REVIEW OF LITERATURE

Many of the researchers have worked in determining the handedness of the writer and who have also mentioned certain specific writing characteristics in the handwriting of left and right-handed person. Research has also been done on disguised handwriting using unaccustomed hand, postures of grasp and the variations in the handwriting.

Trankell et al (1956) have provided substantial evidence that writing with the left hand is not necessarily poorer or slower than writing with the right hand.

Clark (1957) reported that a survey of 72,238 Scottish children in 1953 disclosed that 6.7 percent of the males and 4.4 percent of the females (i.e. 5.5 percent overall) were left handed writers. Then, in a second survey of 5790 Scottish children in 1956, she reported 8 percent of boys and 6 percent of girls (i.e., 7 percent overall) to be sinistral. A 1964 to 1965 survey of the English Children indicated 11.3 percent of males and 8.8 percent of females to be left handed.

Zitzelsberger (1958) reported that the elements of skill and speed, slant, size, proportions and alignment were not always reliable indicators of sinistrality.

Piggot (1958) collected 25000 samples of handwriting dating from 1956-57 and found that 5% were left-handed. This percentage is the same as that found in people over 65, who would then have been over 36.
Harrison et al (1958 and 1961) studied the terminal strokes upwards and to the left, inconsistent slope to letters, heavier pen pressure on up strokes than down strokes, right to left letter “t” crossing and punctuation marks in left handed handwriting.

Harrison (1958) has commented that the individual exhibiting ambidexterity are probably persons who were sinistral in their early years but who were persuaded to change to dextral in handwriting during the course of their schooling. Suffice it to say that in most cases the executions by the two hands will be similar in many respects, but divergences between them will be found in fluency or writing quality. The reason for this is suggested to be the lack of practice that one hand will experience owing to the writer’s inclination to use the other hand as a matter of personal preference.

Harrison, Conway and Beacom (1958, 1959 and 1961) suggested that indications of left-handed writing might be as smudging or messiness, terminal strokes upward and to the left (due to IHP), inconsistent slopes to letters, heavier pressure on upstrokes than down strokes (due to IHP), right to left horizontal strokes, tapering and curving upwards at left end (due to IHP, tendency to vertical slope or backhand, right to left “t” crossing (due to IHP) and right to left “i” dots and punctuation marks (due to IHP).

Beacom (1961) reported that the incidence of sinistrality may be as much as 30 percent at infancy and 11 percent in adulthood. The latter is double the percentages for adults
reported in 1945. Furthermore, the numbers are larger for males than for females.

Beacom and Mary (1961) suggested in their study that the 90% of Chimpanzees are left-handed.

Macfarlane Smith’s desk study (1964) found a slightly higher percentage than seven to eight years previously. There was a sex difference with 7% of males left-handed but still only 5% of females.

Patterson (1967 and 1970) analyzed 500 questionnaires from members of MENSA whose member score highly on intelligence tests. She found 7% were left-handed but this is a minimum figure as 12% had unknown handedness including some who were ambidextrous.

Connolly and Elliott (1972) in a study of the painting strokes of children found that left-handers frequently drew horizontal strokes from right to left and tended to make clockwise.

Levy et al (1974) gives a graph of percentages of left-handed writers that displayed a sharp increase from 1932 (2.2%) through 1947 (8.2%) plateaued at around 11 percent from 1960 to 1972.

Fryd (1975) suggested the potential of stroke direction in sinistrality determination dealing with the cross stroke to the block letter “T”.

Peter et al (1978) found in a sample of 5910 Canadian school children, 11 percent to be sinistral, provided by 11.9 percent of the males and 10 percent of the females.
Richardson et al (1978) have found that of seven tasks employing the hands i.e. writing, throwing, cutting with scissors, playing with a racquet or bat, brushing one’s teeth, striking a match, hammering a nail (males) or threading a needle (females), handwriting proved to be the most reliable index of handedness.

