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# LEFT-HANDEDNESS AND LEFT-SIDEDNESS.

BY PROFESSOR CESARE LOMBROSO.

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As is universally known, we use the right hand very much more commonly than the left, the number of persons who are more agile with the left hand being comparatively small. They are ordinarily found among women, children, and savages, and they were more numerous in ages past than they are now. Much has been written of these persons, but as no one has heretofore tried to determine their frequency by means of statistics, I decided to undertake that task with the aid of my friend Professor Marro.

Amongst 1029 operatives and soldiers I found a proportion of four per cent. in men and five to eight per cent. in women. Among lunatics the proportions are not much different. On the other hand, studying a certain number of criminals, the quota of left-handedness was found more than tripled in men, thirteen per cent., and nearly quintupled in women, twenty-two per cent. Some particular kinds of criminals, however, as, for example, swindlers, offered me again a much greater proportion, thirty-three per cent., while murderers and ravishers give less—from nine to ten per cent. At all events, this is a new characteristic, which connects criminals with savages, and differentiates them from sane people as well as lunatics.

As appetite comes in eating (according to the proverb), so, once in the midst of these first discoveries, I wished to see if I could not go farther in my researches. Until now, I thought, left-handedness only has been studied. Would it not be worth the trouble to search if there be not, also, what one may call "left-sidedness" as applied to the senses—that is, if there be not men who have a greater sensibility on the left than on the right side? With this idea I instituted a kind of physiological surveillance over a number of my friends and colleagues, and over some working-men.

As a result I found that left-sidedness is in much larger proportion than left-handedness, showing itself in no less than twenty-six per cent. of normal people. The curious fact appeared also that left-handed people do not have more of this sensitive left-sidedness than right-sided people, and not even as much, at least in the sense of touch, as criminals, who average twenty-seven per cent., although they show a difference in the intensity of the sense of touch. The proportion of sensitive left-sided people among criminals, however, becomes very much more if one takes into account the sensibility to pain, which they have more highly developed in the left side, and visual sharpness, which, according to the calculations of Dr. Bono, is not only greater in them than in honest men, but is more accentuated in the left eye than in the right. In lunatics, as is revealed by the researches of Tonnini and Amadei, this sensitive left-sidedness is almost more the rule than the exception, rising as high as forty-four per cent. It appears, then, that left-handed people are more numerous among criminals, and sensitive left-sided people among lunatics.

To understand the exact significance of these researches, it is necessary to know that a greater tendency to asymmetry is seen in the animal species the nearer they approach man and the more perfect they are. According to Livingstone, parrots are left-handed and so are wild animals (lions, etc.). Camerano found in decapod crustaceans the left tentacle stronger by 200 grams than the right, while Rollet (*Revue Scientifique*, 1889) found in twenty-seven anthropomorphous monkeys the left shoulder heavier than the right. Parot noted that in the new born the weight of the members of either side of the body is the same, the child using indifferently one or the other; it is only at two years of age that it begins to prefer the right; in middle age the difference becomes really acute, while, however, it lessens in old age. Furthermore, one notes that the asymmetry increases in proportion as the organs are noble, and more so the more they are exercised; so it is natural that in man one side of the body should prevail over the other and especially in the brain. The reason why the right predominates in most cases, above all, in the extremities, principally in the arms, is explained by the fact that the movements of the limbs are under the supreme direction of the brain, which, as we all know, is one of the highest organs, is the least symmetrical, and is divided into two parts not per-

fectly alike. In fact, the left lobe takes precedence. Receiving the blood from the heart more directly and in greater quantities than the right, it is the first to develop from the embryo, works more, and is the more voluminous of the two, the right only serving, one may say, as a help or reinforcement to the other.

Thanks to the lesser activity of the right lobe, the left parts which get their strength from it (in the world of nerves the organs always cross, and the right members of the body receive the nerves from the left of the brain, and *vice versa*) remain less agile and robust than those of the opposite side. As asymmetry always grows in proportion to the development, and as the brain is among the organs which develop the most, it becomes more asymmetric the more it works. Therefore, as man advances in civilization and culture, he shows an always greater right-sidedness as compared to savages, the masculine in this way outnumbering the feminine and adults outnumbering children. Thus women and savage races, even when they are not properly left-handed, have certain gestures and movements which are a species of left-handedness. Some time ago Delaunay observed that the man holds out the right arm, which the woman takes with the left; that the woman buttons her clothes from right to left, while the man does so from left to right, and that women and children, when they trace a line or turn a key, for instance, of a watch, initiate the movement from right to left, while the adult man does so always from left to right. This explains why, in early times, and still among people little civilized, such as Arabs, the writing was preferably from right to left, which is the habit of children until corrected. Delaunay even went so far in his observations as to discover that antique chronometers were wound from right to left, while modern ones are wound in the opposite direction.

