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7/31/2017

Notes:

Patron: Cartmill, Tomas

Call #: ARC HV2510 .A5 v.113 1968

Status: Undergraduate

Journal Title: American Annals of the Deaf
ISSN: 0002-726X

E-Mail: u0497896@utah.edu

Volume: 113 Issue:
Month/Year: 1968 Pages: 11-28

Phone: 801-839-9581

Article Author: Leonard G. Siger

Delivery Method: ILLiad

Article Title: Gestures, the Language of
Signs, and Human Communication

Imprint:

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GESTURES, THE LANGUAGE OF SIGNS, AND HUMAN COMMUNICATION*

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My interest in visual communication stems from more than a decade of teaching at Gallaudet College in Washington, D. C., which for almost a century was the only college in the world for totally deaf and severely hearing-handicapped students. For purposes of lecturing and interpersonal communication at the college, we make use of the simultaneous method, which includes the language of signs and fingerspelling by means of the manual alphabet. I am grateful to the Director of the Warburg Institute, Professor E. H. Gombrich, for having the opportunity this evening to present to you some remarks on gestures, sign language, and non-verbal communication.

We have records of manual systems used for numerical computation and as memory aids. A method for using the hands to count is described in a text once attributed to the ecclesiastical historian Bede. Illustrated manuscripts survive from as early as the tenth century (figure 1). A Vatican manuscript illustrates the numbers one to a million, or a thousand thousands. In the top two rows are the numbers one to nine and ten to ninety made on the left hand. The third and fourth rows show one hundred to nine hundred and a thousand to nine thousand formed on the right hand. The hands for one hundred to nine hundred repeat the finger positions of ten to ninety, and those for a thousand to nine thousand are the same as in one to nine. Only the hand, the right instead of the left, is varied.

The numbers ten thousand to ninety thousand are made on the left hand held before or in contact with the body; the same positions, but with the right hand, are used for one hundred thousand to nine hundred thousand. Seen in the last three medallions on the folio are the hand positions for the large numbers one, two, and three hundred thousand. Beginning with ten thousand, in the very first medallion, there are directions given on how to perform each numeral. For ten thousand, raise the supine left hand before the chest with the fingers erect and at the throat. For fifty thousand, raise the prone hand and place the thumb in the navel. For seventy thousand and eighty thousand, place the left hand on the thigh, supinely for seventy thousand and in the prone position for eighty thousand. For ninety thousand the hand is placed against the loins with the thumb inserted in the groin. Whether this system or any part of it is that which is being referred to in classical notices is not known, since the references in ancient literature to digital computation are brief and general.

*A paper delivered at The Warburg Institute of the University of London, June 19, 1967.

On the verso of the Vatican manuscript page, a million, or a thousand thousands, is shown by the fingers of both hands clasped before the midsection of the body. However, a manuscript of Turin shows for a thousand thousands the fingers of the two hands clasped over the head (figure 2). We can recognize within the ornamental bilobate medallion something akin to the modern gesture of victory in prize-fighting, though from earlier years of the twentieth century when there were more knockouts and fewer decisions on points. Both the number sign and the gesture indicate an ultimate achievement, a certain pride of accomplishment that is intellectual in one instance while athletic in the other.

One finds the medieval system of doing arithmetic on the hands in an early sixteenth-century edition with the cuts showing well-costumed individuals of various classes and professions posing for the hand configurations. With little change, the same hand numbers appear in the late eighteenth century in a work by Vincenzo Requeno on the art of gesturing with hands. His discovery, Requeno writes, is "necessary for understanding the Greek and Roman writers, and for the improvement of modern pantomime."

In the sixteenth century the Florentine Rossellius compiled a treasury of memory aids for the use of the learned. Of the many pictorial and verbal devices that are presented, one is a hand alphabet (figure 3). Rossellius illustrates three ways in which each letter of the Roman alphabet may be formed with the fingers on one hand for the purpose of spelling out difficult words to oneself.

The letters of the alphabet can be made with the entire body also, according to Giovanni Battista della Porta in his *Art of Memory*, first published in Italian in 1566 (figure 4). In his amusing corporal alphabet, *A*, *H*, *N*, and *O* require the cooperation of two people. The letters *C*, *Q*, *S*, and *U* require some athletic ability, while *G* would demand rather greater physical agility and the aid of a dwarf or child with good balance. The letter *L* to be successfully completed needs a flowing robe at the foot line. Though *I* is very easy of performance and *E*, *F*, *M*, *P*, *R*, *T*, and *X* are not difficult, one or two items in the group might seem to be embarrassing.

