

*American Handbook of Psychiatry*

# **DISTURBANCES OF THE BODY-IMAGE**

**Lawrence C. Kolb**

# **Disturbances of the Body-Image**

**Lawrence C. Kolb**

e-Book 2015 International Psychotherapy Institute

From *American Handbook of Psychiatry: Volume 4* edited by Silvano Arieti, Morton F. Reiser

Copyright © 1975 by Basic Books

All Rights Reserved

Created in the United States of America

## **Table of Contents**

[Disturbances of the Body-Image](#)

[Historical Perspective](#)

[Development of the Body-Image](#)

[Physiology of the Body-Image](#)

[Family and Cultural Attitudes Affecting the Body-Image](#)

[Special Examinations for Body-Image Disturbance](#)

[Phantom Phenomena](#)

[Adaptation to Disturbance of the Body-Image](#)

[Prognosis](#)

[Treatment](#)

[Bibliography](#)

## Disturbances of the Body-Image

Since the earlier work of this writer on this subject and publication of the chapter on “Disturbances of the Body-Image” in the first edition of this *Handbook* in 1959, an extraordinary interest has developed in the body-image as concept, its relation to personality functioning and psychopathology, the use of psychological tests to ascertain quantitatively its expressions—particularly in boundary and penetration—the confirmation and expansion of earlier observations as related to developmental experiences in its evolution, and finally, the application and elaboration of the preventive and therapeutic procedures suggested previously as of value in clinical practice.

Body-image disturbances now receive wide recognition, particularly in psychiatric and neurological practice, and in the consultive services to medicine and surgery in general hospitals and clinics. The psychiatrist is frequently called upon to assess the unusual problem of the patient with such a disturbance and to provide an opinion as to the nature of the clinical phenomena and the treatment. In the general field of psychiatry, knowledge of the body-image concept has been applied in furthering understanding of the bodily preoccupations in the schizophrenias, involuntional psychoses, hypochondriasis, neurasthenias, and the multitude of phenomena that occur with acute and chronic brain disease, or result from various toxic, metabolic, and degenerative states. Sound data on the specific developmental factors

which predispose or determine disturbances of the body-image in the major psychoses and psychoneuroses are sparse.

Body-image phenomena, as observed in the general clinic, may represent either a healthy psychophysiological reaction, or be evidence of psychological and emotional maladaptation. The differences between expected and healthy presentations of body-image phenomena and their pathological variants are not widely recognized and hence not generally diagnosed. The distinctions between health, disease, and the rationale of much of the clinical phenomenology may only be understood in the context of the developmental process of the personality and by consideration of the detailed accounts of phantom phenomena.

The material presented in this chapter deals mainly with the general principles and phenomenology underlying body-image disturbances, discussion of disturbances which follow dismemberment or disfigurement of the body or body surface, and considerations for prognosis and treatment. The concept of the body-image is discussed in the following section.

### **Historical Perspective**

The first written account of body-image disturbance was that of Ambroise Paré, a sixteenth-century surgeon. Noting the frequent occurrence of the phantom limb following amputation, Paré advised surgeons that this

disturbance should not prevent their proceeding with additional amputation if such were indicated. It is most unlikely, however, that Paré's report was man's first awareness of this overt expression of his body-image. Recognition probably dates back to the earliest days of man, with the phenomenon providing him with an experience as impressive and of as great psychological import as his dreams and other reactions to death. Price and Twombly have translated a Latin dissertation, with commentary, written on the subject by Lemos in 1798.

Following Paré, Weir Mitchell provided one of the better descriptions of the phantom, observations which were noted a few years later by Jean-Martin Charcot. Head was responsible for the description and development of the first basic concepts of the body schema or body-image, as well as for the interpretation of its significance for the perception of body functioning in relation to motility, localization of tactile stimuli, and the phantom phenomenon. The broader concept of body-image presently utilized in psychiatry was developed largely by Schilder.

The concept of disturbances in body-image derives from observations of the affected individual's failure to perceive his body and its parts, and adapt to them as they actually exist. The outstanding examples of acute disturbances occur as a result of traumatic or surgical dismemberment, where the basic body-image persists, despite the visible or apparent loss of a

body part. The phantom limb is one of the most dramatic and convincing expressions of the phenomenology. Similar disturbances are seen following radical excision of tumors or masses of the face, head, and neck; thoracoplasty; paralysis of extremities following poliomyelitis; sudden paraplegias or hemiplegias; and distortions of the body resulting from hyperadrenalism or other endocrine dysfunctioning.

At the present time, body-image disturbances may be classified as consequent to the following categories of illness: (1) disorders following neurological diseases and affecting any part of the sensory or motor system connected with movement and posture, whether involving the peripheral or the central nervous system; (2) disorders occurring with changes in the body structure as an expression of acquired or induced toxic or metabolic disorder; (3) disorders consequent to progressive deformities, occurring either late or early in life and caused by other somatic diseases; (4) disorders after acute dismemberment; and (5) disorders of personality development, including the psychoses, psychoneuroses, and psychopathic states.

Head, the neurologist, visualized the body schema not simply as the integrated resultant of past sensory experiences, but more as a unity deriving from past experiences and current sensations organized in the sensory cortex. These postural schemata, often functioning outside central consciousness, were considered to be modifying impressions of incoming

sensory impulses for their localization on the body surface. Also, they made possible the intricate and delicate motor activities through the constant relationship of the body to other objects. Thus Head conceptualized an area of sensorimotor functioning, a postural model of the body, which brings about the possibility of projecting the recognition of posture, movement, and locality beyond the limits of the body to the ends of instruments held in the hand, or operated by the body. Anything which participates in movement of the body was seen as added to the postural model and as becoming a part of the body schema. The postural model of the body, as described by Head, is of major importance in understanding many phenomena which occur in the area of practice shared by the fields of neurology and psychiatry, or the levels of functioning of the central nervous system.

Schilder, in contrast to Head, extended the body-image concept to include not only an individual's personal or psychological investment in his body and its parts, but also a sociological meaning for both the individual and society. To Schilder, the image of the human body is that picture or scheme of our own body which we form in our minds as a tridimensional unity involving interpersonal, environmental, and temporal factors. He also related the body-image concept to curiosity, expression of emotions, social relations, duty, and even ethics. In his considerations, the borderline between body-image and the psychoanalytic concept of the ego is obscure. He specifically suggests that one go beyond the purely perceptive side of the body-image development to

that of the expressive. Schilder conceived of the ego as constant and underlying throughout life, something which takes or views the body as an object toward which it has percepts, thoughts, and feelings.

Federn, in discussing the individual's consciousness of himself, differentiated the ego from the body-image. He writes of the mental and bodily ego as felt separately; the mental ego is identified alone in the sleeping state, but it is experienced as inside the bodily ego when awake. According to Federn, ego is not body-image except when the body-image is invested completely with ego-feeling. Similarly, the ego, in contrast to the body-image, is considered to be capable of complete dissolution yet to have a capacity for preservation of the somatic organization which allows for proper use of the body and its perceptions. Federn equates ego-feeling with unity, in continuity, of contiguity and causality of the experiences of the individual: "The body scheme represents the constant mental knowledge of one's body; the body image is the changing presentation of the body in one's mind. Throughout the changes, the bodily ego is the continuous awareness of one's body. Image, scheme, ego, all three are themselves not somatic but mental phenomena."

Szasz reviewed the thinking of Schilder and other psychoanalysts relative to the relation of the body-image and ego. He proposes that the ego relates not only to other people as objects but also to the body (of the self) as an object, with mutual interaction between the ego and the body as an object.

His discussion of his position versus that of Schilder is in terms of modern theories regarding the ego, and his effort to synthesize disparate viewpoints poses an interrelation between the ego and the developing bodily functions. This interrelation could be considered theoretically as “a process of progressive mastery of the ego over the body (as an object), or, to put it more generally, as the evolution of a progressively more complex ego-body integration.”

As indicated in this brief historical account, the phantom phenomenon, as representative of the body-image phenomena, was studied by surgeons and neurologists. The first theoretical explanations for the changes in modifications in the limb phantoms were derived from neurology, namely in the context of Hughlings Jackson’s laws of dissolution and restitution of function consequent to lesions within the nervous system. These data have never been contradicted, and the theoretical explanations advanced suffice to describe the modifications of the body’s postural image organized in the sensorimotor cerebral center under ordinary conditions.

The second primary source of information on body-image has come from psychoanalysis. The observations of psychiatrists and psychoanalysts are based on studies of percepts, thoughts, and feelings toward the body, as well as personality reactions to disruptions of the body-image. Since these data represent an organization of information which occurs in the central

nervous system at the highest integrative level, they may be best understood in terms of the theoretical constructs of modern psychology. Within the later framework it is possible to predicate current unusual modifications, perceptions, attitudes, or reactions to the body as consequent to the individual's previous life experiences, which determine conflict between the body-image as perceived and that maintained by the ego as ideal.

A third, and most intriguing new line of study relating to body-image, is followed extensively by Fisher and Cleveland and their colleagues working in the field of psychology. Moving away from earlier theoretical concepts of W. Reich's armor concept, and Jung's Mandala formulation, they conceived the "body boundary" as a protective psychological construct which might be related to various more or less effective modes of personality functioning, predictive of different types of personality as correlated to externally or internally manifested psychosomatic disease. These workers devised methods of scoring the Rorschach-test responses, so as to give quantitative "body boundary" and "body penetration" scores which appear to correlate well with their predictions as to aspects of personality functioning and type of psychosomatic disease. Their methods and findings are described more fully below in the section on Special Examinations.

For the purposes of this chapter, the term "body-image" includes both the postural model of the body as defined by Head, and also the perceptions,

attitudes, emotions, and personality reactions of the individual in relation to his own body.

The term body-image is too broad. The phenomena largely studied by the neurologists are best designated as representative of the *body-percept*, the accumulated sensory experiencing of the body which establishes the preconscious body schema and postural model and from which emerge the body phantoms after loss of parts. The *body-concept*, on the other hand, includes those thoughts, feelings, attitudes, and memories which evolve as the individual (ego) views and experiences his body with others. The *body-ego* is the perceiving or viewing aspect of personality as it concerns the body-image. Each individual projects an idealized image of the body, the *body-ideal*, against which he measures the percepts and concepts held of his body. His ego functions to integrate the disparities within these evaluations which lead to arousal of either painful or pleasurable affect. The ego defenses alleviate the painful affect.

The descriptions of the consequences of dismemberment are now sufficiently extensive to allow discrimination between healthy and pathological adaptations to modification of the body-image resulting from trauma, surgical procedures, or disturbances of the central integrating mechanism. Where the consequence of disturbance of the body-image does not follow the general expectations of the recognized healthy adaptation, the

influence of neurotic or psychotic personality development or social factors will be found operative.

The discussions appearing in the succeeding portions of this chapter are arranged to help the reader gain a clear picture of the factors influencing the development of the body-image and some of the known consequences of the expression of the body-image in healthy persons in the face of the acute stress procedures. From this information, the variations which constitute pathology and pathological psychodynamics in an individual case may be inferred.

### **Development of the Body-Image**

Over the years, the individual organizes his body-image through the integration of multiple perceptions, a process beginning with the earliest stages of development. The embryonic and infantile nervous system is exposed to proprioceptive sensory impressions from the vestibular apparatus and the receptors in muscles and joints. (The hand-to-mouth movements appearing initially *in utero* are the precursors of the complex and significant face-hand relationship.)

With the progressive acquisition of motility, the newborn acquires knowledge of his body from tactile impressions. In the sucking and feeding process, the mouth is the first area to be stimulated, regardless of whether hand, breast, or both are presented. Tactile impressions arising from the

regions of the cheeks and oral cavity become closely linked with the increasingly prominent role of the hand sucking. From approximately the twelfth week following birth, the structuring of the hand-to-mouth relationship is accelerated. The child begins to use both hands and arms to grasp and knead the mother's breast. From this movement, he then proceeds to use his hands to explore his own body surface and to contact others. Concomitantly, he finds that the hand can also substitute for the nipple as a pleasure part and can thereby relieve tension.

