

# Explorations



## BASIC CONCEPTS IN THE THEORY OF HUBERT GODARD

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## I. INTRODUCTION

As Rolfers we have gotten used to describing our experience in our work using a unique vocabulary (core, intrinsic movement, span, line, X and O legs, internals and externals). Though it is natural for a group of people who interact to develop a jargon that meets the needs of the group, it can also serve to hide areas of confusion, our own ungrounded abstractions: even among ourselves we do not have clearly agreed upon definitions of the terms we use.

In part, our attitude has been justified by the inadequacy of the vocabulary commonly available to describe what is important in our view. This has been especially true in terms of the movement aspect of the work. Although it may not capture the wholistic paradigm entirely, the osteopathic approach to spinal mechanics has helped us express aspects of the structural perspective. But the conventional models available really do not express the essence of human movement. The biomechanical approach sees the body as just another fancy machine. The model starts with the assumption that a movement can be completely understood from a mechanical point of view. Subjective experience is denied any importance. It is assumed that muscles have a predetermined function that will be common to the majority of people. It is taken for granted that the study of individual muscles or

muscle groups will yield an understanding of the whole. The lab environment is accepted unquestioningly without consideration of how it might influence the research outcomes. This view does not do justice to our experience of working in movement with our clients, so we have avoided it.

As Rolfers, we are working in the realm of the body in gravity. At the same time, we see our clients as whole beings with an emotional, psychological and a physical history that reveals itself in every gesture. In practice, this has to be considered or our movement work won't work. Experience shows us that freeing structural restrictions will not necessarily result in a change in the movement pattern. Nor is movement education simply a matter of showing the client a better way, or of having her mechanically repeat a new motor sequence. In practice we find that movement patterns can be changed by shifts in perception, in sensory awareness. Also, in practice, it is a common experience that our work leads to psychological or behavioral changes. All this takes place while we stay primarily involved in improving the body's relationship to gravity.

If we do not want to adopt the conventional models for studying movement, we need to be able to offer a well articulated alternative. We need to be able to describe our perspective in words that make a bridge to the conventional world, while at the same time preserving the subtlety and

originality of our experience. We need an articulated theory in order to validate our experience, in order to evaluate our theories, in order to teach new students.

The theory has to be grounded in physiology and supported by research, but without taking on the assumptions that shape a world view with which we do not agree. As IPR used to say "you can't get there from here." In order for a theory of movement to describe what we have observed, it will have to include biomechanics but it will also have to encompass the subjective, symbolic or perceptual aspect, the meaning of the movement in the world of the mover, as well as the influence of the context or environment.

Hubert Godard, dancer, Rolfer, teacher, and researcher, presents just such a theory in the movement workshops I have participated in over the past 5 years. Godard articulates the theory and practice of movement work in a way that makes sense of our experiences and in a language that allows us to share the work with the rest of the world. His perspective is a synthesis of many streams of thought: he draws from philosophy, neurophysiology, psychoanalysis as well as work in rehabilitation and physical therapy. Insights from biomechanics, physiology and phenomenology all come together to create a clear and creative picture of the many dimensions of movement education. His theory explains what "relationship to gravity" means in terms that go

beyond structural alignment. It accounts for how and why subjective experience cannot be overlooked if movement education is to be effective.

This paper is an overview of the theory of movement Hubert Godard presents in his workshops. It is intended merely as an introduction and broad overview of a very rich and complex system. To truly do justice to Hubert's approach would require much more development than these few pages can offer. However, I hope that presenting this basic framework will inspire questions that will lead to a continuing series of articles.

In this paper, I will begin by describing the premises upon which the movement work is based. These premises shape the lens through which we look at movement, and work with clients. I will introduce the key concepts of tonic function, 2 directions, the role of perception and the neurophysiological basis of movement. Some of the implications of the theory for the practice of movement education will be pointed out. I will sketch in broad terms some of the functional relationships that can be used as a template for working with clients. I hope this paper will be a step in the development of a vocabulary that will begin to allow us to communicate about movement work with each other and with the world outside the Rolfing community.



## II. TONIC FUNCTION

### BASIC PREMISES—

#### The phenomenological approach

One of Ida P. Rolf's key insights is that appropriate relationship with gravity is basic to our health as humans. From a structural point of view, this relationship is most commonly described in terms of alignment. From a functional point of view, bio-mechanics, studying the movement of various joints and the impact of forces upon them, is the standard approach. Both of these perspectives carry a kind of objectification, a denial (or ignoring) of human experience. Even when pain brings our attention to a particular area or muscle, still we do not experience ourselves as a collection of nerve impulses, muscle fiber contractions, or sidebends and rotations. Alignment and mechanics leave out the effect of what is occurring in the mind/body of the individual involved.

We are not the first to consider that human experience may not be adequately described by objectifying the body. This was the idea behind the philosophical approach known as phenomenology. Phenomenologists wanted to study perceptual experience in its purely subjective aspect. They did not accept the traditional division of subject and object, and instead attempted to study human being in-the-world, as experienced. For a phenomenologist, the body

does not exist separately from the body as lived. A person does not exist separately from the environment but is embedded in it.

What the phenomenologists have been talking about for years in the circles of philosophy is now beginning to be applied in physical therapy and motor research. Edward Reed<sup>1</sup> has carried the phenomenological perspective into the study of motor responses. Reed observes that the study of movement typically takes place in laboratories, under artificial conditions. Often the approach is to isolate specific movements, or even to attempt to isolate the action of a specific muscle. Reed notes that unfortunately, movement studied outside of the context in which it occurs leads to very little that can be applied to the problem of rehabilitation.