Though Della Porta's curious alphabet might be considered outside the limits of usefulness, a mnemonic alphabet such as that of Rossellius could be adapted as a system for practical communication between individuals. In 1620 Juan Pablo Bonet published the first full-length work on the education of those born deaf. His *Reducción de las letras* illustrates a one-handed finger alphabet that, transmitted through French educational sources, is used today by deaf persons in the United States.

In addition to its use in making configurations, the hand was sometimes used as a sort of tablet for holding the letters of the alphabet. In 1516 Thomas Murner invented a prosodic hand, illustrated in L. Volkmann's article *Ars Memorativa*. The five vowels are located on the tips of the fingers beginning with the thumb, and the fourteen joints of the fingers prove just sufficient to take the Latin consonants, *b* and *c* on the two joints of the thumb reading down, then reading up on the four fingers, *d-f-g* on the index, *l-m-n* on the middle, *p-q-r* on the ring, and *s-t-v* on the little finger. In this connection there exists

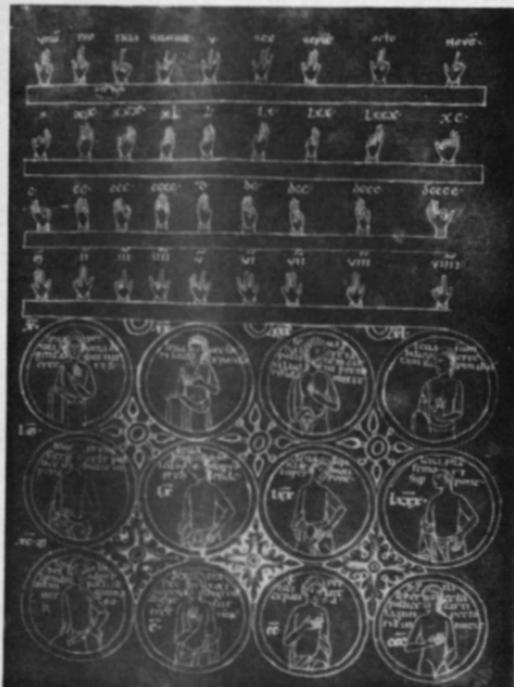


Figure 1.



Figure 2.

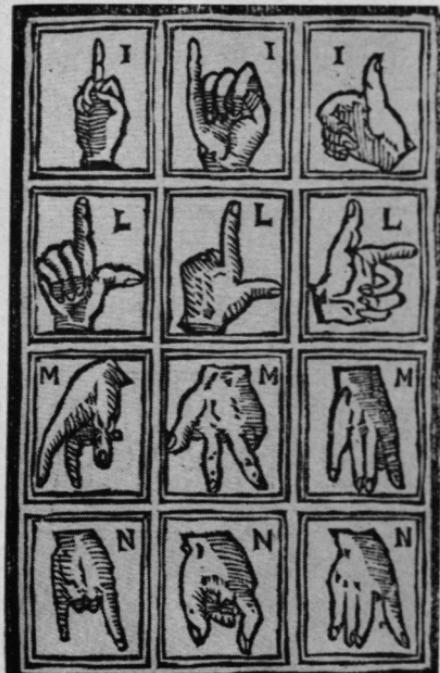


Figure 3.



Figure 4.



Figure 5.



Figure 6.



Figure 7.



Figure 8.



Figure 9.



Figure 10.



Figure 11.