When the two lobes of the brain do not work as usual, a greater difficulty is observed in controlling the emotions or those exceptional phenomena which, until now, have never been satisfactorily explained, such as, for instance, the doubling of personality. Such a case was mentioned by me in "Genius and Lunacy," in which a person subject to hallucinations, while declaring that he heard voices right and left, confessed that those on the right were not true ones but his own fantasy, because evidently on that side the ailment was less strong and disturbed the system less.

Ball describes another, who, going mad from sunstroke, heard a voice asking news of his health. Later, to the voice was added a phantom, with a long beard and black eyes, who little by little became his master, or more precisely his jailer. The phantom ordered him to throw a watch into the fire, and he did so; to poison a woman and child, and he, although with repugnance, killed them. As he explained to his physician: "I have two brains, a right which is mine, and a left which is my tyrant's; unfortunately, the latter always ends by vanquishing." Perhaps thus may be explained that frenzy of doubt, where "the yes and no in the head dispute," in which one sees a man incapable of making a decision, supplicating others with words and gestures to do so for him. This is a case in which there is contradiction between the two lobes of the brain, as in the case of a pair of horses, one wishing to go in one direction and the other in another, so that the great effort to act is frustrated by a complete inertia, when an extraneous influence does not intervene to re-establish order. In the same way I try to explain another and more curious fact, which occurs in certain old lunatics, that of writing backwards as is done in lithographs. We, from children, imagine and probably acquire the forms of the letters correctly in the left lobe, and backwards in the right, and so we reproduce them according as the left or right lobe predominates. Vogt, in fact, in an interesting experience with about a hundred children, noted that when they were made to write a word with the right hand and then with the left, a likeness in the writing was scarcely ever attained; but, on the contrary, if that of the left hand was written backwards and shown in a mirror, a likeness was seen.

These, however, are simple hypotheses; but what is sure is, that criminals are more often left-handed than honest men, and lunatics are more sensitively left-sided than either of the other two. That fact indicates that in criminals and lunatics the right lobe predominates very much more often than in normal persons. While the healthy man thinks and feels with the left lobe, the abnormal thinks, wills, and feels more with the right—thinks "crooked," as the popular proverb truly has it. I may say that the little research I have made in brains and skulls of criminals shows a singular prevalence of the right lobe. In the only brain of a criminal weighed by Bischoff, the right lobe was twenty-one grains heavier than the left. In fifteen brains of homicidal

thieves, weighed by Professor Giacomini, eight had the right lobe twenty-one grains the heavier, and only in seven was the left heavier, with an average of thirty grains. I have studied forty-four heads of criminals in my museum at Turin, and I find asymmetry very prevalent in the right lobe in forty-one per cent., and in the left in twenty per cent. This agrees (in a negative way) with what Boyd and Ireland ("The Brain," 1880) find in normal brains, which present a greater development on the left side, and Bastian, who finds a greater specific weight in the gray substance of the left hemisphere in comparison with that of the right.

Here it may be said: How is it that one person is left-handed, and another sensitively left-sided, and not both together? How is it that there are in the world left-handed people who are anything but lunatics and idiots and even less criminals? This is explained by the fact, that the workings of the brain which influence the movements are quite different from those which act on the sensibilities, and so it may easily be that the first predominate over the last.

Besides, the presence of a single hereditary trait in an individual does not at all mean that all his organism is in a state of arrested development or of inferiority. As long as there is nothing but left-handedness or sensitive left-sidedness, it is as though we had only one musical note, which, taken alone, signifies nothing and gives no harmony; that is, such traces of lunacy or criminality, until associated with other symptoms, such as exaggerated cranium asymmetry, hallucinations, etc., mean nothing. So one can without difficulty find among good men real left-handedness, as among the greatest evil-doers there are some who have not that characteristic. I do not dream at all of saying that all left-handed people are wicked, but that left-handedness, united to many other traits, may contribute to form one of the worst characters among the human species.

Here I will note a curious thing. Long before I, after much technical observation, came to this conclusion, the people in the provinces of Emilia, Lombardy, and Tuscany had already declared the same when they framed and used the saying, "He is left-handed," to express the idea that a person is untrustworthy.

CESARE LOMBROSO.