The infant's exploratory movements of the hands over his own body, the hands in contact with the mother, and their use in projecting into and grasping objects in space provide the primary kinesthetic and tactile sensations underlying the definition of the perceptual/ postural model. These are the processes upon which the beginnings of self-awareness, of individuality, and the sense of the ego are founded. Important perceptions also develop in the early period from exposure to sensations which arouse varying degrees of pleasure and displeasure; stimulation by self and others, thermal stimuli, and, occasionally, direct painful contact.

In every instance, however, those sensations subserving optic, olfactory, auditory, thermal, and pain stimuli are of secondary importance to the kinesthetic and tactile exploration and perception of the body to form this model. This is in keeping with our knowledge of the embryological

development of the nervous system in humans. As Langworthy found many years ago, those sensory paths subserving kinesthetic and tactile activities are the first to complete myelinization.

Even the influence of visual percepts of the body must be considered as subsidiary to the kinesthetic and tactile. The fact that the congenitally blind develop the capacity for adult patterns of response to Bender's test of double simultaneous cutaneous stimuli demonstrates the fundamental importance of the processes of kinesthetic and tactile sensation in structuring the postural model to subserve location of touch on the body surface. The significance of early sensory experience for the development of the body-image is further strengthened by the observations of Pick and Riese and Bruck that infants and young children who sustain an amputation before the age of five do not develop a phantom extremity. Similarly, Souques and Poisot and Simmel have reported that children born without limbs (congenital aplasias) do not experience a phantom limb. While finding that phantoms were rarely reported if amputation was performed before the age of four, Simmel did discover three subjects with phantoms, out of 135 examined, who experienced the phantom after amputation before the age of two; one was six months at the time of operation. Weinstein and Sersen, on the other hand, found phantom representation in five out of thirty children with congenital limb aplasias. The descriptions of the phantom representation in these cases were obtained by a play technique with the child where he was required to

determine the length of the limb, while the examiner extended the length by moving his finger down the existing limb and then beyond the stump. The reports are not those of a fully developed limb and the children generally indicated only transitory perceptions. Whether the Weinstein-Sersen account may be accepted as equivocal to those experiences of phantoms found after amputations remains for definition and verification by others.

With growth of the individual in size and shape, and with evolving capacities for intricate motor activities, the body-image is continuously modified. The progressively developed images of the body and the body parts remain as memory traces within the nervous system and reappear in states of neurological dissolution or psychological regression, as clinical observations have demonstrated. Thus in his therapeutics with hypnosis, Halpern has focused on the repressed developmental aspect of the body-image. His clinical reports disclose the reemergence of transactional sequences between parents and child under hypnosis that establish and modify the body concept, and which carry the conflict situations between the growing child and parental figures. Peto, too, has noted the fantasies of bodily fusion of patient and analyst into an amorphous mass during deeply regressive transference states in the second or third year of psychoanalytic psychotherapy of patients with previous acute psychosis. He interprets these experiences as regressions to the earliest stages of archaic thinking when the individual often experiences his body as fused with the body of the parent.

In addition to the modifications resulting from developmental and sensory influences, the character or quality of the body-image is also a function of the socialization experiences of the individual. The socially determined qualities commence to appear with the earliest experiences of the individual in relation to the significant person in his family or home environment. The child acquires social percepts, attitudes, and affects toward his body and its various parts, culminating from his interaction with his parents and members of his family as they represent the molding forces of the culture. The attitudes of parents impart an indelible impression on the child's concept of himself, his body, and its function. Depending on the experience with the parents, the body and body parts may be conceived as good or bad, pleasing or repulsive, clean or dirty, loved or disliked.

Among some families as well as some cultures, certain aspects of body development tend to be prized, while others are derogated. In general, these attitudes are related to the sex of the individual. Strength and prowess may be emphasized in boys and men, with a major investment in the development of strong limbs and muscles. In a similar manner, the parents and the culture may emphasize the aspects of the body-image which are regarded as qualities of beauty for girls. Apart from these sexually defined values, there are also specific body parts which may be deemphasized for both sexes. This deemphasis can manifest itself in concealment by clothing; denial through prohibitions of exposure, touch, or examination; absence of verbal

communication (except in jokes); and outspoken derogation of certain body features.

Attitudes toward the body also derive from the individual's perceptions, comparisons, and identifications with the bodies of other persons. Usually, children who are accepted by and conform to their family and cultural expectations, neither over- nor under-evaluate their body. Derogatory attitudes with over-compensatory mechanisms frequently develop to obscure either actual or fantasied body defects when the child feels, or is made to feel, that his body fails to meet the expectations of those about him. Where families tend to exploit the significance of body functioning and appearance, overevaluation and reliance upon security through bodily beauty or activity inevitably follow. Should there be a disruption of the body-image, persons with such security reliance are less able to adapt and are thus more susceptible to emotional disturbances.

Insofar as knowledge of the surface of the body and its parts is concerned, the individual has many sources upon which to draw. Early, and relatively easily and quickly, he gains a concept of the orifices, including the mouth, the nose, the ears, anus, and urethra. In contrast, knowledge of the internal organs is gained from sensations of discomfort. These sensations may be displaced to the contiguous body surface, referred over related surface segmental impressions, or transferred to the surface through the

mechanism of segmental pain. The incorporation of internal organs into the body-image is customarily vague, except when a sense of pain or discomfort is referred to the surface. Exploration of the body serves as the focus for establishing language and thought, spatial orientation in differentiation of laterality (left-right), and enumeration. As has been noted many times, confusion may ensue in development and reemerge in periods of personality disturbance in terms of word usage and their symbolic meaning as referents to the body. Hirsch has reported on a series of psychotic patients who equated in their illness those parts of their personality identified as “bad” with the left side of the body—the “unconscious side” as against the “accepted” or “good” parts, as reflected in the right. This kind of valued differentiation of left-right in the body-image has a long cultural heritage. Its reemergence in psychosis indicates the fluidity of ego organization—a failure to conceive the body as a whole. The influence of body knowledge and awareness on language and usage of words referring to the body is shown in such studies as that of Wright, who analyzed the names of parts of the body that occur most in literature, and found a correspondence between the ratio of frequency of body parts as compared with the ratio of distribution of sensorimotor cortical representation of the same parts. He came to the conclusion that the linguistic importance of the name of the body part was related to the extent of sensorimotor experiencing of the part. In Bennett’s study, groups of sighted, blind, and schizophrenic subjects were requested to

list spontaneously names of parts of the body, as well as other categories of names as a means of examining their body concept. Both sighted and blind subjects list the same parts preferentially in the following order: The sighted list *arm, leg, head, fist, hand, finger, eye, neck, ear, nose, toe, and chest*. The blind give the same listing except *neck* which is replaced in order by *mouth* and they add *heart* and *stomach*. The schizophrenic responses were very similar to those of normals excepting that *ankle* occurred less frequently. Bennett concludes from his direct approach to body naming by men, in contrast to Wright's study of word usage—as derived from a study of word frequencies as listed in books—that his findings would not substantiate the Wright correlation with sensorimotor representation. Thus he emphasized that one might not explain the differences in responding between sighted and blind regarding the occurrence of *nose* and *eye* as the parts first listed by the blind, while they are less frequently mentioned by the sighted. One may argue instead that the frequency of linguistic preference represents rather the result of the social transactional process as it concerns the body in the interface between the developing child and parents or their substitutes.

Szasz suggested an extension of the concept of the body-image or, as he calls it, the ego-body integration, to include not only the percepts, affects, and attitudes experienced historically in the life of the individual but also body parts which occur in fantasy as wish-fulfillment in defensive operations of the ego. Thus, Szasz, in broadening the concept of the perceptive ego to the

expressive, would include penis-envy in females, castration in men, fetishism, and transvestism. In the case of the transvestite, he is seen as creating, with the aid of garments, a materialization of female phantom parts and an image of the body to which the ego clings.

In evaluating Szasz's concept from the standpoint of human experience, the writer holds that the expression of a phantom part is of a different quality and order than that expressed in a wished-for and envied missing body part that has never been experienced in reality. Persons who have not experienced the existence of a limb do not seem to have the capacity for consciously experiencing the existence of a phantom, even though they may wish for a limb. There is a basic physiological substratum imposed upon the cerebral cortex as the result of perceptual experience which allows development of quality of experience over and beyond that observed in the case of ego-adaptive wish-fulfillments. In line with this rationale, the writer is discussing only those disturbances of the body-image which are derived from actually perceived body parts in this chapter. Disturbances representative of partial ego-adaptive mechanisms are discussed by other contributors.

### **Physiology of the Body-Image**

From a neurophysiological standpoint, the postural model of the body is maintained through integrations of spinal neural activity and those of higher

cerebral levels. That modification of peripheral sensory activity may influence the subjective appreciation of the body-image is shown by the following observations. Souques and Poisot found that cocainization of the peripheral nerves leads to temporary disappearance of a phantom extremity. Schilder states that Gallinek and

Forster had success in removing a phantom by peripheral changes, and also that Adler and Hoff noted diminished perception of the phantom with application of ethyl chloride to the stump. Head has described the disappearance of the phantom limb following a cerebral operation. De Gutierrez-Mahoney and Echols reported abolition of a painful phantom by surgical excision of the posterior central gyrus. De Gutierrez-Mahoney found, on follow-up studies, that the original impression of abolition of the pain or phantom did not hold. In their study, Appenzeller and Bicknell indicate that spinal-cord lesions may alter phantom sensations and at least temporarily abolish some. Centralateral parietal-lobe lesions with accompanying sensory defects may lead to permanent disappearance of the phantom experience. Yet, their study is incomplete in that neither the extent of the cerebral impairment is known, nor the length of follow-up of patients claiming complete disappearance of the phantom. Kolb observed three patients after removal of the somatosensory cerebral cortex done in an attempt to eradicate a painful phantom extremity. The phantom was not lost, but it became less vivid. He also observed that there are no significant modifications in phantom

percepts following explorations of the stump with removal of terminal neuromata, or with rhizotomies, sympathectomies, cordotomies, injections of alcohol into neuromata, paravertebral anesthetic blocks of the sympathetic ganglia, spinal anesthetics, and prefrontal lobotomy.

The body-image is, as Schilder so properly inferred, integrated in the parietotemporal areas of the cerebral cortex. Pool and Bridges have reported that unilateral surgical ablation or cortical undercutting of the parietal lobe does not destroy phantom percepts. From his study of patients with hemiplegic anosognosia, allachesthesia, and various aphasias, Anastasopoulos concludes that the right parietal lobe is the major cortical area for corporeal representation. However, it would seem that imperception of the body occurs only in those with bilateral cerebral vascular lesions that have led to extensive cortical damage. Cook and Druckemiller have suggested that the body-image is represented in the cortex as the function of a widespread neural network in the postrolandic area. This network, they postulate, may be activated by stimuli from the periphery or centrally from other areas of the brain when the individual turns attention on problems of body functioning or is actively motile.

Fisher and Cleveland suggested from their studies that, when the individual ascribes definitive boundaries to his body, this correlates with the relative reactivity of his body exterior to his body interior. Using the galvanic

skin resistance (GSR) as a measure of reactivity, it was found that when the individual ascribed greater strength to his right versus his left side—or vice versa—there exists a variability in the relative GSR. So, too, when the head area is perceived by the individual as of large magnitude, it is characterized by a relatively lower skin resistance than the non-head area. When adjudged to be small it has a higher skin resistance relatively to other parts of the body. This work remains unconfirmed. Its explanation in terms of integration at cortical levels of brain functioning remains unknown.