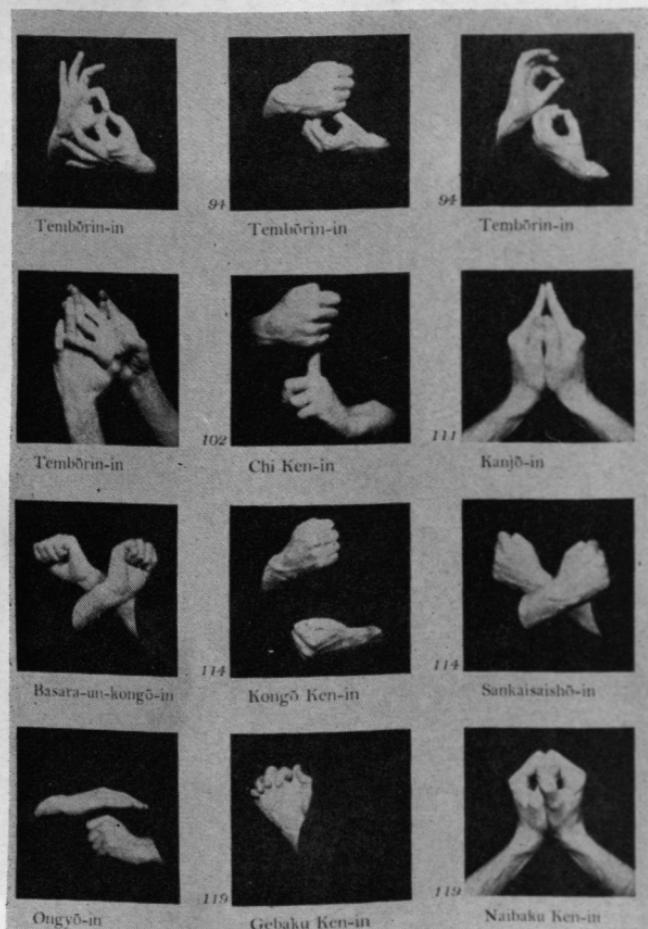


Figure 12.

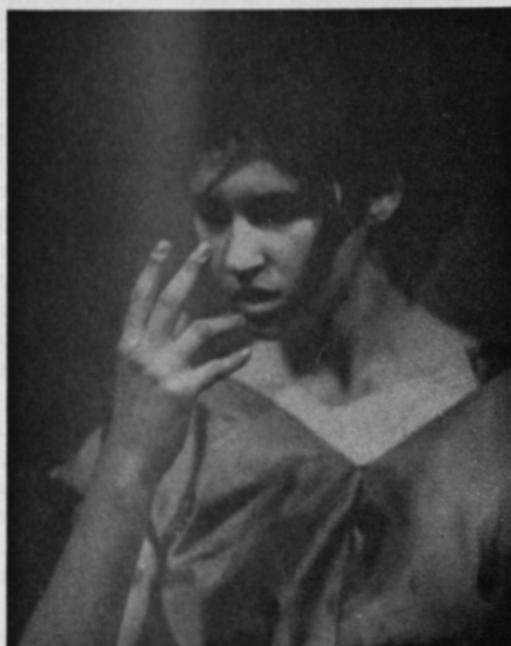


Figure 13.

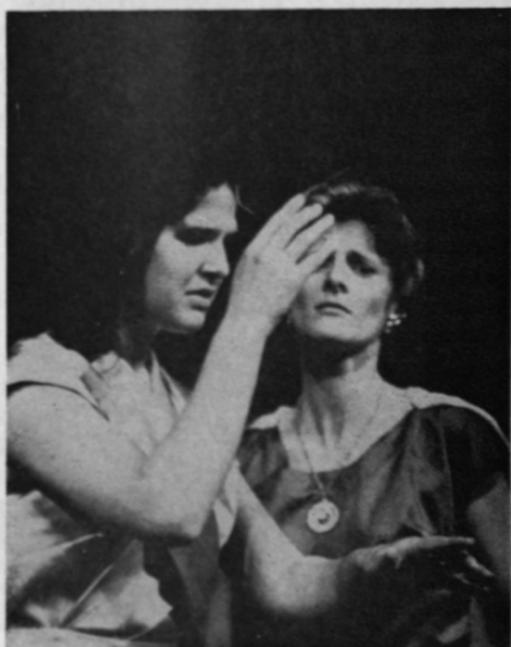


Figure 14.

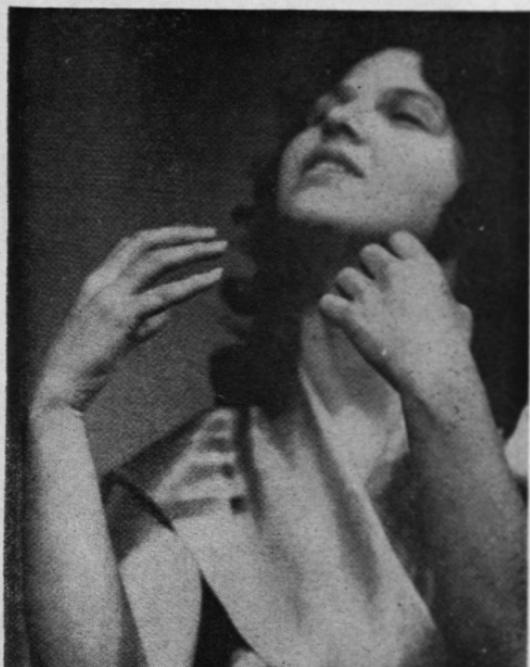


Figure 15.