Shanon (1979) studied cross strokes in the lowercase cursive “t” and upper case “H”, the crossbar to the “7” and the Hebrew letter Daleth in the writing of dextral and sinistral Americans and Israelis as well as in the drawing of a horizontal straight line. All right handers with only two exceptions, whether English or Hebrew, executed these strokes from left to right. Among left-handers, higher percentages of Hebrew writers than English writers executed the strokes from right to left, the direction Hebrew writing normally takes.

Thomassen and Teulings (1979 and 1983) commented on the fact that they found a larger proportions of left handers than of right-handers tended to write the digit “0” in clockwise fashion.

Allen and Wellman (1980) reported finding, quite remarkably, a number of dextral writers employing the parallel position, but the tendency apparently declines with age and maturity in writing.

McKeever and VanDeventer (1980) chose to subdivide the inverted hand position (IHP) in to two classes: normally inverted (in which the point of the pen or writing instrument is directed towards the writer and the bottom of the page) and
markedly inverted (in which the point of pen is directed to the left of the writer). In their study, however, only 3 of 65 left handed writers fell into this category.

Wing (1980) in a study of the neurological controls affecting the amplitude (height) of handwriting found that there was no difference between the handedness or the sex of writers in the height of the writing produced. He supported the findings of Reed and Smith (1962).

Lester, Werling and Heinle (1982) in a study of 2168 people sought evidence in some 40 aspects of writing by which left handed writers could be differentiated from right-handers and failed.

Totty, Hardcastle and Dempsey (1983) endeavoured to find a dependence of slope in handwriting upon the sex and handedness of the writer and while results suggested that right-handers and males tended to write with greater forward slope than left-handers and females, the figures did not achieve statistical significance.

Spiegler and Yeni-Komshian (1983) in a study of 1816 American University students, their siblings and their parents found a 13.8 percent incidence of left-handedness provided by 15.2 percent of the males and 12.6 percent of the females. Furthermore, the incidence of familial sinistrality, that is brothers, sisters and other relatives (not parents) being left-handed had no significant effect upon the subjects of the study. However, the incidence of left handedness was effected by parental handedness in that maternal left-handedness could be
significantly associated with increased sinistrality in both sons and daughters, whereas paternal left handedness could be significantly associated with increased sinistrality in sons but not in daughters. While parental sinistrality produced left handedness in the offspring to levels as high as 22 percent this study did not support the finding in other reports that ran as high as 87.5 percent.

Porac, Coren and Searleman (1983) study reveals that of 450 triads of father/mother/offspring, 4.7% of the parents and 9.1% of the offspring wrote with the right hand employed an inverted-hand posture. One may speculate that the rise in the frequency of Inverted Hand Posture in the young generation is a consequence of the lack of attention that penmanship now receives in the school systems but the authors suggest that a complex, multicausal mechanism may be involved. The incidence of inversion in right handers varies between 1 and 10 percent whereas the estimates of inversion within left handers ranges from 30 to 75 percent.

Guiard and Millerat (1984) have suggested a more reliable criteria for identifying the Inverted hand position: the slant of the page relative to the vertical (inverters to the left and non inverters to the right), slant of the writing forearm relative to the vertical edge of the sheet (inverters perpendicular and non inverters parallel) and the position of the non writing hand on the page (inverters below and to the left of the writing point and non inverters to the right and often above the writing
point). The latter tendency is comparable to the position of the left hand with a non-inverted right-handed writer.

Bryson et al (1984) has observed the position of hand in young sinistral writers that is described as parallel, in which the hand is neither clearly above nor below the line of writing.

