

Transcendental Feedback Phenomenology (TFP)

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Abstract:

TFP is a method for examining core consciousness during traumatic experiences, including uncovering subtleties of consciousness and meaning. It applies system dynamics (SD) to convert Husserl's Transcendental Phenomenology into a relatively simple formalized science. This methodological advance positions TFP as a new source for implementations in phenomenology, consciousness studies, and deep psychotherapy. Key reasons why TFP succeeds are:

- * The epoche: brackets-out extended consciousness and focuses on core consciousness.*
- * Structures consciousness as a multiloop nonlinear feedback system, the same structure as the neurophysiological system underlying consciousness.*
- * Utilizes Forrester's 5th principle of SD, quantification of unmeasured but important concepts and relationships, and his method for geometrizing differential equations.*

TFP's use is illustrated by applying it to recall, analyze, and resolve a traumatic 16-hour religious experience. Thus, TFP implements the search for the deepest truths of the inner life and the quest for permanent foundations for science, philosophy, and religion.

I. Introduction to TFP.

Some philosophers, psychoanalysts, and mystics believe that successful analysis of deep traumatic experiences is the key that leads toward understanding the essence and meaning of human existence or, at least, understanding a good deal of the essence and meaning of the experience itself. The Transcendental Feedback Phenomenological method (henceforth referred to as TFP) goes a long way toward implementing the opening up and deepening of either philosophical, psychotherapeutic, or religious/spiritual reflection on one's own consciousness during such an experience. The first philosophical attempt at a meditation like this in the modern era was made by Descartes (Husserl 1977). Later, in the late 19th century and during the first third of the 20th century similar, but deeper, meditations by those in the field of Husserlian transcendental phenomenology (henceforth referred to as HTP), particularly Brentano (1874) and his student Husserl (1931), revealed much of the subtleties of consciousness. However, their work failed to put HTP on a formalized scientific basis. The great value of TFP is that it provides the key tool needed to convert Husserl's important – but abstruse and unwieldy - HTP method into a relatively simple formalized science. That tool is system dynamics (henceforth referred to as SD), a powerful and relatively simple formalized analytical technique that emerged in 1961 from intense work on servo-mechanisms at MIT during World War II (Forrester 1961, Richardson 1981, Sterman 2000).

In this Section the reader is briefly introduced to HTP, TFP, and the TFP Reduction. Then, the recursive 10-step TFP method for making a TFP Reduction is detailed in Section II. Sections III and IV illustrate how to apply TFP by making a TFP Reduction of the changing horizon of consciousness during a religious experience of mine that occurred in 1962. That experience occurred at the end of a 5-year religious crisis (see Table I in Appendix A1). No psychedelic drugs, anti-psychotic agents, or any other type of drug or herb were involved. In the West the

experience is called purgation culminating in mystical union (henceforth referred to as PMU). Section III presents a narrative of my 16-hour experience of purgation and mystical union (henceforth referred to as PMU-16). Section IV gives the TFP Reduction of PMU-16 to obtain its essences and much of its meanings. References are listed in Appendix A3.

I.A: Key Concepts and Ideas:

1) What is a transcendental feedback phenomenological reduction (TFP Reduction)?

a) TFP is a novel SD-based procedure for performing an HTP Reduction. It is a simpler, more detailed, and more formalized method than Husserl's (1927) HTP method and, hence, clears the way for a new upsurge in the field of transcendental phenomenology.

b) A TFP or HTP Reduction refers to the examination of the changing horizon of one's own core consciousness during a deep traumatic experience. The ultimate aim of a TFP or HTP Reduction is to obtain the essences and meanings of the experience by examining core consciousness during the experience from as many angles or aspects or subreductions as possible. Such aspects include the very important and fundamental eidetic reduction, together with - but not limited to - the physical, psychological or behavioristic, etc. subreductions. As the eidetic reduction and all of the relevant subreductions are being completed, a great deal of the essences and meanings of the experience can be intuited. This leads to the resolution of a great deal of the trauma. When this has been accomplished, much of the motivation driving the TFP or HTP Reduction ceases. In the process a great deal can also be found out about the nature of core consciousness, mental imagery, archetypes, the neurophysiology of core consciousness, and the autonomous conditioned learning that occurs during a deep traumatic experience.