### ACTION SYSTEMS

Like the phenomenologists, Reed points out that the movement of organisms is always taking place in a context. It is never in a vacuum, but always a part of the complex interactions that allow the life and survival of the organism. Reed emphasizes that lab studies that attempt to isolate movements do not give us very useful information. He suggests that to be useful, the study of movement must be taken in terms of functions—what he calls action systems.<sup>2</sup> Reed's list of human action

systems includes, among others, the locomotion system that gets us around, the expressive system that allows us to look and listen, and the semantic system that lets us speak and represent. The concept of action systems allows movement to be studied in terms that make sense of it: Movements are purposeful activities<sup>3</sup> that cannot be reduced to the sum of individual motor units. Movement is the basis through which organisms establish a relationship with the environment. It cannot be studied separately from the environment in which it is embedded, nor separately from its function in that context. From this wholistic point of view, the study of movement begins to contribute to our understanding of actual behavior, instead of artificial laboratory conditions.

There are many action systems, but underlying all of them are the movements of lying, sitting or standing: These are the fundamental movements of the orienting system. These basic movements enable us to identify food and other resources the environment affords. Underlying these basic movements is the even more basic necessity of establishing a viable relationship within the gravity field.<sup>4</sup>

### TONIC FUNCTION

Godard calls the body's ability to organize itself in gravity, "tonic function."

Tonic function is fundamental, at the root of every action, even though we may never think of it.

It takes place every moment below the level of conscious awareness. You are standing and you raise your arm—what is the first muscle to contract? Most of us will imagine arm and shoulder girdle muscles, but the answer is the soleus, a muscle that is key in maintaining uprightness in gravity.<sup>5</sup> Even before the intended movement occurs, the gravity function is ensured. Like the air around us, our relationship with gravity is so basic, so fundamental, that we rarely think of it. Yet it underlies—sets the tone for—every one of our actions and behaviors. Tonic function, or an individual's tonic organization, is what we are working with as Rolfers when we look at the body from a functional point of view in relation to gravity.

Anatomically, tonic function involves the parts of the body—brain, nerve pathways, fascia, muscle spindles, golgi tendon organs, and tonic muscles, what we could call the tonic system—that function to coordinate the body's negotiations with gravity. What I want to show here is that an individual's particular tonic organization cannot be adequately described without taking much more than anatomy into consideration; and from the point of view of movement work, a person's tonic organization will not be effectively educated without a much wider vision.



## UPRIGHTNESS

For human beings, being in relationship to gravity is expressed by how we stay upright, or oriented. This is one of the essential aspects of our uniqueness as human beings. Physically we are formed to be upright, and this differentiates us from all other animals. From a phenomenological point of view, our verticality is key to our humanness. As Erwin Straus says in his wonderful article Upright Posture,

"Men and mice do not have the same environment, even if they share the same room. Environment is not a stage with the scenery set as one and the same for all actors who make their entrance. Each species has its own environment. There is a mutual interdependence between species and environment. The surrounding world is determined by the organization of the species in a process of selecting what is relevant to the function cycle of action and reaction. Upright posture pre-establishes a definite attitude toward the world; it is a specific mode of being-in-the-world."<sup>6</sup>

As humans, our relationship to gravity is basic and it significantly and uniquely shapes our relationship to our environment. Straus points out that being upright is more than a simple mechanical problem. For human beings: "Obviously, upright posture is not confined to the technical problems of locomotion. It contains a psychological element.

It is pregnant with a meaning not exhausted by the physiological tasks of meeting the forces of gravity and maintaining equilibrium." (p137)

For humans, being upright is a problem with significance, meaning; it has a symbolic dimension. Our language reflects this in words that link verticality with morality: to be upright and upstanding mean to be good. Even more fundamentally, uprightness is a condition for our survival:

"Because upright posture is the leitmotiv in the formation of the human organism, an individual who has lost or is deprived of the capacity to get up and keep himself upright depends, for his survival, completely on the aid of others. Without their help, he is doomed to die. A biologically oriented psychology must not forget that the upright posture is an indispensable condition of man's self-preservation." (p139)

When we work in movement with a person's orienting system, their relation to gravity, we are addressing one of the most fundamental aspects of what it means to be a human being. We are tapping into a primordial, instinctive relationship that is so profound as to be almost invisible.

## TONIC FUNCTION AND INDIVIDUAL DEVELOPMENT

This is true on a species level as well as on an individual level. Straus says:

"Upright posture characterizes the human species. Nevertheless, each individual has to struggle in order to make it really his own. Man has to become what he is.... While the heart continues to beat from its fetal beginning to death without our active intervention and while breathing neither demands nor tolerates our voluntary interference beyond narrow limits, upright posture remains a task throughout our lives. Before reflection or self-reflection start, but as if they were a prelude to it, work makes its appearance within the realm of the elemental biological functions of man. In getting up, in reaching the upright posture, man must oppose the forces of gravity. It seems to be his nature to oppose nature in its impersonal, fundamental aspects with natural means. However, gravity is never fully overcome; upright posture always maintains its character of counteraction. It calls for our activity and attention." (p141)

Each individual must come to terms with gravity and uprightness. Physiologically this happens through the development of the ability to control movement. The nerves and muscles that make up the tonic system—that register and respond to our changing relationship with gravity—these are the very same pathways that will fulfill this basic developmental function. The theory is borne out by the research of Judith Kestenberg, a psychoanalyst who is also trained in Laban movement. She describes the patterns of

movement that develop throughout infancy<sup>7</sup>:

"The simplest explanation for changes in muscle tension is the physiological interplay between agonist and antagonist muscle groups. A free flow of tension occurs when agonists are not met with counteraction by antagonists. The constraint in movement, called bound flow of tension, occurs when antagonists contract along with the agonistic muscles.