Figure 16.

also a hand that contains on it, apportioned to the different parts of the inner surface, the notes of Guido's musical scale.

In the latter part of the seventeenth century, in a work entitled *Didascalocophus, or the Deaf and Dumb Man's Tutor*, the philosopher Dalgarno recommends an alphabetic glove that can be worn by the master and his deaf pupil. "To practice with these," we are told, "will be easy for any that do but know their letters and can spell, and a short time will so fix the places of the letters in the Memory, that the Gloves may be thrown away as useless." "Dalgarno's glove," as it is called by historians of education, revives Murner's early sixteenth-century prosodic hand, with the vowels still at the tips of the fingers but with the consonants going across the fleshy parts of the fingers instead of up and down and with the palm of the hand brought into use to accommodate the additional letters of the English alphabet.

In an anonymous work that appeared at the very end of the seventeenth century on the "language of the finger" (*Digit Lingua*, 1698), there is to be found a two-handed alphabet which, with very few changes, is used today by deaf persons in Great Britain. With the exception of the letters *B*, *C*, and *Q*, the consonants are formed by both hands in imitation of printed capitals, but the vowels once again are those of Murner and Dalgarno, made on the tips of the thumb and fingers.

Listed illustrations of gestures from early periods are harder to come by than those for manual number systems and hand alphabets. Though ancient and early modern sources provide evidence of the existence of signs in use among deaf individuals, detailed descriptions of the signs are lacking. But gestures were an important part of the orator's training and practice in antiquity. Today pronunciation is related to skill in the clear and accurate vocalizing of words; but the ancient art of *pronuntiatio*, or delivery, was conceived of as having two parts, the use of the voice and the use of the hands and body.

The Roman writer Quintilian devotes a long section to gesture in the eleventh Book of the *Institutes of Oratory*. In Book I, he names the subject *chironomia* or the "law of gesture," *lex gestus*, saying that it originated in heroic times and had met with the approval of the Greeks. By gesture Quintilian means the orderly and elegant movement of the head, body, and limbs, in addition to the hands and fingers. In the eleventh Book where the topic is treated in detail, he begins with a justification of gesture, pointing out how "signs take the place of speech in the dumb," and how through gesture "pictures, which are silent and motionless, penetrate into our innermost feelings with such power that at times they seem more eloquent than speaking itself."

He deals with the head, the parts of the face, especially the eyes, and the neck and shoulders; then the hand in its full range of capacities, with the right way and the wrong way of using it; modifications in direction of gesture required by changes in the judge's sitting position; the arrangement of the speaker's dress and his manipulation of it during the oration; and the different styles of delivery appropriate to the separate parts of an oration. His statement that "our delivery must conform to our words" is echoed in Hamlet's speech to the actors (*Hamlet*, Act III, Scene 2, lines 20-21): "Suit the action to the word, the word to the action."

Quintilian gives eighteen basic gestures with variants on some

of them that increase the number. He identifies the six kinds of motion in gesture—forward and back, to the right and to the left, up and down—and a seventh, circular, which he frowns upon as not in accord with the requirements of dignified exposition. From his passing reference to “foreign schools” and “other writers,” we know that there were systems before Quintilian and that during his time there were schools of thought on gesture other than the Roman.

Accomplished speakers in the Renaissance were expected to do just as well as their ancient counterparts, and some demonstrated an astonishingly high degree of gestural capability. Dean John Donne, for example, must have been remarkable in the pulpit of Old St. Paul’s. A contemporary poet describes his skill in this way:

Yet have I seen thee in the Pulpit stand,
Where one might take notes from thy look and hand
And from thy speaking action bear away
More Sermon than some Teachers use to say.
Such was thy carriage, and thy gesture such,
As could divide the heart, and conscience touch:
Thy motion did confute, and one might see
An error vanquish'd by delivery.

The Renaissance revival of interest in detailed rhetorical gesture culminated in the seventeenth century in the writings of John Bulwer, the first of the English propagandists for the education of the deaf.