2) How is meaning obtained?

When one makes a phenomenological search for meaning one must be alerted to the subtleties associated with such a search:

a) The meaning of deep traumatic experiences is, to a large extent, based on a first-person analysis of one's own core consciousness or subjectivity during that experience. Formalized sciences - like physics, chemistry, biology, neuroscience, etc. - cannot give us meaning, because such sciences are limited to making a third-person formalized analysis of objective phenomena (Gurwitsch 1966). A HTP Reduction and its advanced form, a TFP Reduction, are capable of obtaining meaning because they examine the first-person details of one's own consciousness from moment to moment during a deep traumatic experience. The system dynamics-based TFP Reduction presented here is unique because, at present, it is the only formalized first-person approach to the meaning of such an experience.

b) Nevertheless, a TFP Reduction is limited to a certain extent in its ability to determine meaning. For example, the TFP Reduction and its simulations of core consciousness ultimately yield a great deal of the meaning of PMU-16, but the system analysis considers only 16 hours of a 5-year religious crisis. In particular, it does not consider the psychological dynamics of the 30 years of life that preceded my 1962 experience of PMU-16 nor does it consider the psychological dynamics of the years that followed it.

c) Here are the steps of a more comprehensive procedure for determining the meaning of PMU-16:

(1) Make a TFP Reduction of one's own core consciousness during PMU-16. This complex, subtle, and important task for determining the meaning of PMU-16 is being performed in Section IV.

(2) Make a phenomenological reduction of the 5 year crisis, using the Ordinary Feedback Phenomenological Reduction (OFP Reduction).

(3) Make a phenomenological reduction of – in my case - the 70+ year lifetime (OFP Reduction).

The general term, Feedback Phenomenological Reduction (FP Reduction), encompasses all three steps: the TFP Reduction of PMU-16 and the two OFP Reductions. The two OFP Reductions have not been performed yet.

3) What is core consciousness?

a) This term originates with Damasio (1999): Here is his definition:

"... consciousness is not a monolith, at least not in humans: it can be separated into simple and complex kinds, and the neurological evidence makes the separation transparent. The simplest kind, which I call core consciousness, provides the organism with a sense of self about one moment - now - and about one place - here. The scope of core consciousness is the here and now. Core consciousness does not illuminate the future, and the only past it vaguely lets us glimpse is that which occurred in the instant just before. There is no elsewhere, there is no before, there is no after. On the other hand, the complex kind of consciousness, which I call extended consciousness and of which there are many levels and grades, provides the organism with an elaborate sense of self - an identity and a person, you or me, no less - and places that person at a point in individual historical time, richly aware of the lived past and of the anticipated future and keenly cognizant of the world beside it.

"In short, core consciousness is a simple, biological phenomenon; it has one single level of organization; and it is not dependent on conventional memory, working memory, reasoning, or language. On the other hand, extended consciousness is a complex biological phenomenon; it has several levels of organization; and it evolves across the lifetime of the organism. Although I believe extended consciousness is also present in some nonhumans, at simple levels, it only attains its highest reaches in humans. It depends on conventional memory and working memory. When it attains its human peak, it is also enhanced by language.

"The supersense of core consciousness is the first step into the light of knowing and it does not illuminate a whole being. On the other hand, the supersense of extended consciousness eventually brings a full construction of being into light. In extended consciousness, both the past and the anticipated future are sensed along with the here and now in a sweeping vista as far-ranging as that of an epic novel.

"If it is true that core consciousness is the rite of passage into knowing, it is equally true that the levels of knowing which permit human creativity are those which only extended consciousness allows. When we think of the glory that is consciousness, and when we consider consciousness as distinctively human, we are thinking of extended consciousness at its zenith. And yet, as we shall see, extended consciousness is not an independent variety of consciousness: on the contrary, it is built on the foundation of core consciousness. The fine scalpel of neurological disease reveals that impairments of extended consciousness allow core consciousness to remain unscathed. By contrast, impairment that begin at the level of core consciousness demolish the entire edifice of consciousness: extended consciousness collapses as well. The glory that is consciousness requires the orderly enhancement of both kinds of consciousness. But if we are to elucidate the glorious combination, we are well to begin by understanding the simpler, foundational kind: core consciousness."