### **Family and Cultural Attitudes Affecting the Body-Image**

Genetic and intrauterine processes and those later accidents of life in the form of traumatic or surgical experiences determine the bodily structure adapted to and perceived by the ego. From this ongoing interaction between perceived body and perceiving ego, consciously and unconsciously, there arise percepts, attitudes, and affects leading to adaptations of the body-image.

Social psychologists have advanced the hypothesis, supported by investigations, that when one's evaluation of a personal trait is unclearly defined he will depend to a large extent on the opinion given him as to that trait by "significant others." In the studies of Kipnis, her subjects perceived smaller differences between themselves and their friends than between themselves and a least-liked roommate. When her subjects perceived their

best friends as relatively unlike themselves, they were more inclined to change their self-evaluations than those who perceive their best friends to be like themselves. When the subjects perceived their best friends as having positive personality traits they tended to modify their self-evaluations in a positive direction. The opposite was true when the best friend was perceived as possessing negative traits. But when her subjects perceived more negative traits in their best friend than in themselves they broke off their relationships more frequently than when the friend was perceived as having more positive traits.

These findings probably bear upon the attitudinal set which confront those with obvious body deformity. The deformities bear upon the attitudes of those who relate to the deformed which, in turn, influence the development of body concept by the deformed and mutilated. Recent experimental studies support these contentions. Centers and Centers analyzed the responses to questionnaire studies of groups of children and report that the presence of amputation represents a threat to the bodily integrity of the nonamputee. This reflects in his greater tendency to reject amputee children rather than nonamputees.

Gilder et al., examined the responses of a group of amputees and nonamputees when viewing the normal and amputated human figure through the distortions produced by wearing aniseikonic lenses. Generally, the change

reported was that of less distortion as if the viewer unconsciously wished to deny the mutilation.

Gross deformities, such as aplasias, lend themselves to the development of body-image concepts at both the physiological and psychological levels of integration, which differ from that where there have been less serious disturbances of the body structure. The body-image of the blind, the deaf, and persons with other dysplasias has been less well studied than that of individuals who have acquired deformities as a consequence of illness, trauma, and surgical procedures.

For the most part, the influence of family attitudes on the development of disturbed body-images has been neglected in study and practice. In point of fact, however, the capacity for a satisfactory social adaptation among those with bodily defects depends more upon the family and cultural attitudes toward body structures than upon the presence of defect. When the family or social attitude toward serious body defect is constructive and supportive, there is greater possibility for successful compensatory development without personality disorder. In the family with healthy attitudes the defect is accepted, and personality development is directed by the parents along lines where other assets can be developed and strengthened. By these means the afflicted can obtain a kind of satisfaction which, to a degree, compensates for the effects of the inadequacy of the body-image. MacGregor et al., have

summarized much of the existing knowledge concerning family patterns that contribute to a healthy and satisfying body-image concept.

The attitude of society toward physical disfigurement is generally that of disapproval, repulsion, and rejection. The deformed child is rejected on grounds that his deformities are due to “sins of the fathers,” “punishment for wrongdoing,” “incestuous parentage,” etc. These myths and conceptions exist not only among the ignorant or uneducated but also among the well-educated and highly intelligent. Adoption agencies report that it is difficult to place children with deformities. For this reason, it is not an uncommon practice for agencies to offer disfigured children to people who would otherwise not be considered suitable as adoptive parents. But even under these circumstances, the agencies report that they have difficulty in finding adoptive parents for children with physical disfigurement.

The use and misuse of superstitious rationalizations regarding deformity have a psychological value in that they provide a means for expressing and projecting an individual’s own conflict and fear about deformity in his body. In the case of the parents, the acceptance of these unsound and unrealistic values provides a means or an excuse to project the blame for the deformity onto another source, to strengthen their existing guilt feelings, or to support hostile or rejecting attitudes toward those whose appearance is different.

Despite evidence of social, vocational, and intellectual competency, the deformed are exposed to a kind of stereotyping which is socially disadvantageous. Pervasive as these attitudes are, there is a reality basis for the high concern manifested by patients with physical deformities. As a rule, the type rather than the severity of the deviation evokes the stereotyped responses. A receding chin is often associated with weakness or effeminacy. A large nose may assign its possessor to a minority group. Persons with protuberant ears, knock-knees, or pigeon toes are frequently ridiculed or become the butt of jokes and hostile humor. Some facial configurations precipitate immediate typing as a moron, gangster, drug addict, or sufferer of some serious disease. On the other hand, certain physical deformities carry a degree of social prestige, as the broken nose of a prize fighter or the scar resulting from a war injury.

With the birth of a deformed child, the mother usually responds with mixed feelings of humiliation, sadness, guilt, or depression. A small group of mothers consciously fail to see the defect as being as serious as other family members and the physician do. While this minority of mothers will have feelings of protectiveness toward their deformed children, they will also feel jealous toward other mothers with healthy babies. Comments about her baby's defect tend to increase the mother's sensitivity.

MacGregor et al., in their study of persons with facial deformities, point

out that the attitude of the mother varies according to the sex of the child with the defect. These investigators noted that overemphasis on physical beauty by mothers led to maladjustment in daughters. The facial defect of the female child was seen as producing feelings of rejection, hostility, or guilt in the mothers. As pointed out in this study, boys born with facial deformities were less likely to suffer from such maternal attitudes. It appears that the mothers and the culture as a whole did not make a strong connection between the idea of beauty and the equally desirable idea of “masculinity.”

The attitude of the mother toward the defective body of the child is strongly influenced by her perception of the attitude of the husband-father. As a rule, if his response is sympathetic and positive, she finds it easier to accept the disfigurement. However, in some cases, mothers are less anxious about the child if the husbands show more distress than they do. In other cases, the guilt feelings of the mother may become magnified when the father blames her for the defect and when she has reason to believe that there is a basis for the accusation.

If the mother has a realistic awareness of the importance of physical appearance but does not exaggerate this value to the exclusion of all other assets, it is possible for her to accept the disfigured child. In such instances, and with the help of teachers and friends, the mother can be instrumental in helping the child to compensate through good manners, gracefulness, careful

grooming, and attractive clothing. The usefulness of encouraging compensating personality traits depends, however, on the genuine acceptance of the child by both parents. Otherwise, parental urgings of compensatory behavior can aggravate or increase feelings of inadequacy in the deformed.

In a study of children with excessive body sensitivity but without particular deformity, Levy found that the specially conducive factors were parental oversolicitude, histories of significant illnesses and injuries in the past, exposure to sick persons or frequent discussions of illness, bodily variations differing significantly from that of peers, and special bodily values of the group subculture. Parental solicitude leading to excessive bodily concern in the child was secondary to a variety of conditions in the life of the parents. For the mother particularly, marital conflict, death of the father, difficulty with the spouse's parents or family, absence of neighbors, and narrow emotional outlets tended to cause her to focus her interest on the child. To compound this difficulty, the interest carried with it displaced hostility, and also destructive drives and the reaction-formation of protection. In sum, parental exploitation of the child to resolve emotional conflicts or satisfy ambitions, parental ignorance or immaturity linked with vacillatory overprotection, the death or deformity of siblings, miscarriage and stillbirths, and other special concerns resulting from personal experience served to sensitize the protective parent.

Observations of family life indicate that the deformed child does not receive the same treatment as the other children of the family. The afflicted child is usually treated either with greater consideration or with less approval and warmth, and sometimes even with outright hostility. The responses of the siblings are not necessarily the same as those of the mother to the child. In families where mothers reject the deformed child, the siblings may compensate by providing friendship and help to the child with a defective body. In some other families, the siblings will treat the defective child with outspoken impatience and resentment. Observations suggest that mothers and siblings have less pathogenic attitudes toward children who are accidentally deformed than to children born with a congenital defect; there also appears to be less likelihood of guilt reaction, resentment, and hostility on the part of the mothers.

Emulating the rejecting attitudes of their families and society, most patients with body defects manifest unhealthy attitudes and behavior in relation to their bodies. The majority of children are unwilling to look into mirrors, dread making trips away from home, and try to slip into corners and hide their faces from public view. Contacts at school with other children, who may jeer or ridicule them, often result in the deformed child's returning home in tears or sulking. In small children the ridicule may not at first be understood, but, once it is within the child's comprehension, it can lead to his avoidance of other children. Frequently, a deformed child will persist in

questioning the parents as to why he is different and why he is the only one in the family who is different. Some children attempt to diminish the importance of the deformity by joking about it, while still others studiously avoid mentioning the subject. In every instance, however, these types of behavior are related to the parents' behavior and attitudes concerning the deformity.

The parental attitude is a composite of the parental health and acceptance, and particularly that of the mothers. Some mothers attempt to protect their deformed children from hardship by insistence on their avoiding any activity where they might be questioned. The consequence of this isolation is that both relatives and strangers are kept from contact with the child. Another type of mother attempts to hide the defect by requiring the child to wear certain concealing clothing or to assume certain postures. In the reports of these instances, the mothers failed to recognize that this hiding was also their effort at *withdrawal*, although they did mention feelings of anxiety in the presence of strangers. In studying the children who *deny* the existence of the body defect, it has been found that their mothers attempt to deny anxiety by insistence on exposure of the child to strangers, relatives, and others. The mothers themselves are reluctant to make personal contacts or to discuss the disfigurement. When the subject of disfigurement arises in conversations, parents holding these attitudes tend to minimize their concern. Still another group of mothers compensate for their belief that the children are stigmatized by using the mechanism of "undoing." Here the

deformity is spoken of as “cute,” and a lack of personal concern is stressed. It is noted in these circumstances that the presence of strangers does not produce feelings of discomfort, but discussion of the defects does.

Differences between healthy and unhealthy attitudes of mothers have been comprehensively discussed by MacGregor et al. Healthy mothers do not consider disfigurement as a stigma or punishment for their own behavior. They do not hide concern, and they are able to seek advice from professional persons and their acquaintances. In contrast, mothers whose behavior fits the child’s pattern of “avoidance” are likely to become angry when the child fails to follow instructions to conceal the deformity. Such mothers regularly react by blaming the child when the child complains of discrimination. While the denying mother may allow the child with a defect a greater degree of freedom, his complaints of the attitudes of others usually meet with her rejection. She is inclined to “brush him off” with statements that he should learn “not to concentrate on the defect.” Those mothers who “undo” the defect attempt to have the child develop a sense of distinction, which leads to impairment of reality sense.

The foregoing description of specific interaction between mother and child in relation to body structure provides the matrix from which the body-image and consequent ego attitudes and adaptation to the body-image arise. This knowledge, derived from studies of family instruction with deformed

children, may well apply to children who later show body-image disturbances in the context of schizophrenic and psychosomatic conditions. Unfortunately, detailed studies are not available on the family patterning that leads to body-image disturbance under these conditions, information which is very likely crucial to understanding the personality character of the schizophrenic, whose conviction of bodily ugliness is a well-known clinical phenomenon. This knowledge is essential to formulating rational methods of prevention and treatment of the body-image disturbance.

### **Special Examinations for Body-Image Disturbance**

Attitudes toward the body and its parts may be elicited, and ego adaptations to such attitudes may be inferred from the data provided in the course of the psychiatric anamnesis and examination. While the usual examinations and techniques underemphasize this aspect of personality, procedures are now available which may be used to assess the body-ego integration. These techniques include modifications of the regular diagnostic examination, new rating scales for measuring and appraising body cathexis, projective techniques, and specific perceptual tests.

Years ago, Levy suggested a method of integrating physical and psychiatric examinations for children. The child, at the termination of an ordinary physical examination and while still undressed, is asked to play the

role of physician and examine his own body. The physician asks him to comment on what he has noticed about the various parts of his body, observable differences between himself and others, and preferences as to how he would like to see his body parts when he is grown. In addition to these questions, inquiry is made regarding ideas and feelings about the importance or lack of importance of height, weight, strength, and appearance. Reporting on his study, Levy noted marked discrepancies between children's attitudes toward the various body parts and their actual physical structure. The visible mouth area produced the most frequent number of responses. Eyes and hair produced frequent responses from both boys and girls. On the other hand, mammary and genital responses were more evident in boys than in girls, a finding related by Levy to the fact that there is no censor of boys in exposing these parts to nakedness. Children showing a sensitivity to secondary sexual traits appeared to have many doubts as to their sexual identity. Individual points of body sensitivity were displaced to other parts of the body by some children. Jacobson also suggested a method of evaluation.