The new born infant's toes stiffen periodically in bound flow. His legs fling and bicycle in spurts of free flow. An influx of suddenly emerging free flow may bring his fist near his mouth, and the ensuing bound flow may enable him to hold his fist there for a brief moment." (p196)

These movements form the basis of interaction with the environment:

"The shape of the body changes during movement. It grows and shrinks as does the simple configuration of the amoeba when it extends its pseudopodia and retracts them (Laban, 1960). We change our shape by alternately growing and shrinking as we inhale and exhale. We grow when we take in and shrink when we expel waste. We grow towards pleasant stimuli and shrink away from noxious ones... Growing and shrinking of body shape are the basic elements of shape flow. They alternate periodically... This rhythmic alternation between growing and shrinking and their dimensional attributes is another highly differentiated self-regu-



lation. It provides a structure for the organism's interaction with the environment." (p.196)

Tension flow and shape flow are the basis of movement patterns. Godard suggests that these patterns of movement are related to the tonic system. For a baby, learning to move and walk requires the development of the tonic system. Through learning to alternate bound flow and free flow in infancy, the baby develops control over movements that eventually lead to the ability to stand. But as Kestenberg shows, the alternating rhythm between bound flow and free flow also serves another purpose, as significant as locomotion: it is the first communication system:

### TONIC FUNCTION AND COMMUNICATION

Kestenberg makes the same connection as Straus in recognizing the meaning in movements:

"We learn from movement studies that there is not only a correspondence between specific drives and specific objects, but also a correspondence between certain feeling tones and modes of expression. For instance, annoyance is expressed appropriately through the narrowing of the brow in frowning, while pleasure of recognition broadens the face in smiling." (p.196)

The basic movement patterns and expressions allow a growing independence which forms the basis for the ability

to communicate. Kestenberg's research examines the relationship of the tension-flow patterns of the infant with the movement patterns of the mother through each phase of development. Early on,

"The average new mother learns from her infant and allows the infant to learn from her. When he grows toward her, she grows toward him, using free flow, and adjusting the degree of tension release in a finely modulated manner. When he shrinks away a bit, she shrinks from him, using bound flow evenly to ensure that he does not lose hold of the nipple... Mother and child relate and adjust through feelings of sameness or difference, but they are not yet able to communicate." (p.199)

The tension flow patterns evolve into the means of communication:

"The establishment of a primary system of communication is the developmental task of the oral phase... By gaining control over oral rhythms of tension-flow and corresponding changes in shape-flow, the infant becomes partially independent of his mother and can erect the first edition of his body image... Attention and exploration of inner and outer space become the basis for the initial stage of object constancy. Only when self and object can be recognized as separated in space, can there be communication instead of communing." (p. 200)

In the oral phase, the baby sucks and bites, unites with mother or an object, and then

separates.

As the baby develops, he learns to direct his attention or let it wander; he learns about objects, about space, what is near to him, and what he can reach for.

"Object constancy in space connotes that the object cathexis is controlled by the ego's internalized images of location and distance. Locating the mother internally reflects the child's capacity to bridge distance and make external space a medium of communication with his mother." (p.203)

Communication and relationship with the mother, the development of a body image and the sense of separate self are also interwoven with the use of muscle tension.

"[the infant] gradually begins to recognize himself by the sameness of his movement patterns, which are similar to those of his mother, but not identical. In moments of complete synchronization and attunement with maternal rhythms, he loses the budding feeling of separateness. To regain his lost boundaries, he stiffens in the periphery of his body and interrupts the symbiotic fusion at will. In the words of Mahler (1968) he "hatches". To do so, he creates his own hard shell of outer muscle tension." (p.203)

Learning to control movement and eventually to walk is also becoming independent, developing autonomy. Thus the psychological processes that take place between the developing infant and the mother, the relationship be-

tween mother and child, will shape and be reflected in the patterns of function of the tonic system. How the mother holds the baby, how the mother moves with her infant, the mother's own movement rhythms will influence development. Kestenberg has published case histories that show these influences on the baby's psychological development. How we are held, or hold ourselves, develop into deep rooted personal psychological patterns<sup>8</sup>.

The course of motor development and the course of psychological development run along a single path: the path of taking over, learning to move with the tonic system. The psychological evolution of the baby comes from that first expression, contraction and release of the tonic function. Gravity control, fundamental movement patterns of tension and release, the development of the psyche and basic expression of feelings are threads woven together into the first dialogue between mother and child, a tonic dialogue.

Kestenberg's research is another anchor to an understanding that movement, posture, and relationship with gravity, are imbued with many meanings that go far beyond mechanics. For each of us, the history of our own coming into uprightness is inevitably linked with the relationship with the environment around us, including the people, our parents, who are part of it; and all of this is written into our basic postures and stance in gravity.