Bulwer collected, described, and illustrated gestures that he had read in literature or observed in life. He claimed to have found in the hand a “natural language” that could express the spectrum of human emotions (figure 5). In 1644 he published *Chirologia; or the Naturall Language of the Hand . . . with Types, or Chyograms: a Long-Wish'd for Illustration of this Argument*. The principle of his approach to the subject can be determined from the description of item “M,” the scratching of the head when in doubtful or troubled thought: “Why we should in earnest meditation so naturally expresse our endeavour by this recourse of the Hand to the head, to scratch where it doth not itch; is, may be, to rowze up our distracted intellect; or else the Hand, which is the Engineere of invention, and wits true Palladium, having a naturall procacity to bee acquainted with the phansie, officiously offers it selfe to facilitate the despatch of any affaires that perplex a faculty so neer ally’d unto it, the Hand is the collaterall line of Nature, being couzen germane to the Fancie.”

Published at the same time with the *Chirologia* was another work by Bulwer entitled *Chironomia*, or the art of manual rhetoric. In this second work attention is focused on gestures of a more abstract or intellectualized character (figure 6). Such items as “B” through “F,” “H,” and “W” all represent gestures that were described by Quintilian in the *Institutes*. Of item “F,” *Enthymemata tundit*, he wrote: “It is much employed by the Greeks . . . in rounding off their enthymemes detail by detail.” The gesture, following Quintilian, is made by touching the tip of the index to the middle of the right-hand edge of the thumbnail, with the remaining fingers folded. According to Bulwer item “H,” in which the first joint of the index is grasped, has “a rhetorical force in Disputations.” Item “W,” where the left thumb is pressed by the right index, “doth urge and instantly enforce an argument.” Item “X,” in

which the right index touches or counts off the left fingertips in series, "doth fit their purpose who would number their arguments, and by a visible distinction set them all in a row upon their fingers." This gesture, Bulwer warns, is to be used only for the most substantial distinctions, accurately and ingeniously disputed, whose impression is intended to go deep into the minds of listeners.

The gestures for disputing, arguing, and distributing the members of an oration can be found in European painting from the late fifteenth century through the seventeenth century. They are made use of by artists especially in representations of the New Testament theme of the Dispute in the Temple, or Christ among the Doctors.

In a version of this theme by Bernardino Luini (figure 7), we see Christ distributing the parts of the argument. He has reached the middle or third finger, and the last two have yet to be unfolded. In the Dispute by Pinturicchio (Bernardino di Betto di Baggio), He unfolds the points in the demonstration more actively and has reached the middle finger (figure 8). The choice by the painter of the moment in which the third finger is reached may be indicative of the symbolism of the Holy Trinity. In a painting of the same subject by Giulio Campi (figure 9), it is the learned doctor on the right side of the composition who is speaking in dispute, and he grasps his left index with the first two fingers of the right hand, while Christ listens with the open hand. Albrecht Dürer shows the gesture called *Arguebit* by Bulwer, but with the remaining fingers unclenched (figure 10). This is the most complex and dramatic, in its use of the specific gesture, of the numerous illustrations of the scene that we have been able to gather. Against Christ's manual statement there is posed the clamor on the hands of the ugly figure on His right who attempts with both hands to put, or rather to silently shout, down the points being argued by the young Christ. The hands of the others, though not gesturing with motion, are associated with weighty arguments by their placement in thick tomes. In two instances the fingers in the books of theology are grotesquely bunched, on the hand of the bearded figure in the upper left and on that of the figure in the lower right segment of the painting. That the manual gesture was central to Dürer's conception of the theme can be seen from his study of the hands of the twelve-year-old Christ drawn in the year of the painting (figure 11). It can be noted, in passing, that these hands are illustrated upside down and sideways in a book entitled *Hände* by Rolf Voigt. The language of gesture in art is in the process of rediscovery.

Apart from rhetorical gestures with their generalized significance and the intent to support vocal statement, we observe a class of symbolic gestures with more loaded meaning and greater independence from the spoken word. For example, the title-page of John Buwer's *Chiropologia* shows, on the side of the well of "chirosophy," four hands in a row: the first open, the next with the four fingers crimped, then a fist with the thumb inside, and finally a fist with the thumb on the outside. These are identified as hands of Intellect, Will, Memory, and Knowledge (*Scientia*), respectively. The four hands are derived from the manual gestures attributed to Zeno the Stoic, who "stretched out his fingers and shewed his open palm, saying 'Such is a picture.' He partially contracted his fingers, and said 'This is assent.' Making a closed fist, he said 'This is comprehension.' Then closing in the left hand over the right he

pressed his fist tight, and said 'This is science, and only the wise man can attain to it.'