Secord and Jourard developed a rating scale as a means of appraising body cathexis. Secord also devised a word-association test utilizing homonyms as a means of investigating bodily concern. Secord's test discriminates three groups of individuals relative to body concern: (1) the narcissistics who overvalue and overprotect the body because of its intrinsic personal value; (2) anxious persons who register bodily concern owing to

physical pain, injury, or shame; and (3) overcontrolled individuals who apparently rid themselves of body concern through denial. The first two groups in the Secord test gave numerous responses on the word-association test, in contrast with the few responses by the third group. Using two tests, the body-cathexis scale and the word association, Secord found that the narcissistic group scored high for body acceptance and high on the word association.

The scores of those with high anxiety were low on body acceptance and high on word association. Overcontrolled persons scored low on both tests. Hunt and Feldman used both the body cathexis scale of Secord and Jourard, and the Draw-a-Person test to study the responses of a group of male and female psychology students. In general, they confirmed earlier findings that women cathected their bodies more highly than men as they showed greater variability in both reporting satisfaction and dissatisfaction. The group as a whole reported more favorable responses to their bodies as perceived in the present as against earlier in adolescence.

Machover described the Draw-a-Person test, a projective technique which elicits unconscious attitudes and percepts of the body-image. Using this test or its modification (the Man-Woman-and-Child test), Noble et al., Kolb, and Wille found that some limb amputees include amputated extremities in their drawings. It has not been determined whether the amputated percept

might have existed prior to amputation, nor is it known whether all amputees provide such mutilated percepts and, if this is not the case, the factors that differentiate this group from those who fail to do so.

Using the Draw-a-Person test with crippled children, Wysocki and Whitney found that they express more aggression in their drawings than do noncrippled children. In expressing their aggression through the medium of this test the crippled showed a variable intensity of aggression according to the area of insult.

Centers and Centers, using the same test to study the responses of amputee children, found that the majority represented themselves realistically, omitting the missing limb or including a prosthetic device. The majority then, as might be predicted, do not present in their responses to this test evidence of greater anxiety or conflict. Yet in this study, the Self-Portrait Draw-a-Person distinguishes the amputee child from the nonamputee. The amputee children more often drew self-portraits with absence of one or both hands. Also, they showed a tendency to incorporate more detail in their self-portraits than nonamputee children. While the hypothesis of the investigators is not supported by their studies, it seems evident that the projection of the body percept in drawing differs in amputee from nonamputee children.

Studies of figure drawings of patients with paralytic poliomyelitis by

Johnson show that this group draws significantly smaller figures than control groups of nondisabled recovered poliomyelitics. Neither group represented their defects isomorphically, although both groups drew less distortions in upper than lower extremities. As in poliomyelitis, there occurs a loss of muscle function in the absence of loss of sensation in a part of the body; changes in the body image should offer a contrast to those following cord transections or amputations. In a study by Wachs and Zaks, paraplegics tended to draw figures larger than a matched control.

Figure drawings similar to Machover's have been used by Abel in studying patients with such facial disfigurements as congenital absence of ears, harelips, absence of the nose, scarring from burns, oversized nose, or the sequelae of facial cancers and surgical interventions. Abel has found same-sex drawings to be especially productive of information supplied by the patient. Severely disfigured persons seeking corrective (plastic) surgery portrayed their problem fully in the same-sex drawing. The mildly disfigured were less likely to do so. The projections of the face in the drawings have been categorized by Abel into the following four groups: (1) specific portrayal of the individual's disfigurement; (2) distortion of the disfigurement (a large nose for a small nose); (3) omission of all features of the face; and (4) a face with features but without disfigurement.

While Corah and Corah did not discover overt portrayal of the cleft lip

or palate deformity in their studies of figure drawings of a small group of children with these deformities, they do report a significant difference in the scores of these children on an index-discrepancy score, that is the Binet mental-age. Their study did not support the hypothesis that physical handicaps will be represented often in figure drawings. The question requires restatement and restudy.

Fisher and Cleveland have utilized the Rorschach test in relating a single dimension of body-image concern with the manner in which the individual sees his body damage.

Thus they correlated personal concept of boundary definiteness with the responses to the individual's percepts to the Rorschach inkblot stimuli. Typical responses considered to equate with expression of definite body-image boundary were: "cave with rocky walls, man in armor, animal with striped skin, turtle with shell, mummy wrapped up, woman in fancy costume." Such responses, they labeled "barrier responses." They also defined a second boundary index termed the "penetration response" and scored by reported verbal response to the ink blots which were interpreted as emphasizing weakness, lack of substance, or penetrability of persons and objects. Here typical verbal responses were "mashed bug, person bleeding, broken body, torn coat, body seen through a flouroscope." The method of interpreting verbally reported percepts and quantitation scoring are given in detail in

their book, *Body-image and Personality*. The *barrier-response* score seems not to change with time in individuals; the *penetration response* score correlates more with change.

Patients with rheumatoid arthritis, neurodermatitis, and conversion symptoms involving muscular functions were found to have barrier scores higher than those with gastric ulcers or spastic colitis. So, too, those with high barrier scores seem predictable to adapt more effectively to body disablement, to maintain ego integration and to communicate well in small group settings. Roughly, the scores appear to distinguish between several groups with psychopathology. Schizophrenics have higher barrier and lower penetration scores while neurotics have lower barrier and increased penetration scores.

As Fisher mentions, others have questioned his assumptions that these scores represent measures of body-image and suggest instead that they are indicative of cognitive or perceptual operations. However, as suggested earlier, such operations have their beginnings in the developmental processes connected with exploration of one's body. To achieve clinical validity and usefulness, more work must be done to verify and amplify the hypotheses and findings of Fisher and co-workers. Others have failed to replicate these correlations. Bard has utilized psychological tests to predict psychogenic invalidism following radical mastectomy.

Hunt and Weber have devised a Body-image Projective Test in which varying anterior and lateral silhouettes of the female body are presented in booklet form to women who are requested to respond to questions as they view each silhouette in turn: "What looks most like me? What I would least like to look like? What would I most like to look like?"

Perception, as related to the postural image of the body, has been studied intensively by Asch and Witkin. In this work, subjects were placed in a small, tilted room and were instructed to adjust a rod, presented on the back wall, to the true upright. Judgments were obtained with the body of the subject upright and with the body tilted. Striking individual differences were found in the extent to which the perceived upright is affected by the surrounding tilted field. Individual consistency was considerable. Witkin is continuing these studies.

Bender's studies of double simultaneous stimulation of nonsymmetrical areas of the body provide a special technique of examining perception of the body-image.

During double simultaneous stimulation of the face and another part of the body, the facial stimulation is not only invariably reported but is consistently dominant to all other body parts. The genital region is only slightly less dominant, with the hand the least, and other body areas falling in

between. Normal persons who make frequent errors in initial trials of reporting double stimulations tend to correct errors. Persons with brain disease and schizophrenics appear to modify their responses less readily. Linn, utilizing Bender's test in studying patients with organic brain disease, suggests that the face-hand response is fused and the hand-touch response is not discriminated verbally. Linn's patients reported through nonverbal gestures for the hand-touch test but gave oral responses in the face-touch experiment. He concludes from these observations that the hand response is not the result of extinction by more dominant face perceptions of body-image but rather a nondiscriminated manifestation of fusion of the face-hand response. Linn's hypothesis is in keeping with what is known of the early experiencing of the body by the developing perceptual ego. Pollack and Goldfarb tested both institutionalized schizophrenic and nonschizophrenic children with the Bender technique. They found that, by the age of seven, all normal children perceive both face and hand stimuli within ten trials, while the pattern of response of the schizophrenic children was significantly different and more similar to that of younger children and those with mental changes due to severe brain disease.

Orbach and co-workers devised a new instrument, an adjustable body distorting mirror, as a means of determining objectively the individual's internalized picture of his physical appearance. The observer is requested to adjust his reflection until it appears undistorted to himself. In their early

experiments using this device they discovered that a wide range of reflections was acceptable to the various subjects as representing his body. Yet, when subjects are shown a series of distorted and undistorted photographs of themselves they accurately select that most approaching the true identity. Each subject appears to need an external reference point for body identification. Modifying the test to allow a series of judgments, they discovered that judgments of one's head and shoulders are most accurate and consistent. Next in accuracy are judgments of the vertical halves of the body. Least accurate are those of the legs and feet. It must be recognized that such judgments are based on visual stimulation alone whereas the perceptual image of the body—as mentioned earlier—is derived from kinesthetic and tactile impairment.

A later study by Cardone and Olson, utilizing this device in examining the responses of a schizophrenic population, disclosed that such patients performed less accurately than healthy controls, but the patients seemed to have, in addition to the defect in body perception, also a more general perceptual impairment. Hemiplegics, too, have the latter defect but did not disclose a body perceptual impairment.

### **Phantom Phenomena**

The phantoms of amputated limbs, the first to be recognized, are also

the most frequently encountered, best understood, and best described. To a lesser degree, phantoms also occur following removal of other body protuberances such as the nose, eyes, teeth, nipples, penis, and the breasts of women. Since the phantom is the expected healthy response following sudden loss of a limb, a detailed account of this phenomenon is presented as a means of describing the pathological reactions to limb mutilations.

The phantom limb or digit is almost a universal phenomenon following amputation, having been reported in as many as 98 percent of cases. Ewalt and his associates, studying 2284 amputees in an American Army hospital during World War II, developed some significant data on the occurrence of the painless phantom as compared with the painful phantom. Their report shows that only eight patients of the total group complained of painful phantom limb, whereas the remainder had a painless phantom. From 22 to 64 percent of women report breast phantoms following mastectomy, and Jarvis discusses the variability in the frequency. Figures are not yet available as to the frequency of observation of the phantom of other lost body appendages.

Riddoch, Henderson and Smyth, and Lhermitte, have provided excellent descriptions of the characteristics of the phantom delusion. They point out that the amputee is most aware of the distal portions of the phantom such as the hand and foot. They also note that following amputation, the individual initially perceives the phantom as consisting of the whole extremity.

Henderson and Smyth have characterized the sensory phenomena of the phantom as consisting of three general types. The first is a mild, tingling sensation, the basic phantom phenomenon, which is dependent upon the function of the sensorimotor cerebral cortex. The second experience is a stronger, momentary pins-and-needles sensation such as that felt in the phantom when the neuromata in the stump are touched. This sensation is apparently dependent on the functional activity of the lower spinal center. The third type consists of certain superadded disagreeable or painful sensations which are described as "twisting," "burning," "pulling," "itching," or various other complaints couched in bizarre terms. These epiphenomena are discussed in the excellent clinical reports of Bailey and Moersch. Frederiks distinguishes usefully between the perception of the phantom limb per se and phantom-limb sensations such as tingling, pain, or other sensory phenomena occurring with the phantom. He emphasizes that phantom sensations do not exist without the percept of the phantom part.

Most phantoms, regardless of type, are intermittent and more annoying than agonizing. The introspective and observant amputee may notice aggravation of the basic tingling sensation by stimulation of the stump. The aggravation, when a leg has been lost, may also be occasioned by urination, by changes in the weather, or by emotionally disturbing incidents.

Related to these general types of sensory phenomena, especially the

pins and needles, sensations referred to the phantom are most often elicited by deep pressure on the amputation stump, less often with algesic skin stimulation, and least by tactile stimulation. Erickson and his associates, have demonstrated that similar sensations may be referred to the phantom by stimulating the appropriate portion of the postcentral gyrus of the cerebral cortex. Cohen and Jones have described pain of cardiac origin referred to the phantom left arm. Cronholm has extensively studied the sensations referred to the phantom by various stimuli applied to the amputation stump and skin areas contiguous to the stump.

