says they make her feel *sick*. In another case in the *British Medical Journal* of 24th May, 1924, it is said that it caused the child pain and *sickness* when she was made to write with her right hand, but with her left she wrote easily, though it was backwards. Another very interesting case of mirror writing with some drawings has been described by J. L. M. Symns¹⁰. In this case, on the left-handed child being asked in her scripture class to draw the story of the "Three Wise Men," she cried bitterly because she was unable to depict

them walking towards the manger. There is a boy in the Kanke (Ranchi) Lower Primary School, of about six years of age, who is just learning his alphabet; he writes correctly with facility with the left hand, but writes with the greatest difficulty with his *right hand*, and then only in mirror fashion.

After experiments on the problem of mirror writing, L. G. Fildes¹¹ comes to the following conclusions:—(1) Mirror or reversed writing is very commonly found among young children and defective children. It varies in kind from occasional reversal of single letters to a complete reversal of all words and letters written (true mirror writing). The latter, however, is comparatively rare. (2) It is found most frequently in association with left-handedness, but it also occurs in varying degrees among right-handed children, who have never written except with the right hand. (3) It occurs both in copying letters and in writing from memory. There seems no doubt that the tendency to reverse letters seen in mirror writing is only part of a larger tendency, especially among young children, to reproduce forms without any apparent heed to the position which they occupy in space. In support of the last view expressed above, I may mention with profit some similar observations made by Major Berkeley Hill and Prof. Henry Head, who in course of his correspondence with the former, in reply says: "I am much interested to hear what you say about the way in which some of the native troops (of Uganda) read with the books upside down; this is a well known condition in children. Many children are quite content to look at pictures upside down or sideways, and it makes no apparent difference to them that the figure is the wrong way up. Occasionally this peculiarity persists even after they are able to read."

Squint has also been found in many cases to be associated with left-handedness. Out of 10 cases of left-handedness in the Ranchi European Mental Hospital, 5 have squint also. W. S. Inman¹² says that he investigated 150 consecutive family cases of squint. In 13 the patient was a non-squinter, giving a family history of the three conditions, viz., squint, left-handedness and stammering. Out of the remaining 137, all of whom were squinters, 33 or 24 per cent. were left-handed. Again out of these 137 squinters only 19 were stammerers, while four cases showed all the three conditions, viz., they were left-handed, they stammered and they squinted. In an address on "Squint, Mancinism, and Tubercle," W. C. Rivers¹³ says that out of 120 cases of squint investigated 10 were left-handed and all these 10 were *left-eyed* squinters also. In another place he quotes Lombroso and Fere, according to whom mancism has

been reckoned among the stigmata of degeneracy. He also quotes Markel and others who say that savages, lunatics and criminals show excess of mancism.

To quote Hugh Gordon again, he says that Ballard and others have shown that stammering is more prevalent among left-handed children who write with the right hand, than among pure left- or right-handed children. Out of 10 left-handed patients of the Ranchi European Mental Hospital, there are three only who are defective in speech, (I mean defective in articulation).

In conclusion, it may not be out of place to describe the cases of left-handedness in the local mental hospital:—

1. Miss G.—Imbecile, left-handed, squint in both eyes, left more so.
2. Mrs. C.—Maniac-depressive insanity; left-handed; has high errors of refraction, mirror writer.
3. Mrs. Bk.—Secondary dementia, left-handed, squint in the left eye alone.
4. Miss Bl.—Imbecile, left-handed, squint in both eyes; defective speech.
5. Mrs. A.—Dementia præcox; left-handed.
6. Miss M.—Epileptic, left-handed, squint in the left eye and defective speech.
7. Mrs. T.—Dementia præcox; left-handed.
8. Mrs. H.—Maniac-depressive insanity; left-handed; mirror writer.
9. Mr. B.—Imbecile, left-handed, squint in both eyes; mirror writer.
10. Mr. S.—Imbecile, left-handed, and defective speech.

In a subsequent paper I hope to deal with the causes of left-handedness and mirror writing and some problems connected with them.

REFERENCES.

1. Left-handedness and mirror writing. By Hugh Gordon. *Brain*, January, 1921.
2. Left-handedness. By P. B. Ballard. *School World*, December, 1916.
3. Ambidexterity. By J. Jackson.
4. *North American Review*, 1903, p. 440.
5. *Brain*, January, 1921.
6. *School World*, December, 1916.
7. *Brain*, 1880-1881, Vol. II.
8. Left-handedness and Reversal of Letters. By L. G. Fildes and C. S. Myers. *British Journal of Psychology*—General Section, 1921-22.
9. *British Medical Journal*, 19th April, 1924.
10. A Case of Mirror Writing with some Notes on the Literature of the Subject. By J. L. M. Symms. *Practitioner*, March, 1918.
11. Experiments on the Problem of Mirror Writing. By L. G. Fildes. *British Journal of Psychology*—General Section, 1923-24.
12. Emotion and Eye-Symptoms. By W. S. Inman. *British Journal of Psychology*—Medical Section, 1921-1922.
13. An Address by W. C. Rivers on Squint, Mancinism and Tubercle. *Lancet*, 12th February, 1921.