Frank et al (1985) attempted to determine more precisely the potential that stroke direction may have for discriminating left-handed writing from right-handed writings. These were broader studies of curved and almost straight horizontal strokes in lettering, numerals and the bowls of cursive letters. Such as "g" and "d", that suggested some significant differences in writing performance. For many left handers circular forms were executed clockwise (39%), whereas right handers almost invariably (99%) moved the pen in counterclockwise direction. Furthermore, horizontal strokes were executed from right to left by 69% of left handers but never by the right handers. Thus, in their sample of 347 left handed writers, stroke direction in one or more of the target letters “O”, “A”, “E”, “J”, “T”, “H”, “G”, “Q”, “F”, “t”, “o”, “g”, “q” and numerals “5”, “9” and “0”, indicated sinistrality in some 276 (80%) of the writers. A problem encountered in these studies was that stroke direction was determinable by burr striations in only a percentage of writing samples that varied (22% to 97%) with the target letter or numeral. Clearly the tendency to produce striations varies with the ink and/or writing instrument.
Beukelaar and Kroonenberg (1986) reported that in a sample of 331 left-handed Dutch persons none born prior to 1940 used the left hand for writing.

Peters et al (1986) study of 2194 German school children revealed that 9.5 percent of the males and 6.9 percent of the females wrote with the left hand. The difference between the German and Canadian figures was significantly lower incidence of left-handedness among females but the lower levels of left-handedness among German children suggest that pressures against the use of the left hand may be more operative within the German sample.

Peters et al (1987) have stated that the writing performance of right-handers and left handers, when writing with the preferred posture, was well matched and that the performance of inverted writers was by no means inferior to that of non inverted writers.

Levander and Schalling (1988) study of Swedish college students found 60.4 percent of males and 38.9 percent of females utilized IHP.

McKeever and VanEys (1989) have suggested that grandparents may have a significantly greater effect than parents do upon the occurrence of IHP left-handedness in children.

Sperry, Zimmerman and Dawson (1990, 1991 and 1993) have each claimed success in the identification of subdominant handwritings. These have been referred to variously as awkward hand, weak hand or unaccustomed handwritings or
lettering. Nevertheless what is available supports a number of general statements respecting writings of the subdominant hand.

Coren (1992) offers another important viewpoint. According to him the right hemisphere of the brain develops earlier. If the foetus is deprived of oxygen during pregnancy, left brain damage is much more likely to happen than right brain damage. The left hemisphere requires more energy than the right for its normal functioning. It is at greater risk of having its blood supply and oxygen temporarily stopped by the pressure on the head and the arteries during delivery. He contacted 4000 families to discover whether there is a direct relationship between birth stress and left-handedness and found that the age of the mother is important. The older the mother the greater the chance of a left-handed child. Maternal smoking also predisposed to left-handedness and furthermore, premature and Caesarian babies are more likely to be left handed than others. These various influences suggest that environmental conditions can affect left-handedness as well as the genetic ones implied by regional differences and supported by international comparisons.

Bethold (1995) found that in a small sample of 25 subjects, mainly twenty year olds, 3 (12%) wrote with the left hand.

Iwasaki et al (1995) have suggested that the percentage of sinistrals in many populations tends to drop continuously with the age of individuals over 30 years. The persistent
conversion of left-handed writers to right-handedness in earlier generations is suggested as one of several causes.

Srivastava et al (2004) studied the handwriting characteristics of left and right handed handwriting in Hindi Language they observed the various writing characteristics such as direction of strokes, letter design, direction of horizontal lines of mata and formation of certain letters and symbols. Besides these characteristics they studied some auxiliary characteristics such as use of staple and pin on papers at the corner.

Janjua et al (2005) studied the handwriting of 200 individual of left and right handed persons and find out the common class characteristics of left and right handed handwritings and have suggested that when a person uses his unaccustomed hand for writing then there is changes in the writing characteristics and show wider range of natural variation as compared to his accustomed hand whether it is left or right hand.

Janjua et al (2006) studied the handwritings of 50 left and 50 right-handed individuals, which further having 25 males and 25 females in order to find out the characteristics for differentiation of left and right-handed handwritings.