The phantom is experienced as a reality, the absent extremity occasionally described as feeling swollen, numb, or tight. Following an acute traumatic dismemberment, the amputee may forget his loss and fall as he attempts to step on the foot which has been removed. It is not unusual to obtain accounts of reflex movements in the missing extremity. The amputee often describes volitional wiggling or movement of his fingers or toes and flexion of the extremity—wrist or ankle. Weir Mitchell observed that the conscious awareness of the phantom may be greater than that of the contralateral intact limb. The patient, preserving an alignment of the phantom with the stump, is likely to comment upon its capacity to penetrate solid objects unaccompanied by any sensation of touching. Thus, a patient lying in bed with a mid-thigh amputation may feel as though his phantom leg is flexed at the knees and the lower part is penetrating the mattress without

experiencing contact with the mattress.

The phantom extremities existing after denervations of limbs, or severance of the spinal cord, are similar in many respects to the phantoms following limb dismemberment. Patients report that they perceive the phantom extremity in positions other than those actually maintained by the intact extremity. Occasionally, they speak of a reduplication of the phantom in which one phantom coincides with the paralyzed limb and another coincides with the limb in its healthy state. Reduplication is encountered most often in patients with high cervical transverse lesions of the spinal cord or among those with lesions in the cerebral hemispheres.

Differing from the phantom produced in the amputee, the phantom of the paraplegic does not shrink away or telescope, provided the cord transaction is complete. Also, in the paraplegic, the length and position of the phantom usually remain unaltered by postural changes of the body or by vasomotor stimulation. However, paraplegic patients do report volitional movements of the phantom and occasional homolateral associated movements. As Bors reports, the most frequently willed movement in the paraplegic is in the anal sphincter.

The initial perception of the phantom becomes modified through continuing experiences. With time, the patient comes to feel certain parts less

vividly than others. The faintly perceived parts tend to fade away, while others persist with undiminished intensity. In the case of the extremities, the parts which recede first are the upper arm and thighs. Next to disappear are the lower arm and calf, and these are followed in turn by the joints and parts of the hands and feet. Among the last to disappear are the toes, instep, and heel, the lateral margin of the sole of the foot or the fingers, and the palm and ulnar part of the hand. The great toe, the thumb, and the index and little fingers are retained longest.

The phantom modification and dissolution take place over varying periods of time and in some amputees are fully completed. The sequence of the disappearing parts follows the well-known neurological homunculus as represented in the sensorimotor cortex. It appears that those body areas having the most cerebral representation are richly endowed with sensory fibers that make for high sensory acuity and fine discrimination. On the motor side, the areas have high innervation ratios and the capacity for discreet and skilled movements. These highly innervated parts, dominantly perceived through usage, have not only the longest phantom life but are also subject to earliest exploration and stimulation.

Telescoping is another characteristic of the reorganization of the phantom. As the distal portions of the phantom become conspicuous in relation to the proximal segments, the position of the phantom hand or foot is

at first unchanged. The patient is unaware of empty spaces or gaps between the stump and the well-perceived distal portions of the extremity. Then the amputee experiences the emptiness of the inner space, and the persisting phantom seems to become disconnected. Although it remains in its customary place and position, it has no sensation of intervening segments. Subsequently, the distal phantom hand or foot approaches the stump. In some patients the distal segment of the phantom, once connected to the stump, fades away, leaving only the toes or fingers, which may also disappear in time. In other patients the phantom hand or foot may remain intact, but in these cases it is gradually displaced into the stump, with the toes or fingers protruding. Occasionally, the stump comes to enclose both the foot or the hand. It is important to note again that the phantom extremity or portions of the extremity may diminish in size. This' disconnection of the phantom size, which is frequently overlooked, is only observed if the patient is requested to compare the size of the phantom to the healthy foot.

The telescoping phenomenon is never complete. The phantom may be restored to its former extent when the peripheral stump is stimulated by pressure, as with the fitting of a prosthesis and during disturbances of consciousness in the course of severe intercurrent illness. Jackson's theories of dissolution and restitution of function within the nervous system, following either temporary or complete cessation of function of cortical or higher segmental areas of the brain stem, provide insight into the basis of the

process. According to Jackson, a loss of the most recently acquired and most highly organized function ensues, with a reemergence of more primitive functions with later acquisition of new or reappearance of some of the lost functions. Thus earlier infantile and childhood perceptions of the lost limb are seen in the telescoping phenomena. As a whole, neurological theories lend themselves to appropriate and satisfactory explanations of the reorganization of the phantom parts representative of the postural model of the body. Neither the psychoanalytic theory of wish-fulfillment nor gestalt psychology succeeds in explaining the failure to experience the phantom extremities by those who have an aplasia of the limb from birth or an early amputation.

In the case of an acute illness effecting loss of consciousness, there is a reduction in the recently acquired modification of the body-image among those patients in whom the phantom had disappeared. The more primitive, intact body percept, which includes the phantom, reemerges. It is of interest that a paraplegic patient with phantom does not experience telescoping under these circumstances. With these patients the continuing optical image of the intact extremities prevents reorganization of the body-image.

The life of the phantom has been variously reported to persist from a period of a few months to as many as twenty or thirty years. While it is common to hear that the usual phantom disappears within two years after amputation, no firm evidence is available on the period of survival. It seems

probable that the failure to reorganize the body-image with disappearance of the phantom extends over a much longer period than is usually thought.

Facial phantoms, following loss of the nose, eyes, teeth, and other portions of the face, are less frequently reported. It is uncertain whether this infrequency results from the attending physician's failure to examine completely because of psychological denial by the patient, or from psychophysiological lack of organization of this area of the body. Hoffman pointed out that the examination for the phantom of the facial organs should be made in terms of the subjective perception of the function of the organ. This is in accord with the description of the phantom eye of patients who have lost an eye. They report scratching or itching sensations in the eyebrow, expectancy of movements of the eyeball as though the eye were present, and sometimes blinking of the phantom eye. Among patients having resections on the nose, there may be a compulsion to touch or palpate the end of the nose. Some data exist concerning facial phenomena relative to the eye, nose, and eyebrows following radical maxillectomy with enucleation of the eyeball for carcinoma of the maxillary sinus. Similar disturbances have been reported after resection of the mandible for carcinoma.

In the last decade a number of studies have been conducted to ascertain the frequency and mode of presentation of phantoms of the breast. Jarvis and Simmel review the literature in this area and report extensively on their own

observations. Often perceived as a percept of the whole breast, or of the nipple, many patients indicate the presence of the phantom principally in sensations of itching and scratching, as heaviness, or as “full of milk.” Simmel discovered that almost all women report a faint breast phantom when requested to perform a sway test by leaning forward with closed eyes and slowly swaying backward and forward. Their perception is episodic and less realistic than that of the limb and is accentuated by menstruation and changes in the weather. Anal-genital phantoms include those of the testicles, penis, and rectum. There appears to be no direct correlation between the occurrence of actual erection and the presence or absence of the flaccid or erect penis phantom. In the paraplegic patient, Bors has reported that phantom sensations of the bladder and rectum are more rare than the flaccid and erect penis.

The infrequency of breast, penis, and testicle phantoms has been ascribed by Gallinek to the lack of proprioceptive sensibility in immovable organs. However, the fact that they occur occasionally makes this explanation inadequate. Bressler’s comment that the breast is not integrated into the primitive body-image of the female child in the early years of growth and that full development occurs later seems especially pertinent. Moreover, it is not unlikely that psychosocial and cultural attitudes toward the genital and procreative organs contribute to the tendency to consciously deny the phantom phenomena that follow their loss.

Internal organs, per se, are not represented in the body-image, presumably as there is no sensing and exploration through the kinesthetic and tactile systems and other sensory during development. When, however, the individual endures pain in such organs over a prolonged period, as with a gastric ulcer, or when through surgical or traumatic means a portion of the organ is brought to the bodily surface, both perceptual and conceptual experiences take place and come to represent that aspect of the organ in the body-image. Dorpat reviewed the reports of phantom sensations of internal organs at length. Druss, O'Connor, and Stern report the interesting series of body-image changes noted in four women after ileostomy. These women all wished to be men. Following surgery, the ileostomy was connected with fantasies of acquiring a phallus in part fulfilling their wish and related to behavioral changes of exhibitionism, increased aggressivity, and erotisation of the stoma.

The effects of psychotomimetics, such as mescaline and n-lysergic acid diethylamide (LSD), as they induce perceptual disturbance and modify the phantom have not been elucidated. Zador has described changes in the size, shape, and position of the limb phantoms of two amputees and of a patient who was paralyzed by poliomyelitis. The latter developed a phantom of a limb after an Esmarch bandage was applied. The writer and his associates have conducted a series of experiments on an amputee who continued to have pain in a phantom arm following resection of the contralateral posterior

central gyrus. In this study, 18  $\mu\text{g}$  of LSD administered intravenously produced no change; 86  $\gamma$  of LSD led to perception of more definite form; with a larger dose (95  $\gamma$ ), the size of the phantom enlarged. Phantom pain was unaffected in both trials with LSD.

### **Adaptation to Disturbance of the Body-Image**

A series of emotional, perceptual, and psychosocial reactions are a natural consequence of disturbance of the body-image. The nature of these reactions determines whether the individual's adaptation is healthy or pathological. The existence of a phantom is the expected healthy response to amputation of a limb or body part occurring after early childhood. Similarly, patients who have undergone changes in body configuration as the consequence of metabolic disorder frequently report bodily perceptions at variance with those observed by the patient's medical attendant and his family. The reports of sudden changes in the body configuration which result in personality disturbance are in part reactions to disturbance of the body-image.

Whether a sudden change in the body-image results from a surgical procedure or from a metabolic disorder, it always arouses anxiety in the patient. The distortion of the customary body-image is experienced as a distortion of the self. In instances of dismemberment, mourning for the loss of

the part, similar to that of separation from significant persons, is expected. Further complications are introduced, with resulting anxiety, as the disfigured person is threatened by fears of separation from and rejection by the significant persons upon whom he is dependent. Feelings of hostility may emerge toward these persons as part of the separation anxiety. The perceptual life of the patient is disturbed as regards his unreal appreciation of his own body and also his perceptions of other persons. Some amputees report unusual sensitivity and discomfort upon seeing other amputees. The extent of perceptual distortion among patients with body-image disturbance is not known. The unconscious mental life of the patient is also modified by the distortion of his body-image. The dream-life may become a wish-fulfilling type in which the disfigured person sees himself performing activities in which the lost part plays an active role. Repetitive dreams recapitulating the incident that led to disfigurement are associated with the affect of anxiety.

A healthy adaptation may be measured by the patient's willingness to discuss his disfigurement, dismemberment, functional loss, and the phantom and by his ability to accept offers of aid. With plastic surgery, eyeglasses, hearing aids, dentures, and other aids to social and vocational rehabilitation now widely available, the healthy person reacts by accepting his defect and cooperating with those who can assist in readaptation. Usually, the limb amputee is willing to accept the prosthesis. Similar attitudes normally obtain among those who have lost an eye and require ocular prosthesis.

Psychopathological responses to the disturbance of the body-image are manifested variously. Denial of disfigurement as a wish-fulfilling mechanism to maintain the preexisting body-image is occasionally seen, as in the failure to report the phantom after a limb amputation.