The type of hand traditionally associated with the founder of Stoicism is reminiscent of the symbolic gestures of Japanese Buddhists (figure 12). Here too each gesture is charged with meaning. In the illustration the first four hand positions show variations on the gesture of Turning the Wheel of the Law. The fourth variant is an unusually complicated gesture the performance of which would require training before it could be properly executed. The hands are placed back to back with the left palm turned outward. The intertwined fingers touch at their tips, and the two thumbs meet on the right palm.

In the center of the second row is seen the fist of Knowledge, called the "diamond fist," because it clasps the tip of the raised index or "diamond finger." The next gesture, on the right of the second row, is performed in accompaniment with the ceremony of unction. Behind the peaked index fingers, the others are crossed and folded in. It bears a resemblance to a two-handed configuration known to us from childhood as "Here's the bell, here's the steeple," in which the church building is first constructed and then opened to reveal the worshippers, "all the people," as raised fingers.

The three fist gestures, in the third row, all have to do with power, the one on the left for instance symbolizing divine diamond strength and anger. The first position in the last row shows a gesture of hiding forms. The left hand, forming the fist of Void, is held under the horizontal prone right hand. The gesture has a magical purpose to dissimulate or hide the form of the body, subtracting it from the view of others. In the sign language of the Plains Indians, for *hide* both hands are held flat, and the right hand passes under the left; but in the sign language of the American deaf, it is the right fist with raised thumb that is passed under the flat hand. The latter, of course, have no magical aim nor do they comprehend within their meaning a deep religious or philosophical significance.

The remaining two gestures go together to make a pair. The first of the two is familiar to us from life as well as from art, it is the gesture of prayer, but the second falls outside the range of our experience. Actually both have special and related symbolic meanings. One is the "Outer Bonds" fist, expressing the vow of Beings to become the Buddha, while the other shows the "Inner Bonds" fist and is expressive of the vow of the Buddha to help Beings. In their way, they exemplify when taken together the principle of semantic opposition that has been observed of manual communication systems.

From such symbolic gestures it is but a step in the order of development to a fully articulated language of signs such as that in use at present in Great Britain or that used by deaf persons in the United States. The recorded history of the language of signs of the American deaf begins in France in the second half of the eighteenth century when the Abbé de l'Epée decided to accept the manual gestures that he found being used by his first deaf pupils and then proceeded to systematize them into what he called the "natural language of signs." The new language, based on the gestural behavior of the children themselves, was employed as the principal medium of instruction in the school that was founded in Paris. De l'Epée describes his principles and procedure in two books, *L'institution des sourds et muets, par la voie des signes*

méthodiques of 1776, and *La véritable manière d'instruire les sourds et muets*, published in 1784.

De l'Epée was the first teacher to provide a normal classroom setting for deaf children, and he was perhaps the first educator to see as a main consideration the provision of the content of education for the deaf child. Having observed the severe cultural deprivation to which his pupils were subjected by their handicap, his initial procedure was to accept and learn the gesture language that they already possessed. To the signs that the deaf children brought with them to his school, he added new "conventional signs" or *signes méthodiques*. The "methodical signs" were intended to make it possible to convey without speech the full inflectional system of the French language.

De l'Epée's work was continued by a remarkable successor, the Abbé Sicard, who published *Signes des mots* in 1808 and the *Théorie des signes* in 1823. The story of his narrow escape from mob fury is told dramatically by Thomas Carlyle in *The French Revolution*. Sicard became, at last, head at the national level of all language and literature instruction in the vernacular.

The sign language, in its advanced state of development in France, was brought to the United States by Thomas Hopkins Gallaudet, who used it as the medium of instruction at the American School for the Deaf in Hartford, Connecticut, opened in 1817. Gallaudet had gone first to Great Britain, where his inquiries were rebuffed by professional educators of the deaf. There, it appears, the teachers hoarded their skills as a craft mystery to be kept in the family as an ensured means of profitable income. Had this not been the case, the sign language might not exist in its relatively sophisticated form in the United States today.