## COORDINATION, EXPRESSION, AND INHIBITION

Following Kestenberg, Godard sees the early movements as the basis of expression, the building blocks of communication with the mother and eventually of communication in general. He says: "In the body, there is no difference between the gravity system and the expression system. They are inseparable. Whenever we work on tonic function, we inevitably work on expression."<sup>9</sup>

Some basic anatomy of the tonic system helps to explain this statement:

Tonic muscles are postural muscles. They are muscles that are primarily involved in maintaining the body's upright stance. Tonic muscles are differentiated from phasic muscles, the ones we use for large motor movement and short, intense activity. Physiologically, there are several different ways to differentiate tonic muscles from phasic muscles: tonic muscles have more red fibers, phasic have more white; tonic muscles use oxygen more than sugar as fuel, while phasic are the opposite; tonic muscles are densely spindled and have a higher proportion of fascia. By these definitions, some examples of muscles that are considered tonic are the soleus, the erector spinae<sup>10</sup>, and the hamstrings.

The large number of spindles in tonic muscles makes them an important sensory tool: the spindles send

sensory information back to the central nervous system. The brain uses this information to set the tone of other muscles.

For phasic muscles to work, the postural muscles have to release; thereby, they control and shape movement. The tonic muscles are like reins directing the phasic muscles. The order in which tonic muscles release orchestrates the actions of the other muscles. In walking, it is the initial release of the tonic back muscles that allows the movement forward; the hamstrings' releasing allows the quadriceps to work and coordinates the movement of the other leg muscles.

The subtlety of the tonic muscles, the extent of their ability to contract and release appropriately, and the order of this interplay creates coordination, which Godard, in long-standing movement tradition, terms the kinetic melody, "the synergy in space and time of all the muscles of the body." Coordination, how everything works together, is basic to movement. Perhaps this helps explain why the Rolfing process, which works primarily with the tonic function of the body, has such powerful effects on the performance of athletes and on increasing the efficiency of movement in general.

Through its role in coordination, the tonic system will also be involved in expressing inhibition: If one part of me wants something, but I am also blocked psychologically, the block will be expressed by a lack of subtlety, flexible re-

sponse, in the tonic muscles. The tonic system controls movement by its appropriate alternation between tension and release. The inhibition will interfere with the timing of the tonic system, and therefore with the desired expression. To change a movement pattern may necessitate dealing with the inhibition. If we study movement only from the popular point of view of economy or efficiency, we may overlook the limitations in expression that may be the real issue that is preventing the most economical or coordinated movement.

The tonic muscles play an important role in coordination. This too has both a mechanical aspect and a symbolic one. The tonic system is linked with physical and psychological developmental history, as well as a person's expressiveness in the present. No surprise that working with tonic function can have deep psychological changes as a "by-product."

### PSYCHOLOGICAL VS EMOTIONAL

From what Godard is saying, movement work is inevitably psychological work. But there is an important distinction to be made between psychological and emotional. In MacClean's model of the triune brain, tonic function is at the oldest, reptilian brain level, whereas emotional associations take place at the limbic level, a more recent development. The most profound changes come from the deep-

est level. Godard surmises that this is why both IPR and Alexander expressed some resistance to working on an emotional level. The theory is that by addressing the tonic function we can affect the basic senses of support and orientation without needing to talk about the associations involved. We can help build the basic sense of support in the body (instead of breaking down armor, as in a Reichian model). In Godard's experience this work often speeds up psychotherapeutic or analytic processes, but it is distinct from them. We can work effectively on tonic function, on movement patterns which will create deep change, without ignoring the psychological significance, and without going off into emotional history and areas which our training as Rolfers does not address.

## III. TONIC FUNCTION AND TWO DIRECTIONS

Earlier I described Reed's experiment that showed that the first muscle to contract when a subject raised his arm was the soleus. The voluntary, conscious command is "lift the arm." The experiment reveals what we will call a pre-movement, the movement of the tonic system, which in this example involves the soleus and other leg muscles. The pre-movement is not under conscious control. It cannot be accessed directly by the mo-



tor cortex, by voluntary commands. But it can be influenced by what Godard calls the sense of weight and the sense of orientation, the perceptual organization of an individual's experience of gravity.

"In space, the root of a bean-plant will grow every which way, but as it approaches the earth, the roots will grow down. The plant obeys the law of gravity, but it also obeys the law of the sun. Attracted by the sun, the plant grows upward. We could say that there is gravitropism and heliotropism, two directions."<sup>11</sup>

In order to move, the body as a whole or an individual muscle must have a point of support. Without falling into a typology, people do seem to exhibit a preference for organizing themselves in gravity more in terms of one direction or the other: either using the earth, the downward direction as their primary support, or using the sky, the upward direction. These two directions can also be thought of in terms of a sense of the inside space of the body or more of a sense of the outside space or environment. The sense of two directions is, in Godard's terms, one of the primary ways to work with tonic function.

The two directions are the symbol of gravity in experience, a pull downward and a resistance to the pull, or a lifting. We can describe the sense of two directions in anatomical terms, from external observation: two directions involves a sense of upward and downward lengthening for instance,

of the spine—lift at the AO junction (organization of the sub-occipital muscles) and an internal sensation of the weight of the sacrum, or the body weight distributed on the soles of the feet. At the individual muscle level, it has to do with the ability to access both the proximal and distal attachment of a given muscle. The concept of 2 directions is not intended to imply lengthening only: from down to up, or from up to down, the two directions allow both a gathering-in, a building of pressure, as well as an expansion, or release.