Simmel suggested that denial here represents more the conscious suppression of the existence of the phantom experience. I would suggest, however, that unconscious denial does exist as well and is evident in the behavioral expressions suggesting the continuing wish-fulfillment for the absent limb. Thus, one of the unconscious manifestations of denial is the unwillingness to accept devices that aid rehabilitation. Scott has reported the phenomenon of psychological denial in a manic patient (amputee) after a suicidal attempt. The question of the frequency of the phantom phenomenon and its significance as an indication of psychopathology will remain undetermined until a more systematic study has been made of other than limb amputees. The failure to report a phantom with absence of a body part must be distinguished from conditions in which the body-image never included the absent part, or where slow modification of the image took place with progressive dismemberment, as in leprosy. The known causes for failure to report a phantom with absence of a body part are: (1) aplasias of the part (congenital defect); (2) amputations in infancy and early childhood; (3) loss of internal organs; (4) slow dismemberments (nonsurgical) as in leprosy; and (5) psychological denial.

The failure to reorganize the body-image over a period of time subsequent to its distortion represents a psychopathological adaptation. This maladaptation is frequent among those individuals in which the integrity of the body-image, as it existed prior to illness or trauma, is overevaluated for maintaining selfesteem. Limb amputees, in whom the presence of a limb symbolized either masculinity or femininity, generally adapt poorly to limb loss. Renneker and Cutler found that successfully married women with children adapt easier and faster to the loss of the breast from mastectomy for cancer than do those who have been unmarried or whose marriages have not been successful.

Depressive reactions occur frequently as a result of the body disfigurement. Psychodynamically, these reactions represent not only a mourning for the loss of the part but have a relation to feelings of overexpectation of rejection and fear of separation from those upon whom the patient is dependent. Repression and introjection of hostile impulses toward the significant persons are part of the reaction complex. Frank paranoidal reactions are particularly apt to express themselves following surgical procedures on patients with a selfderogatory body-image. As the expectation of a satisfying social acceptance cannot possibly be met without modification of the total personality of the neurotic patient, the hostile expectation becomes focused upon the surgeon and any others involved in the corrective procedure and toward whom the patient had built up feelings

of dependent hopefulness.

Complaint of pain in the phantom or in the area of the physical disturbance may serve as a symbolic expression of the anxiety over the loss and the threat to the individual's dependency needs, as well as an expression of a sadomasochistic identification, a depressive equivalent, and as a substitute obsessional symptom. The writer has found in his study of individuals with painful phantom limbs that 70 percent had lived in close association with an amputee prior to their own loss (see Table 1). This appears to demonstrate the high frequency of identification as a determinant for this complaint.

As Kolb pointed out, the characterization of the limb amputee as a terrifying and threatening individual is well expressed in English literature by Melville's Ahab, Stevenson's Long John Silver, Barrie's Captain Hook, and Poe's General A. B. C. Smith.

*Table 33-1. Comparison of Affirmative Answers to Certain Questions as Given to Amputees with Painful Phantom Limb\* and Other Groups*

GROUP	PERSONS QUESTIONED	PERCENT RESPONDING "YES" TO QUESTIONS		
		1	2	3
Amputees	22	73	25	13
Healthy	100	20	8	8
Psychoneurotic	100	33	14	9

Psychotic	100	29	9	9
-----------	-----	----	---	---

*Legend:* Each person interviewed was requested to answer “yes” or “no” to the following questions numbered 1, 2, and 3, as indicated in the table:

*Question 1.* Have you known intimately a person with an amputated limb (friend or member of family)?

*Question 2.* Was the person with the amputation a member of your own family?

*Question 3.* Have you lived with a person with an amputated limb?

*\* Without other physical lesions.*

Fantasies of personal mutilation, usually repressed, may become remobilized by the threat or actuality of trauma of surgical procedure. Many patients with limb phantoms disclose terrifying and superstitious rationalizations which they utilize to explain the existence of the phantom limb. Magical thinking and fantasies concerning the mishandling of the separated limb or about the nature of the phantom commonly serve a guilt-allaying function. Patients with limb amputations frequently express a desire to have the separated part disposed of tenderly and respectfully, as if it were their whole body or that of a close family member. On some occasions they may even fantasy arrangement for disposal of the limb. This behavior is less likely where the illness causing the loss of the limb has been prolonged and the mourning period has been worked through prior to separation.

Psychotic reactions involving distortions in body-image follow either

acute trauma or prolonged somatic disease. Bender, in particular, described psychotic reactions in patients suffering Paget's disease, osteogenesis imperfecta, and dwarfism. The acromegalic presents a similar symptom picture. In the slowly developing disease processes which distort the body structure either directly or through interruption of the growth process, discrepancy develops between the body-image of the sufferer and the physical personality. As Bender indicates, the sufferer is made anxious by the obscurity and mystery of the poorly understood disease process. Moreover, the patient is thwarted in all his strivings, whether social, sexual, or vocational, which were predetermined before the illness. In adolescents the conflict over the idealized image and the fixed image ensues when the developing body structure fails to conform to the wished-for or ideal image. For adults suffering any of the somatic disorders described above, the body-image distortion by illness requires the difficult adaptation from a level of established satisfaction to one of ill-understood acceptance and accomplishment. Bychowski and Eickhoff reported specifically upon the body-image disturbances in adult schizophrenics; Pollack and Goldfarb have studied the image in the institutionalized schizophrenic child. Kolb contrasts the body-image of the schizophrenic and of the narcissistic in his discussion of responses to amputation and emphasizes, too, the often-overlooked delusions of ugliness represented in the body concept of the schizophrenic. Harris initiated work on the perceptual responsivity of the same nosological

group to body drawings and word representation of self.

Simmel studied extensively the body-image of the elderly, those with leprosy and the mental defective. With regard to the leprosy, Simmel's report is of particular importance as she found that those who lost fingers or toes through absorption—that is, gradually—never developed phantoms. However, if that same limb were then amputated for some cosmetic or prosthetic reason, a full phantom emerged. Bender examined the body-image disturbance in the brain-damaged, Schontz in those with hemiplegia.

Pazat describes the tinnitus after amputation of the auditory field by sonic traumatism as an expression of phantom in sensory area. Blank has written at length on the adaptive problems of those blinded, and a number of articles have appeared discussing the problems of children and adolescents with congenital abnormalities and/or amputations (see references 2, 38, 114, 131, and 134).

While not specifically concerned with body-image, the general responses to disfigurement are considered by Dembo et al.; to plastic surgery by Upergraff and Menninger; to hare lip and cleft palate by Brophy; to the face by Baker and Smith, MacGregor et al., and Meerloo; to radical maxillectomy by Hoffman; to rhinoplasty by Linn and Goldman; to mastectomy by Renneker and Cutler; and to genitalia by Heusner.

## Prognosis

Since body-image disturbances may occur within the context of any personality structure, only general statements may be made in regard to prognosis. The outcome of this form of personality disorder is basically dependent on the meaning of the bodily defect to the individual. The extent and disabling nature of the defect and the availability of rehabilitative services have a meaning to the patient which exists, as Kubie emphasizes, on several levels of psychological functioning, i.e., the reality level, the level of conscious fantasy, and that of unconscious symbolic fantasy. Depending upon the individual, the loss may have any meaning, such as a heroic sacrifice or a deserved punishment, a realization of helplessness and vulnerability, a conviction of loathsomeness, a despicable mutilation to be hidden or accepted, or a rejection of the part with defiance toward society and social customs. The meaning may be determined only through the psychiatric study of the individual.

A productive and satisfying social existence depends on acceptance of the changed body structure and the eventual establishment of a new body-image. The need for psychiatric treatment is evident in order to modify pathological and unconscious meanings of the change in the body structure which tend to perpetuate motivations that impede maximum recovery. But this treatment alone may be ineffective if it is not coupled with the skilled

help of prosthetic experts and evaluation of vocational counselors. For some patients the attitude of responsible relatives and the local society may finally decide their success or failure in readapting to productive living. In these circumstances, educational programs designed to avoid cultural stereotyping and rejection relative to one or another disability are necessary. Attempts to predict psychogenic invalidism as a consequence of the disturbance of the body-image have been made by Bard in relation to mastectomy, MacGregor and Schaffner in relation to nasal plastic operations, and Fisher and Cleveland in relation to amputation.

### **Treatment**

Prevention of body-image disturbance includes all those measures designed to avoid genetic and constitutional defects in bodily development. Consideration extends also to the role of industry and society generally in protecting the individual against accidental trauma. The individual's own psychological capacity for protecting himself against accidental injuries is certainly a preventive to the development of the body-image disorders. However, not only is the current state of knowledge in this area inadequate, but what is known is ineffectively applied or implemented by our present social structure.

Various means exist of strengthening the body-image and thereby

enhancing ego functioning and self-esteem. They reside in the use of all those therapeutic procedures which allow for increased facility in use of the body musculature as in athletic games, dance, and posture as well as the correction of bodily defects through surgery, and cosmetic and rehabilitative efforts. It is important to conceptualize their treatment as ego enhancing—thus placing their prescriptions to the forefront in the therapeutic management of all patients suffering personality disorders associated with body-image disturbance. Goertzel et al. have written specifically on dance therapy in this context.

In the instance of the individual confronted with an elective surgical procedure known to produce deformity, the psychiatrist and his medical and nursing colleagues may aid in the prevention of serious disturbance through proper use of the knowledge at hand. For those undergoing amputations or exposure to medications which produce body-image disruption, the preventive effects of proper preparation include advice as to the variety of body changes that may occur. In the case of amputation, the patient should be made aware of the occurrence of the phantom. Considerate inquiry into the patient's fears and anxieties is desirable. If a limb is to be amputated, the patient's desires as to its disposal and possible burial should be ascertained. Some initial discussions of the disability, its meaning to the patient, and compensation for it are advisable.

The family and other persons who are significant to the patient should be advised as to the expected posttreatment psychological and emotional phenomena. This is important, so that their aid may be immediately enlisted in the rehabilitation process and especially in ascertaining the possibility of the operation's emotional destructiveness to the patient. Watson and Johnson have emphasized the significance of the attitude of parents in determining the management of amputation in children. Despite excellent preoperative preparation of both the child and parents for amputations for a bone tumor, the postoperative syndrome was complicated and aggravated by the denying and rejecting attitudes of the parents. Treatment should be instituted as quickly as possible when disruption of the body structure leads to personality disorder. Failure to do so can result in fixation of chronic psychopathic reactions. In panic reactions with pain after limb amputations, the writer has utilized a brief psychotherapeutic technique in which the following topics have been penetrated in successive order from the initial interview: (1) the concept of the phantom-limb phenomenon and any attendant rationalizations regarding this; (2) wishes and fears relative to the disposal of the amputated part; and (3) the significance of present and past attitudes toward the body in relation to real or fantasied experiences with significant persons. This procedure has proved effective in alleviating panic and painful complaints in a number of limb amputees, among those with facial disfigurement following surgery, and in women with breast deformity consequent to thoracoplasty. It

has also been utilized in initiating psychotherapy on amputees who have remained chronically disturbed for years following their loss.

In disturbances of the body-image that have led to chronic personality disorders, whether psychoneurotic or psychotic, the choice of therapy is dependent on the particular variety of reactions suffered by the individual. Various forms of psychotherapy including psychoanalysis, hypnosis, narcosynthesis, electroshock therapy, frontal lobe injection, and treatment with the phenothiazines and antidepressants have been reported effective. Indications for and techniques of application of these treatments are presented elsewhere in this *Handbook*.