In the new country and in the natural course, most of the methodical signs have been discarded by the population because of their practical unsuitability for use in interpersonal communication. Some vocabulary items have become obsolete and in their place new signs have come into being. Dialectal variants have developed in different parts of the country and levels of usage have evolved. The language of signs is universal—but not universally so. In a study carried out in the earlier part of this century, E. Reuschert recorded the different signs that had developed for the same meanings in the major cities of Germany and Austria.

The language includes a manual alphabet, that of Bonet cited earlier, by means of which any word can be spelled. The alphabet is simply a transfer system like Morse code or the Braille alphabet, though not in any way like the Braille syllabary. However, when finger-spelled items occur, they do so as discrete items and are set in the structural context of the signed statement. Moreover, there is a sense in which the individual configurations for each letter of the alphabet are signs too. Each item in the hand alphabet is, etymologically, derivative from the form of the printed letter, though some have developed to an extent that they no longer bear a close resemblance to the modern shape of the letter in typography.

The vocabulary of the language has some signs like *book*, *eat*, and *see*, the meaning of which might be guessed by an uninformed observer if the signing occurred at a tolerable speed. The sign for "book" looks like a book being opened. Others like *bread* and *coffee* have their etymons

from an earlier period in time when father held the family loaf to his chest in order to cut the slices, and coffee beans were milled for each serving. But signs like those for *honest*, *white*, *when*, *who*, *because*, *for*, and *Monday* can hardly be understood by anyone who does not know the language.

The language of signs has also a high potential for the creation of occasional signs, that come into being and then pass out of existence once the situation that brought them into being comes to an end. The nonce-signs thus created might appear to be like idiosyncratic neologisms in speech, except that such is the nature of the language of signs that it easily accommodates their invention and *pro tempore* usage without the need for explanation. They are not to be thought of as pantomimic of physical objects. A reported nonce-sign, made in one motion, had the meaning "twice a week for four weeks."

Almost all signs, because they are in motion, have the potential of verbs. Thus, although the phrase "to purchase a suitcase" would be translated from English by two signs, one for "suitcase" and one for "purchase"; the phrase "carry a suitcase" can be rendered by means of one sign, that for "suitcase" with the motion forward in an arc.

Facial expression is closer to being an integral part of the language of signs than it is in a spoken language. Deaf individuals report that they watch the face of the other person, perceiving the signs made by the hands through peripheral vision. Facial expression may operate, then, like the elements of pitch and tone in a spoken language.

It is not only factual material that can be communicated by the language of signs. A higher order of effect is possible too. Performances in the language of signs of such classics as *Oedipus the King* and *The Trojan Women* by deaf actors at Gallaudet College have been commented upon for the richness of their dramatic quality not only by deaf individuals but by hearing persons who are unfamiliar with the language. Such productions are accompanied by a concurrent spoken translation like the plays in an international drama festival.

Examples from *The Trojan Women* of signs in performance by deaf actors will serve to illustrate the case (figure 13). Cassandra, in her last speech, prophesies her death and that of Agamemnon. The sign the actor makes is that for *see* from the passage, "I see my own body, cold and pale, lying on his, and over all a bitter cold rain falling, falling." A second example shows Andromache, now Pyrrhus's slave, mourning the general fate of the women of Troy in the presence of her mother-in-law Hecuba (figure 14). She begins the sign for *all gone*, which is completed by the right hand descending, its fingers bunching with the back of the hand revolving out, and passing down through the circling and enclosing fingers of the left hand. It is interesting to note that the morphological opposite of this sign conveys the meaning of natural *growth* and the season *spring*. The passage in which the sign occurs reads, "We would all better be dead than to live as we live now, our husbands, fathers, sons *all gone*." In the Loeb Classical Library edition of Euripides, the Greek original is translated by A. S. Way as (lines 636-640) :

To have been unborn I count as one with death;
But better death than life in bitterness,
No pain feels death, which hath no sense of ills:

But who hath prospered, and hath fallen on woe,
Forlorn of soul strays far from olden bliss.

It would have been very difficult to do anything creditable in the language of signs with a phrase like "Forlorn of soul strays far from olden bliss." The phrase might be uncoiled in a much extended translation, but time limits in the theatre and the audience's economy of attentiveness must be respected. So in the sign translation which has been adopted, the point of the elemental tragedy is recapitulated, the pathos of all the Trojan men and male children annihilated.