These directions are a sensation; part of what Straus would call the body scheme:

"The body scheme is not so much a concept or image that a person has of his own body as it is an ensemble of directions and demarcations—directions in which we reach out toward the world and demarcations that we encounter in contact with the world (Shilder, 1935). The body scheme is also experienced, therefore, as an I-world relation. Corresponding to our conation, (inclination, drive, desire) space itself loses its static character, opens endlessly before us, and expands or represses us." (p154)

The idea of body scheme suggests that the space of the body does not end with our skin. Rather, human beings project their sensory awareness out into the world, to include the space around them. This perception or relationship with the surrounding space will also shape our tonic organization. If we can get a sense of physi-

cal support through sensing the two directions in the space beyond our body, our system will no longer need to contract as many muscles for stabilization and our movements will be freer and stronger.

## THE ACTION OF PERCEPTION

Godard demonstrates this in a modern technological version of a traditional Aikido experiment known as the unbendable arm. With arm outstretched, hand resting on another's shoulder, a person is asked to prevent his arm from bending, first with the intention of resisting the outside force as someone leans on it, and subsequently, using an image of energy flowing out through the fingers. Inevitably, using the image, the person with arm outstretched is much stronger, able to keep the arm from bending with ease, whereas when he struggled against his opponent, it was the opponent who was the stronger. Electromyography shows that in this instance, when the subject struggles to keep the elbow joint straight with no sensation in the hand, he is contracting the biceps muscle as well as the triceps—in so doing, he is actually working against himself, helping the attacker bend his arm. When the subject is asked to imagine reaching through the fingers to the wall, the biceps remains released, quiet and free; only the triceps contracts. The result: an unbendable arm.<sup>12</sup>

Physiologically and me-

chanically, I can explain this phenomenon in terms of stabilizer muscles, agonists and antagonist action. But what is even more significant is that it is the perception of these directions that affects movement. The two directions are a perceptual event which profoundly affects the motor pattern of a given individual. This example demonstrates, among other things, a phenomenon that we intuit: that perception is an action. Perception is a form of intentionality, a movement in a direction.

To say it another way, our perceptual state affects our motor patterns. Increasing the person's sensory awareness in his fingers invokes the sense of two directions. The simple act of sensing the fingers changes the pattern of firing of the muscles. The sense of two directions allows the antagonist not to get involved in the movement. There are quite specific physiological, functional consequences to a change in sensory awareness accessed by putting one's attention to a particular image.<sup>13</sup>

In movement education, we will have to take this into consideration. A problem in movement may not be the result of faulty motor function, but of faulty perception. To change a movement pattern, to affect the relationship of the person in gravity, we will have to work with their perception. This will include sensory awareness of the body, and also, sensory awareness of the space in which they move. We may work to change the person's habit of perceiving





which means his/her habit of interpreting of sensation.

It is truly not important to know why a person perceives the ground more than the sky or vice-versa, —perhaps it comes in part from a genetic predisposition, and in part from the situation in development, psychological or physical— but it is key to recognize that they do and that affecting their particular perception will be crucial to developing more movement options.

#### IV. UNDERLYING PHYSIOLOGY

Both tonic function and the sensory phenomenon of working with two directions can be described from a physiological point of view. Here I will briefly cover the key physiological aspects. For a more in-depth account I refer the reader to Kevin Frank's article in the last issue of Rolf Lines

MacClean's model, the triune brain, divides the brain into three levels in terms of function: the most basic, primitive level is the reptilian; the next level, at which hesitation or inhibition and emotion are introduced is the limbic; and the third level is the cortical.<sup>14</sup> This is a classification based on ethology not on neurological anatomy.

Godard's theory is that movement will be more efficient when we use the reptilian level as much as possible: i.e., allow stretch reflexes and

the gamma motor neuron loop to mediate the initiation of movement rather than using only alpha motor neurons and cortical control. This is the physiological underpinning of the quality of movement that we are used to describing as "intrinsic." (to the eye this might look like movement in which there is not obvious unnecessary shortening; what we call the central line or core is free during movement.)

Although the reptilian layer is in charge of movement, the reticular formation is also important in terms of the overall tone of the body. A network of cells dispersed throughout the medulla, the reticular formation is affected by the input of the senses and by the memories and emotions of the limbic system; thus the reptilian layer is influenced from above.

In practice, using what Godard calls impression, i.e., sensory awareness, changing perception, will be able to have a profound effect on tonic organization. Since the reticular formation has a strong influence on the general tonus of the body, and sensory impressions have a powerful effect on the reticular formation, a change in sensory awareness becomes a change in tonic organization. The perception of 2 directions accesses a lower brain response that results in better coordination, more strength, a more adaptive response to the movement requirements of a particular situation.

In movement work, asking not, "how can I do this

movement," but, "what prevents me?" or using the sense of two directions, allows us to access the physiological effects that lead to appropriate tonic function. Consciously willing a movement triggers the alpha motor neuron pathway, that goes directly from the cortex via the alpha motor neuron, to the muscle. We want to allow the gamma loop, that is governed by a sense of a spatial (thus sensory) goal, to mediate the alpha firing. The gamma loop is more of a reptilian—an older brain—function. Asking "what prevents me," rather than triggering cortical alpha motor neurons, allows the cortex to play a more useful role in movement. Actively, the cortex can only slow down the firing level of the spindle response. You cannot inhibit a reflex, but you can modulate it. Rather than getting in the way of the movement we seek, this way, it functions constructively by inhibiting the inhibition (inhibiting the antagonist).