## Bibliography

- Abel, T. M. "Figure Drawings in Facial Disfigurement," *Am. J. Orthopsychiatry*, 23 (1953), 253-264.
- Aitken, G. T. "Amputation as a Treatment for Certain Lower Extremity Abnormalities," *J. Bone Joint Surg.*, 41-A (1959), 1267-1287.
- Anastasopoulos, G. "Le Lobe pariétal et l'image de notre corps," *Med. Contemp.*, 73 (1955), 143-146.
- Appenzeller, O. and J. M. Bicknell. "Effects of Nervous System Lesions on Phantom Experience," *Neurology*, 19 (1969), 141-146.
- Arensten, K. "Fantomoplevelsen hos en Amputeret Behandlet med Psykoterapi," *Nord. Med.*, 39 (1948), 1613.
- Asch, S. E. and H. A. Witkin. "Studies in Space Orientation: I. Perception of the Upright with

- Displaced Visual Fields," *J. Exp. Psychol*, 38 (1948), 325-337.
- . "Studies in Space Orientation: II. Perception of the Upright with Displaced Visual Fields and with Body Tilted," *J. Exp. Psychol*, 38 (1948), 455-477.
- Bachet, M. and G. Padovani. "Reflexions sur le traitement psychotherapique des douleurs des amputees," *Ann. Med. Psychol.* (Paris), 1 (1951), 206-211.
- Bailey, A. A. and F. P. Moersch. "Phantom Limb," *Can. Med. Assoc. J.*, 45 (1941), 37-42.
- Baker, W. Y. and L. H. Smith. "Facial Disfigurement and Personality," *JAMA*, 112 (1939). 301-304.
- Bard, M. "The Use of Dependence for Predicting Psychogenic Invalidism following Radical Mastectomy," *J. Nerv. Ment. Dis.*, 122 (1955). 152-160.
- Bender, L. "Psychoses Associated with Somatic Diseases that Distort the Body Structure," *Arch. Neurol. Psychiatry*, 32 (1934), 1000-1029.
- . "Body Image Problems of the Brain Damaged," *J. Soc. Issues*, 4 (1948), 84-89.
- Bender, M. B. *Disorders in Perception*. Springfield, Ill.: Charles C. Thomas, 1952.
- Bennett, D. H. "The Body Concept," *J. Ment. Sci.*, 106 (1960), 56-75.
- Blank, R. H. "The Challenge of Rehabilitation," *Israel Med. J.*, 20 (1961), 127-142.
- Blatt, E. F. "Body Image and Psychosomatic Illness," *Am. Psychol. Abstr.*, 18 (1963), 401-402.
- Bors, E. "Phantom Limbs of Patients with Spinal Cord Injury," *Arch. Neurol. Psychiatry*, 66 (1951), 610-631.
- Bressler, B., S. I. Cohen, and F. Magnussen. "Bilateral Breast Phantom and Breast Phantom Pain," *J. Nerv. Ment. Dis.*, (1955), 315-320.
- . "The Problem of Phantom Breast and Phantom Pain," *J. Nerv. Ment. Dis.*, (1956), 181-187.

- Brophy, T. W. "The Deformity of Hare Lip and Cleft Palate," *Dent. Summ. (Toledo)*, 29 (1909), 465-471.
- Bychowski, G. "Disorders of the Body Image in the Clinical Pictures of the Psychoses," *J. Nerv. Ment. Dis.*, 97 (1943), 310-335.
- Cardone, S. S. and R. Olson. "Psychophysical Studies of Body-image," *Arch. Gen. Psychiatry*, 21 (1969), 464-469.
- Cath, S. H., E. Glud, and H. T. Blane. "The Role of the Body Image in Psychotherapy with the Physically Handicapped," *Psychoanal. Rev.*, 44 (1957), 34-40.
- Cedercreutz, C. "Hypnotic Treatment of Phantom Sensations in 100 Amputees," *Acta. Chir. Scand.*, 107 (1954), 158-162.
- Centers, L. and R. Centers. "A Comparison of the Body-images of Amputee and Non Amputee Children as Revealed in Figure Drawing," *J. Proj. Tech.*, 27 (1963), 158-165.
- . "Peer Group Attitudes toward the Amputee Child," *J. Soc. Psychol.*, 61 (1963), 127-132.
- Cohen, H. and H. W. Jones. "Reference of Cardiac Pain to a Phantom Left Arm," *Br. Heart J.*, 5 (1943), 67-71.
- Cook, A. W. and W. H. Druckemiller. "Phantom Limb in Paraplegic Patients. Report of Two Cases and Analysis of Its Mechanism," *J. Neurosurg.*, 9 (1952), 508-516.
- Corah, N. L. and P. L. Corah. "A Study of Body-image in Children with Cleft Palate and Cleft Lip," *J. Genet. Psychol.*, 103 (1963), 133-137.
- Cronholm, B. "Phantom Limbs in Amputees; A Study of Changes in the Integration of Centripetal Impulses with Special Reference to Referred Sensations," *Acta. Psychiatr. Neurol. Scand., Suppl.*, 72 (1951), 310.
- De Gutierrez-Mahoney, C. G. "Symposium on Neuro-Surgery: Treatment of Painful Phantom Limb: Follow-up Study," *Surg. Clin. North Am.*, 28 (1948), 481-483.

- Dembo, T., G. Ladieu-Leviton, and B. A. Wright. "Acceptance of Loss—Amputations," in I. F. Garrett, ed., *Psychological Aspects of Physical Disability*, ser. no. 210. Washington: Federal Security Agency, Office of Vocational Rehabilitation, 1952.
- Dorpat, F. L. "Phantom Sensations of Internal Organs," *Comp. Psychiatry*, 12 (1970), 27-35.
- Druss, R. G., J. F. O'Connor, and L. O. Stern. "Changes in Body-image following Ileostomy," *Psychoanal. Q.*, 41 (1972), 195.
- Duke-Elder, P. M. and E. Wittkower. "Psychological Reactions in Soldiers to the Loss of Vision of One Eye, and Their Treatment," *Br. Med. J.*, 1 (1946), 155— 158.
- Duplay, J. and P. Cossa. "Frontal Lobe Novocaine Injections as a Therapeutic Measure," *Ann. Med. Psychol. (Paris)*, 111 (1953), 33-40.
- Easson, W. M. "Body-image and Self-image in Children," *Arch. Gen. Psychiatry*, 4 (1961), 619-621.
- Echols, D. H. and J. A. Colclough. "Abolition, of Painful Phantom Foot by Resection of the Sensory Cortex," *JAMA*, 134 (1947), 1476-1477.
- Eickhoff, L. F. W. "The Aetiology of Schizophrenia in Children," *J. Ment. Sci.*, 98 (1952). 229-234.
- Eigenbrode, C. R. and W. G. Shipman. "The Body Image Barrier Concept," *J. Abnorm. Soc. Psychol.*, 60 (1960), 450-452.
- Erickson, T. C., W. J. Bleckwenn, and N. Woolsey. "Observations on the Postcentral Gyrus in Relation to Pain," *Trans. Am. Neurol. Assoc.*, 77 (1952), 57-59.
- Ewalt, J. R., G. C. Randall, and H. Morris. "The Phantom Limb," *Psychosom. Med.*, 9 (1947), 118-123. *Federn, P. Ego Psychology and the Psychoses. New York: Basic Books, 1953.*
- Fisher, S. "Head-Body Differentiations in Body-image and Skin Resistance Level," *J. Abnorm. Soc. Psychol.*, 60 (1960), 283-285.
- . "A Further Appraisal of the Body Boundary Concept," *J. Consult. Psychol.*, 27 (1963), 62-74.

----. "The Body-image as a Source of Selective Cognitive Sets," *J. Pers.*, 33 (1965), 536-552.

Fisher, S. and S. E. Cleveland. "An Approach to Psychological Reactivity in Terms of a Body-image Schema," *Psychol. Rev.*, 64 (1957), 26-37.

----. *Body Image and Personality*. Princeton, N.J.: Van Norstrand, 1958.

Frederiks, J. A. M. "Occurrence and Nature of Phantom Limb Phenomena following Amputation of Body Parts and following Lesions of the Central and Peripheral Nervous Systems," *Psychiatr. Neurol. Neurochir.*, 66 (1963), 73-97.

Freud, A. "The Role of Bodily Illness in the Mental Life of Children," in *The Psychoanalytic Study of the Child*, Vol. 7, pp. 69-81. New York: International Universities Press, 1952.

Gallinek, A. "The Phantom Limb: Its Origin and Its Relationship to the Hallucinations of Psychotic States," *Am. J. Psychiatry*, 96 (1939), 413-422.

Gesell, A. and F. L. Ilg. *Infant and Child in the Culture of Today*. New York: Harper, 1942.

Gilder, R., S. V. Thompson, C. W. Slack et al. "Amputation, Body-image and Perceptual Distortion: a Preliminary Study," *Res. Rep., Nav. Med. Res. Inst.*, 12 (1954), 587.

Goertzel, V., P. R. A. May, J. Salken et al. "Body-Ego Technique: An Approach to the Schizophrenic Patient," *J. Nerv. Ment. Dis.*, 141 (1965), 53-60.

Guillaume, J. F. and G. Mazars. "Traitement des membres fantomes douloureux par psychotherapie sous narcose ou hypnose," *Rev. Neurol.*, 79 (1947), 213-215.

Halpern, S. "Body-image Symbols of Repression," *Int. J. Clin. Exp. Hypn.*, 13 (1965). 83-91.

Harris, J. E. "Elucidation of Body-Imagery in Chronic Schizophrenia," *Arch. Gen. Psychiatry*, 16 (1967), 679-684.

Harvey, F. "Some Social Aspects in the Case of Patients Undergoing Breast Surgery," *Med. Soc. Work*, 4 (1955), 99-110.

- Head, H. *Studies in Neurology*. London: Oxford, 1920.
- Henderson, W. R. and G. E. Smyth. "Phantom Limbs," *J. Neurol. Neurosurg. Psychiatry*, 11 (1948), 88-112.
- Heusner, A. P. "Phantom Genitalia," *Trans. Am. Neurol. Assoc.*, 75 (1950), 128-131.
- Hirsch, S. J. "Left, Right and Identity," *Arch. Gen. Psychiatry*, 14 (1966), 84-88.
- Hoffer, W. "Mouth, Hand and Ego-Integration," in *The Psychoanalytic Study of the Child*, Vol. 3/4, pp. 49-56. New York: International Universities Press, 1949.
- Hoffman, J. "Facial Phantom Phenomenon," *J. Nerv. Ment. Dis.*, 122 (1955),
- . "Phantom Limb Syndrome. A Critical Review of the Literature," *J. Nerv. Ment. Dis.*, 119 (1954), 261-270.
- Hughes, J. and W. L. White. "Amputee Rehabilitation: Emotional Reactions and Adjustment of Amputees to Their Injury," *U.S. Nav. Med. Bull. Suppl.* (March 1946), 157-163.
- Hunt, R. G. and M. J. Feldman. "Body-image and Ratings of Adjustment on Human Figure Drawings," *J. Clin. Psychol.*, 16 (1960), 35-38.
- Hunt, V. V. and M. E. Weber. "Body-image Projective Test," *J. Proj. Tech.*, 24 (1960), 3-10.
- Jackson, J. H. *Neurological Fragments: With Biographical Memoir by James Taylor, and Including the "Recollections" of the Late Sir Jonathan Hutchinson and the Late Dr. Charles Mercier*. London: Oxford University Press, 1925.
- Jacobson, J. R. "A Method of Psychobiologic Evaluation," *Am. J. Psychiatry*, 101 (1944), 343-348.
- Jarvis, J. H. "Post Mastectomy Breast Phantoms," *J. Nerv. Ment. Dis.*, 144 (1967), 266-272.
- Johnson, F. A. "Figure Drawings in Subjects Recovering from Poliomyelitis," *Psychosom. Med.*, 34 (1972), 19-29.