At the end of the same speech Andromache apostrophizes her dead husband Hector (figure 15), "Dear Hector, once my husband, great in nobility and courage; you were all my desire." What we see is a moment in the medial movement of the sign for *courage*. The two hands continue moving out and up to terminate in firmly clenched fists. It is also a sign for bravery and related meanings. That the verbal strategy of the script for deaf actors is markedly different from the rhetorical pattern in the original text can be seen by referring again to the academic translation (lines 673-676):

Thou, O mine Hector, wast my fitting mate
In birth and wisdom, mighty in wealth and valour.
Stainless from my sire's halls thou tookest me,
And first did yoke with thine my maiden couch.

What is abandoned in the way of words to be spoken is reinstated by the actor who expands the emotional effect visually by exploiting the potential of the sign language.

A final example shows Hecuba mourning over the body of her grandson Astyanax (figure 16) who she says is now dead, killed by the Greeks because of their fear of him. We see the terminal position of the hands in the sign *dead*, which can denote also the verb and noun forms *die* and *death*. The initial position has the hands in a reverse position, with the left palm up and the right palm down. Then the wrists are revolved until the orientation of the palms is opposite. The version of *The Trojan Women* ends with a passage that is particularly effective when rendered in the language of signs:

Mourn for the city ruined,
Mourn for the dead we leave behind;
Mourn for the passing of all joy;
Fearful days are on us now, and will continue so.
True greatness is now changed into deep sorrow.
Mourn for Troy's fall.

It is a pleasure, in closing, to report the founding this year of The National Theatre of the Deaf under the supervision of the Eugene O'Neill Memorial Foundation in Connecticut. The theatre has been funded by the federal government with a grant of 118,000 pounds (331,000 dollars). With a starting company of twelve actors now assembled and with four plays under preparation, the first national tour is scheduled to begin in the autumn. After seeing a trial production of this company, Sir Tyrone Guthrie commented, "It sheds new light . . . upon the whole problem of human communication . . . It makes one revise many preconceptions about speech, music, movement and how we communicate with one another."

Non-verbal communication has always been a part of human behavior. There is an aspect of it, however, that has lived a more than spontaneous existence. The art of gesture was assiduously cultivated in antiquity and enthusiastically revived during the Renaissance. In the Western world it survives today, perhaps in its purest form, in the sign language employed in the dramatic arts of the deaf, where the hands work not only to state facts in a case or tell the news but, additionally, to carry the challenging burden of poetic statement.

List of Illustrations

- Figure 1. Hand numerals, from a manuscript attributed to Bede, *Dc computo vel loquela digitorum*, eleventh century (?), Rome, Vatican Library
- Figure 2. Hand numerals, from a manuscript attributed to Bede, *Dc computo vel loquela digitorum*, tenth century, Turin, Biblioteca Nazionale
- Figure 3. Hand alphabet, from C. Rossellius, *Thesaurus artificiosae memoriae*, Venice, 1579
- Figure 4. Body alphabet, from G. B. della Porta, *Ars reminiscendi* (after L. Volkman, *Ars memorativa*, in *Jahrbuch der kunsthistorischen Sammlungen in Wien*, 1929, fig. 195)
- Figure 5. Social and psychological gestures, from J. Bulwer, *Chiroplogia*, London, 1644
- Figure 6. Rhetorical gestures, from J. Bulwer, *Chironomia*, London, 1644
- Figure 7. Christ among the Doctors, by Bernardino Luini, first half of the sixteenth century, London, National Gallery
- Figure 8. The Dispute of Christ with the Doctors, detail of a fresco by Pinturicchio, in the church of Santa Maria Maggiore, Spello, 1501
- Figure 9. The Dispute in the Temple, detail of a fresco by Giulio Campi, in Santa Margherita, Cremona, 1547-1568
- Figure 10. The Child Jesus among the Doctors, by Albrecht Dürer, 1506, Lugano, Thyssen-Bornemisza Collection
- Figure 11. Hands of the twelve-year-old Christ, a preliminary pencil drawing for the Child Jesus among the Doctors, by Dürer, 1506, Braunschweig, Blasius Collection
- Figure 12. Buddhist symbolic gestures (after E. D. Saunders, *Mudrā*, 1960, p. v)
- Figure 13. Cassandra's prophecy, from a stage production of *The Trojan Women*, by Euripides
- Figure 14. Andromache's lament, from a stage production of *The Trojan Women*, by Euripides
- Figure 15. Andromache's apostrophe to Hector, from a stage production of *The Trojan Women*, by Euripides
- Figure 16. Hecuba mourning, from a stage production of *The Trojan Women*, by Euripides