Evoking two directions can lower the sensitivity of the stretch reflex to allow more freedom of movement. In a simple demonstration, Godard asks someone standing to lift their leg—generally, the hamstrings restrict the movement at 90 degrees of hip flexion (the leg is roughly parallel to the floor.) Then he supports the person at the waist—giving a sense of upward direction—and asks her to feel the weight of her sacrum, thus eliciting the downward direction: the degree of flexion at the hip increases dramatically,

until the leg is nearly perpendicular to the floor!<sup>15</sup> Eliciting the sense of two directions in the spine allows a change in the stretch reflex (a lowering of its sensitivity) in the hamstrings: the leg goes further before the reflex is triggered.

In walking, a sense of two directions in the spine allows the small muscles around the spine and the erector spinae, tonic muscles all, to release. These muscles, and especially the suboccipital muscles, also affect the reticular formation.<sup>16</sup> The release in the spine, the change in the lumbar lordosis and its contralateral movement create a lengthening of the psoas which automatically triggers a stretch reflex response.<sup>17</sup> Thus the spinal release initiates the basic movement of locomotion. As the psoas flexes the knee to continue the walk, foot and leg muscles must be free to allow the movement to occur: phasic muscles, action muscles, must not be overly involved in holding us up.

Appropriate tonic function will sometimes involve quieting or releasing key muscles so that movement is not interfered with, and sometimes activating tonic reflexes like the stretch reflex, so that we can be stronger.

Movement work can be understood as the work of organizing the basic tonic function and through the use of the sense of directions, the involvement of the gamma loop and the stretch reflex. When this occurs, locomotion can be supported by the gravity sys-





tem. Walking becomes an easy, coordinated activity.

This theory begins to define what we have been calling "intrinsic" or "core" movement in commonly held physiological terms. This is an essential step for future research. I have tried to briefly summarize these key physiological aspects. It is important to be able to describe what we, as Rolfers, are trying to do in physiological terms: by proposing a theory, we have something we can put under the scrutiny of evaluative research. We can begin to experiment to see if our theory holds up. One can do movement work without necessarily knowing the underlying mechanisms, but the more clearly we can understand them, the less tied we will be to myth and technique, the more we can be creative.

## V. IMPLICATIONS FOR WORKING IN MOVEMENT

We do not in any way have to lose the symbolic aspects of working with gravity and the body when we become precise in physiological terms. In fact, an in depth understanding of physiology and simple research experiments support the necessity of including the body-as-experienced in working with movement.

Knowing that perception is an action will directly influence our techniques. Understanding that a change in perception—in sensory awareness—evokes a change in the

fundamental tonic response, we will work with this dimension: eliciting sensation, "impressing." We will work with the metaphor of two directions in terms of a balance between perception of both an internal milieu, and perception of the periphery, or the world outside. We often find that the key to evoking an intrinsic movement is not focusing the client's attention inward on the sensations in the body, but on the outside—the ground beneath their feet, the feel of the wind on their skin, the sounds and sights of the surrounding space.

Working at the periphery, evoking sensation anywhere in the skin, in the palms of the hands and soles of the feet (skin is the brain's covering—see Job's Body) is a direct link to the gamma loop—to a movement less controlled by the cortex.

### Movement in situation

Understanding movement as inseparable from the situation has several implications for working in movement. It implies that we cannot teach an ideal form or position. Appropriate movement means appropriate to a specific time and place, a particular situation. There cannot be a right position (such as a horizontal pelvis); what we can teach our clients is adaptability; the sensitivity to respond to the moment at hand, the freedom to move that will allow this response. ( Trying to imitate a

form will also trigger a movement run from a cortical level rather than the sensory activity of finding a way to move which will involve the gamma loop.)

To give movement a context, rather than isolated movement patterns, we will work with whole functions—"foundational movements." These are the learned subroutines that form the basis of actions. They also have strong symbolic significance: To throw, to push, to cut, to show (point), to welcome—to name a few—are basic movements that also relate to the psychological abilities to make contact and to separate.

For example, if I ask a client to push me, I can see if one direction is lost during the action, if she is pushing herself (contracting or shortening) rather than actually pushing me (moving herself away from me rather than me away from her), or if she loses her own center in the push, going with me in the push, not actually separating. The movement of pushing is symbolic of saying no. Rather than discussing the merits of self-assertion, or the reasons or history behind someone's difficulty with it, we can work with pushing. We will access the whole issue from the movement dimension. By learning to keep a sense of two directions while pushing, the other behaviors may (and often are) affected.

Just as we will not be able to study movement as a laboratory experiment separated from life, so we will not be able to work in movement

without accepting that the symbolic realm of the person will profoundly affect the work. Understanding the symbolic dimension of movement, and that movement takes place in relationship with the world outside, we will not just work with clients with their eyes closed focusing them on internal sensations. We will work with them in relationship: with another person or perhaps at first with an (transitional) object. Thus we can recapitulate development. In working on the ability to feel the object (the stick in my hand), we develop the sensation in the skin, the relation with the other, without losing the self.

This will also have implications for the role of the practitioner—our touch, our language, our presence will be also be an inseparable part of the situation. Our own movement will affect the movement we are trying to evoke.