- Jung, C. G. *Psychology of the Unconscious*. New York: Dodd-Mead, 1931.
- Kinzel, A. F. "Body-Buffer Zone in Violent Prisoners," *Am. J. Psychiatry*, 127 (1970), 99-104.
- Kipnis, D. M. "Changes in Self Concept in Relation to Perception of Others," *J. Pers.*, 29 (1961), 449-465.
- Kirk, N. T. "The Development of Amputation," *Bull. Med. Libr. Assoc.*, 32 (1944), 132-163.
- Kolb, L. C. "Somatic Sensory Extinction Phenomenon and Body Schema after Unilateral Resection of the Posterior Central Gyrus," *Trans. Am. Neurol. Assoc.*, 75 (1950), 138-141.
- . *The Painful Phantom. Psychology, Physiology and Treatment*. Springfield, Ill: Charles C. Thomas, 1954.
- . "The Body-image in the Schizophrenic Reaction," in A. Auerbach, ed., *Schizophrenia: An Integrated Approach*, pp. 87-97. New York: Ronald, 1959.
- Kolb, L. C., L. M. Frank, and E. J. Watson. "Treatment of the Acute Painful Phantom Limb," *Proc. Staff Meet. Mayo Clin.*, 27 (1952), 110-118.
- Kubie, L. "Motivation and Rehabilitation," *Psychiatry*, 8 (1945), 69-78.
- Ladieu, G., E. Hanfmann, and T. Dembo. "Studies in Adjustment to Visible Injuries, Evaluation of Help by the Injured," *J. Abnorm. Soc. Psychol.*, 42 (1947), 169-192.
- Lambert, C. N. and J. Sciarra. "A Questionnaire Survey of Juvenile to Young Adult Amputees who had had Prosthesis Supplied Them through the University of Illinois Division of Services for Crippled Children," *J. Bone Joint. Surg.*, 41A (1959), 1437-1454.
- Langworthy, O. R. "Development of Behavior Patterns and Myelinization of the Nervous System in the Human Fetus and Infant," *Contrib. Embryol.*, 443 (1933), 1-57.
- Levin, M. "The Concept of Denial and Its Limitations, with Remarks on Phantom Limb Disorientation and Perseveration," *J. Neuropsychiatry*, 2 (1961), 167-174.

- Levy, D. M. "Method of Integrating Physical and Psychiatric Examination with Special Studies of Body Interest, Overt Protection Response to Growth and Sex Difference," *Am. J. Psychiatry*, 9 (1929), 121-194.
- . "Body Interest in Children and Hypochondriasis," *Am. J. Psychiatry*, 12 (1932), 295-315.
- Lhermitte, J. "L'Image de notre corps," *Nouv. Rev. Crit.*, (1939), 256 pp. go. Linn, L. "Some Developmental Aspects of the Body Image," *Int. J. Psycho-Anal.*, 36 (1955), 36-42.
- Linn, L. and I. B. Goldman. "Psychiatric Observations Concerning Rhinoplasty," *Psychosom. Med.*, 11 (1949), 307-314.
- MacGregor, F. C., T. M. Abel, A. Bryt et al. *Facial Deformities, and Plastic Surgery*. Springfield, Ill.: Charles C. Thomas, 1953.
- MacGregor, F. C. and B. Schaffner. "Screening Patients for Nasal Plastic Operations," *Psychosom. Med.*, 12 (1950), 277-291.
- Machover, K. *Personality Projection in the Drawing of the Human Figure*. Springfield, Ill: Charles C. Thomas, 1957.
- Mednick, S. A. "The Body Barriers Go Rorschach: Review of Body-image and Personality by Fisher, S. and Seymour, S. E., 1958," *Contemp. Psychol.*, 4 (1959), 276-277.
- Meerlo, J. A. M. "The Fate of One's Face," *Psychiatric Q.*, 30 (1956), 31-43.
- Miles, J. E. "Psychoses with Phantom Limb Treated by Chlorpromazine," *Am. J. Psychiatry*, 112 (1956), 1027-1028.
- Mitchell, S. W. "Phantom Limbs," *Lippincott's Mag. Pop. Lit. Sci.*, 8 (1871), 563-569.
- Noble, D., M. E. Roudebush, and D. Price. "Studies of Korean War Casualties, Part I: Psychiatric Manifestations in Wounded Men," *Am. J. Psychiatry*, 108 (1952), 495-499.
- Noble, D., D. B. Price, and R. Gilder. "Psychiatric Disturbances following Amputation," *Am. J. Psychiatry*, 110 (1954), 609-613.

- Orbach, J. "Psychophysical Studies of Body-image," *Arch. Gen. Psychiatry*, 14 (1966), 41-47.
- Paré, A. *The Workes of That Famous Chirurgion, Ambrose Parey*. Translated out of the Latin and compared with the French by T. Johnson. London: Cotes, 1649.
- Pazat, P. and P. Grateau. "Phantom Hearing (Tinnitus) after Amputation of the Auditory Field by Sonic Traumatism," *Rev. Otoneuroophthalmol.*, 42 (1970), 81-90.
- Perrin, F. A. C. "Physical Attractiveness and Repulsiveness," *J. Exp. Psychol.*, 4 (1921), 203-217.
- Peto, A. "Body-image and Archaic Thinking," *Int. J. Psychoanal.*, 40 (1959), 223-231.
- Pick, A. "Zur Pathologic des Bewusstseins vom eigenen Körper. Ein Beitrag an Kriegs-medizin," *Neurol. Zentralbl.*, 34 (1915), 257-265.
- Pick, J. F. "Ten Years of Plastic Surgery in a Penal Institution," *J. Int. Coll. Surgeons*, 11 (1948), 315-319.
- Pisetsky, J. E. "Disappearance of Painful Phantom Limbs after Electric Shock Treatment," *Am. J. Psychiatry*, 102 (1946), 599-601.
- Pollack, M. and W. Goldfarb. "The Face-Hand Test in Schizophrenic Children," *Arch. Neurol. Psychiatry*, 77 (1957), 635-642.
- Pool, J. L. and T. J. Bridges. "Subcortical Parietal Lobotomy for Relief of Phantom Limb Syndrome in the Upper Extremity," *Bull. N.Y. Acad. Med.*, 30 (1954), 302-309.
- Price, D. B., N. J. Twombly. "A. Lemos: Dedolore Membri Amputati Remanente Explicatio (1798). The Phantom Limb: An Eighteenth Century Latin Dissertation Text and Translation with a Medical Historical and Linguistic Commentary," in *Languages and Linguistics*, Working Papers. Washington: Georgetown University Press, 1972.
- Radovici, A. and N. Wertheim. "L'Electrochoc comme traitement des douleurs irreductibles. (Causalgie, Neuralgie Re-belle, Douleurs des morphinomanes. Crises subintrantes tabetiques)," *Presse Med.*, 54 (1949). 754-755.

- Renneker, R. and M. Cutler. "Psychological Problems of Adjustment to Cancer of the Breast," *JAMA*, 148 (1952), 833-838.
- Resnik, H. L. P. "Suicide Attempt by a Child after Amputation," *JAMA* 212 (1970), 1211-1212.
- Riddoch, G. "Phantom Limbs and Body Shape," *Brain*, 64 (1941), 197-222.
- Riese, W. and G. Bruck. "Le Membre fantomes chez 1'enfant," *Rev. Neurol.*, 83 (1950), 221-222.
- Ross, N. "The Postural Model of the Head and Face in Various Positions (Experiments on Normals)," *J. Gen. Psychol.*, 7 (1932), 144-162.
- Schilder, P. *The Image and Appearance of the Human Body. Studies in the Constructive Energies of the Psyche*. London: Kegan Paul, 1935.
- Schonfeld, W. A. "Gynecomastia in Adolescence," *Arch. Gen. Psychiatry*, 5 (1961), 68-76.
- Schontz, F. C. "Body Concept Disturbances of Patients with Hemiplegia," *J. Clin. Psychol.*, 12 (1956), 293-295.
- Scott, W. C. M. "Some Embryological, Neurological, Psychiatric and Psychoanalytic Implications of the Body Scheme," *Int. J. Psychoanal.*, 29 (1948), 141-155.
- Secord, P. "Objectification of Word-Association Procedures by the Use of Homonyms: A Measure of Body Cathexis," *J. Pers.*, 21 (1952-1953), 479-495.
- Secord, P. and S. M. Jourard. "The Appraisal of Body Cathexis: Body Cathexis and the Self," *J. Consult. Psychol.*, 17 (1953), 343-347.
- Selecki, R. B. and J. T. Hebron. "Disturbances of the Verbal Body-image; A Particular Syndrome of Sensory Aphasia," *J. Nerv. Ment. Dis.*, 141 (1965), 42-52.
- Simmel, M. L. "Phantoms in Patients with Leprosy and in Elderly Digital Amputees," *Am. J. Psychol.*, 69 (1956), 529-545.
- . "Phantom Experiences in Mental Defective Amputees," *J. Abnorm. Soc. Psychol.*, 59 (1959),

128-129.

- . "Phantom, Phantom Pain and 'Denial'," *Am. J. Psychother.*, 13 (1959), 603-613.
- . "The Absence of Phantoms for Congenitally Missing Limbs," *Am. J. Psychol.*, 74 (1961), 467-470.
- . "Phantom Experiences following Amputation in Childhood," *J. Neurol. Neurosurg. Psychiatry*, 25 (1962), 69-78.
- . "A Study of Phantoms after Amputation of the Breast," *Neuropsychol.*, 4 (1966), 337-350.
- Simpson, E. B. and H. F. Albronda. "Psychologic Aspects of Amputation of a Lower Limb," *Lancet*, 87 (1967), 429-431.
- Smythies, J. R. "The Experience and Description of the Human Body," *Brain*, 76 (1953), 132-145-133. Souques, A. and Poisot. "Origine peripherique des hallucinations des membres amputes," *Rev. Neurol.*, 13 (1905), 1112-1116.
- Spring, J. M. and C. H. Epps, Jr. "The Juvenile Amputee. Some Observations and Considerations," *Clin. Pediatr.*, (Phila.), 7 (968), 76-79.
- Stern, K., A. Lariviere, and G. Fournier. "Psychiatric Aspects of Cosmetic Surgery of the Nose," *Can. Med. Assoc. J.*, 76 (1957), 469-472.
- Strotzka, H. "Psychotherapie des Phantom Schmerz.es," *Klin. Med.*, 3 (1948), 172.
- Szasz, T. S. "Psychiatric Aspects of Vagotomy: IV. Phantom Ulcer Pain," *Arch. Neurol. Psychiatry*, 62 (1949), 728-733.
- . *Pain and Pleasure*, New York: Basic Books, 1957.
- Taylor, J., G. Holmes, and F. M. R. Walshe. *Selected Writings of John Hughlings Jackson*, Vol. 1, On Epilepsy and Epileptiform Convulsions. New York: Basic Books, 1958.
- Thornton, G. R. "The Effect upon Judgements of Personality Traits of Varying a Single Factor in a

- Photograph," *J. Soc. Psychol.*, 18 (1943), 127-148.
- Updegraff, H. L. and K. A. Menninger. "Some Psychoanalytic Aspects of Plastic Surgery," *Am. J. Surg.*, 25 (1934). 554" 558.
- Wachs, H. and M. Zaks. "Studies of Body-image in Men with Spinal Cord Injury," *J. Nerv. Ment. Dis.*, 131 (1960), 121.
- Watson, E. J. and A. M. Johnson. "The Emotional Significance of Acquired Physical Disfigurement in Children," *Am. J. Orthopsychiatry*, 28 (1958), 85-97.
- Weinstein, S. and E. A. Sersen. "Phantoms in Case of Congenital Absence of Limbs," *Neurol.*, 11 (1961), 905-911.
- White, J. C. and W. H. Sweet. "Effectiveness of Chordotomy in Phantom Pain after Amputation," *Arch. Neurol. Psychiatry*, 67 (1952), 315-322.
- Wille, W. S. "Figure Drawings in Amputees," *Psychiatr. Q., (Suppl.)*, 28 (1954), 192-198.
- Witken, H. *Personality Through Perception*. New York: Harper, 1954.
- Wright, G. H. "The Names of the Parts of the Body. A Linguistic Approach to the Study of the Body Image," *Brain*, 79 (1956), 188-210.
- Wysocki, B. A. and E. Whitney. "Body-image of Crippled Children as Seen in Draw-a-Person Test Behavior," *Percept. Mot. Skills*, 21 (1965), 499-504.
- Zador, J. "Meskalinwirkung auf das Phantomglied," *Monatsschr. Psychiatr. Neurol.*, 77 (1930), 71-99.