### Movement in relationship

Psychologically, one of our crucial balancing acts is on the tightrope between autonomy and relationship. This is beautifully expressed through the physical metaphor of relation to ground and sky, standing on our own (the vertical), and relationship to each other, the horizontal. If we lose one of the directions of the vertical, we begin to use the horizontal for support; we no longer have autonomy; our touch becomes an act of merging. This is not an effective



habit if we make our living touching other people. The phrase "gamma touch" was coined by a doctor to describe the sensitivity needed to move a baby in utero from the outside. Godard has adopted the term to describe a way of touching in which the one touching maintains a sense of two directions in her/his hands: feeling the back of our own hand at the same time as we feel the person we are touching.

What we find is that this touch evokes the gamma system, or intrinsic movement. If we lose one direction when we touch, it is much harder, if it is even possible at all, to educate the client in the movement we are looking for. In order to help someone feel their own system we need not to be using them, through our touch, as a means of support for ourselves. The physiology of the tonic system and gamma touch give a more grounded meaning to the often used abstraction of boundaries.

## VI. KEY AREAS TO LOOK AT

In practice, people do seem to exhibit a preference for using one direction or the other as their primary support. However, in looking at our clients, the idea of two directions is not to create a new typology. It is useful for us, for the practitioner, to look at patterns to develop our body-reading skills. It is not about creating categories of "up people and down people." The two direc-

tions are interdependent: for coordinated movement; both are needed.

### a. Three lordoses

We will not look at alignment in terms of the masses of the body—pelvis, trunk, head—but in terms of the body's lordoses: cervical, lumbar and functionally speaking, the knees. Godard describes it thus:

"Where can you see tonic function? in the coordination of the three lordoses. This is very important: It is not a pelvic rock: you can do this with the muscles of the leg. When you control the blocks of the body, it is the beginning of the end of movement. You will be perfectly aligned and perfectly dead in terms of movement. It is very important to look at motion and not at horizontalizing the blocks. The block is just the result of your expression, which means the diaphragms' tension and the tonic organization.

Anatomically, in front of C3, L3 and the knee, you have a bone: hyoid, the umbilicus (it isn't a bone but is an interworking of tissue almost like a bone), and the patella. All three have the same organization: rectus and obliques. The law of moving the three lordosis is two directions."<sup>18</sup>

The key points for the spinal lordoses will be the apices of the curves: C3 and L3. Eliciting movement at these points, or at the two end-joints of the spine, the atlanto-occipital and the lumbo sacral, will allow two directions in the spine. Working with the area around

L3 could be considered a rearticulation of Ida's idea of waistline back. But here what is important is not the end position but the ability to move. And it is not just any movement, but what could be described as a movement by letting go. It is the change, the release of the area that results in movement and allows coordination. Functionally, the knee acts like a third lordosis, and will be affected by the same issues as the spinal lordoses.

### b. The significance of the upper body, arms and G'

Traditionally, biomechanically, the focus of structural order has been from the ground up, with the pelvis playing its central (center of gravity) role. The significance of the shoulder girdle and of G', the center of gravity of the upper segment (head, arms, thorax), needs to be considered to complete the picture. Philosophically it is interesting because it bridges development, psychology and structure.

The pelvic and the shoulder girdle share the word girdle, but functionally they are very different. In the shoulder girdle, the humerus is held into the gleno-humeral joint not by strong ligaments as in the hip joint, but by a musculotendinous cuff. Under anesthetic, the limitations in ROM of the shoulder joint are freed, whereas in the hip joint, they are not. While the hip joint's main issue is how it responds to weight, the muscles that support the arm are strongly influenced by the stretch reflex

and gamma motor neuron system since they hang.<sup>19</sup> How we learn to reach, how the child is responded to, received, by the environment when she grasps or reaches, the psychodynamics of that early movement, will affect the organization of the shoulder girdle which in turn will affect the upper body's center of gravity, which Godard calls G'.

Ontogenetically and phylogenetically, the spine first reaches the vertical, not in standing, but in sitting. Apes sit and use their arms as do infants before they can stand on two feet. In fact, work with the arms prepares for bipedalism. Reaching, working, in a sitting position shapes the organization of the upper body. Subsequently, in standing, the position of the legs and pelvis is strongly influenced by the weight and position of the upper body segment. The pelvis and legs have to adjust to the placement of the upper body. When G' is anterior to the center line, we tend to have internally rotated femurs; if it is posterior, we tend to have externally rotated femurs.<sup>20</sup>

Since biomechanics and Rolfing have tended to focus on the pelvis as the keystone of structure, the importance of the upper body—with the center of gravity of the segment head-neck-arms being at about T4—has been neglected:

So although we can look at the pelvis as a central issue in a body's organization, we should not lose sight of the important effect of the upper segment, responding to per-



sonal history and the environment, in shaping the position of the pelvis and legs. The biomechanical response is a response to relationship (legs respond to G'). Again we have the interaction between the psychology and biomechanics. Both need to be considered.

### c. The diaphragms' relationship to movement at the lordoses

Restriction in the diaphragms—respiratory and pelvic as well as the functional diaphragm of the palate—will interfere with the ability to elicit a two directional movement at the lordoses.

The freedom of movement and coordination between the key areas of the spine and the diaphragms will be the basis of the movement in two directions that allows appropriate tonic organization.

## SYNTHESIS

We will connect all the different areas by looking at how the person is solving a fundamental problem: how is the relationship to gravity, the preference of direction, manifesting when they do the basic function of locomotion? This question links the many different structural elements.

For example, we see in a person's walk that the knee is limited in its forward motion—is this an articular restriction? if we look closely, we may see the soleus contracting early in the movement: the soleus grabs on to keep the person

from falling forward. As we continue looking, we see a restriction at L3, we see the area of attachment of the diaphragm's crura restricted, and overall, we see a distinct preference for the direction "up." All the pieces of the pattern make sense in the context of a being who has to walk upright in gravity. The lack of balance between the two directions needed for appropriate tonic organization leads the brain to sense the body's precariousness as he takes a step. In response, to prevent him from falling over, a signal is sent to the soleus to contract, restricting the range of motion in the knee joint. To free the knee, we will try many approaches to evoke more balance between the inner sense of both directions. Our hands-on work may perform the function of increasing sensory perception, "impression," just as much as it may be freeing fascia or releasing articular restrictions.

## CONCLUSION

This paper has presented a few of the basic concepts in Hubert Godard's theory of movement. We took a phenomenological view point, and started by looking at action systems, the functional behaviors that shape human movement. Beneath any one of these lies the issue of establishing a relationship with gravity. We called this tonic function. We explained the many aspects of tonic function that go be-

yond just postural negotiations. We saw that tonic function has a physiological and mechanical organization as well as a perceptual and symbolic one. We proposed the sense of 2 directions as a basic tool for working with tonic organization. We tried to trace the effects of the theoretical aspects on the actual practice of movement work as well as to ground the theory in some specifics of analysis.

Throughout the theory and practice, the integrity of the human experience, its internal and external dimensions, is respected. Mechanical models are simply inadequate descriptors of movement: they ignore the fundamental role of symbolism and perception in movement. Godard's understanding of the basis and breadth of tonic organization, his synthesis of insights from phenomenology, psychology and neurophysiology, is an entry into describing the complexity of the human being in motion. The picture is still far from complete: researchers are only beginning to get a glimpse of how the brain, development and experience shape human movement, and theories of how movement is learned or changed are just beginning to be formulated. It is an exciting arena for theoretical exploration, and will perhaps contribute an essential perspective for our work as Rolfers.

## Note:

*Aline Newton and Kevin Frank will be giving a presentation on this topic at the Annual Meeting.*



## FOOTNOTES

<sup>1</sup> Reed, Edward. An Outline of a Theory of Action Systems. *Journal of Motor Behavior*. 1982 Vol. 14 No.2 pp98-134

<sup>2</sup> Reed, Edward. Complex Movement Behavior: The motor-action controversy. pp.45-86 (O.G. Meijer & K. Roth, editors) Elsevier Science Publishers, B.V. (North-Holland), 1988

<sup>3</sup> In this context, "purposeful" may include the purpose of increasing sensation, thus blurring the distinction, from a functional point of view, between motor and sensory.

<sup>4</sup> *ibid*

<sup>5</sup> *ibid*

<sup>6</sup> Straus, Erwin. *Phenomenological Psychology*. Basic Books. N.Y. 1966 p.139

<sup>7</sup> Kestenberg, J. Parents and Children, Chapter 8, "Development of the Young Child as Expressed through Bodily Movement."

<sup>8</sup> Kestenberg, J. and Buelte, A. Prevention, Infant Therapy, and the Treatment of Adults. *International Journal of Psychoanalytic Psychotherapy*, 1977, VI pp.334-396.

<sup>9</sup> Godard, Hubert. workshop lecture, Philadelphia 1993

<sup>10</sup> The soleus is generally identified as primarily tonic, but there is not necessarily agreement about all muscles.

<sup>11</sup> Private correspondence, Kevin Frank\Hubert Godard

<sup>12</sup> unpublished research. Reed's work on the issue of the distinction between peripheral and central\sensory and motor, supports this also.(see footnote 1)

<sup>13</sup> The nature and role of perception, and the distinctions between sensation, perception, interpretation, are a very complex topic that deserve a paper in their own right. Reed provides an interesting perspective in his discussion questioning the distinction between sensory and motor from a functional point of view. Here I am confining myself to making the point that perception has motor consequences.

<sup>14</sup> A good book on the evolution of the brain: Jastrow, Robert. *The Enchanted Loom*. Simon & Schuster, NY 1981. See also Hampden-Turner, Charles. *Maps of the Mind*. MacMillan Publishing, NY 1981 pp 80-85 and Juhan, Dean. *Job's Body*. Station Hill Press Ny 1987

<sup>15</sup> At workshops over the past few years this experiment has been performed several times in front of the class.

<sup>16</sup> Abrahams, V.C. Neck Muscle Proprioception and Motor Control. in *Perception, Posture and Emotion*. edited by D. Garlick. Kensington, Australia 1982 .

<sup>17</sup> See the mechanism that Serge Gracovetsky describes in his book *The Spinal Engine*, Springer-Verlag. NY, 1988

<sup>18</sup> Workshop lecture, Philadelphia, Nov. 1993

<sup>19</sup> Caillet, Rene. *Shoulder Pain*. F. Davis Company. Philadelphia. 1991

<sup>20</sup> Sohler, Raymond. *Deux marches pour la machine humaine*. Edition Kine Sciences, Belgium, 1989