b) Damasio's insightful definitions of core and extended consciousness above are, in my opinion, only a first pass. Read the narrative of the religious crisis, called An Engineer's Story

[<http://world.std.com/~awolpert/gtr17.html>], particularly the excerpt concerning the 16-hour experience of PMU-16 shown in Section III below. Then, compare it with the core consciousness modeled in Figure 1 and simulated in Figure 2 and Figure 3 of Section IV. This will help refine the distinction between core and extended consciousness. Note: during the first nine hours of purgation both core and extended consciousness are operating. During the last hour core consciousness is dominant. A TFP Reduction is capable of modeling and simulating the relatively simple kind of consciousness during PMU-16 that I am tentatively associating with Damasio's concept of core consciousness. Extended consciousness appears to me to be too complicated for the human mind to model and simulate, with or without TFP.

4) What is the epoche and bracketing?

In the TFP Reduction of purgation in Section IV, I bracketed-out extended consciousness during the first nine hours of purgation and only analyzed core consciousness. Husserl called this bracketing-out procedure an 'epoche' (Follesdal 1998). I had never heard of the term, epoche, when I began the TFP analysis of PMU-16 in 1984. Rather, the epoche came to me in a very natural way because I was desperate to recall and get to the essence and meaning of PMU-16. I was convinced - from the moment I began - that progress toward the essence and meaning of PMU-16 resided at the deep level of core consciousness, where the heart is opening against restricting knots.

5) How is a TFP Reduction integrated with Husserl's work?

It is important for the reader to carefully study Sections III and IV in this paper, because together they give a worked out example of a TFP Reduction, illustrating key terminology used by Husserl for his important, but very abstract, concepts and ideas: For example, Husserl's term, noema, is realized in the SD flow diagram; his term, hyle, is realized in the various auxiliaries, rates, and table functions of the flow diagram; his term, intentional objects (the mental image and the archetype) are realized in the state variables or stocks of the flow diagram.

6) Two of Husserl's maxims, "the natural attitude" and "back to the thing itself," are fundamental to both the TFP and HTP methods:

The narrative of the 16 hour experience of PMU-16 in Section III is an example of the "natural attitude." In that narrative the TFP analyst has now discarded, for the time being, all that he had read or been told about concerning religion, mystical experiences, etc. Now he is "going back to the thing itself" and trying to describe the flow of consciousness during the experience as best he can. Using "the natural attitude," he employs phrases like "my heart began to open" or "there was a knot in my heart." That kind of phrasing is all right for mystical literature, but when the analyst enters the scientific domain and starts making a TFP Reduction and uses the natural attitude when naming the model variables in the flow diagram - such as KnotsInHeart, FearOfDeathDueToKnot, HeartOpenness, etc. - that's just too much for the usual mindset of the scientific community. Scientists ask the TFP analyst to define these technically bizarre names for the variables. This causes a temporary standoff.

However the TFP analyst, having experienced PMU-16 himself, knows that in the flow of his consciousness during that experience there arose such mental phenomena as an opening heart, knots in his heart, fear of death because of the knots, etc. He knows if he had not named the variables using the "natural attitude" he could not have simulated consciousness during the actual experience nor have intuited the essence and meaning of the experience. Therefore, he knows that he was justified in naming and modeling the mental phenomena of consciousness during the deep and traumatic experience using the "natural attitude," bizarre as such terminology for mental phenomena may seem to scientists. Most importantly, he knows that if he had defined the bizarre

soft variables at the beginning of the analysis, he would have deprived his intuition, indeed robbed it, of its rightful domain. This will become clear in Section IV.

Therefore the TFP analyst states the following rule to be used during a TFP Reduction: The analyst must suspend the desire to define the technically bizarre soft variables. At the same time he makes the following deal with his scientific critics: The rule is to be justified by its results. The results include the clarification of the noema concept by the flow diagram; the intuitive insights about mental imagery and archetypes obtained from the eidetic reduction; the intuitive insights emerging from the physical, psychological, etc. subreductions; and the intuitive insights about meaning that are the culminations of the TFP and HTP Reductions.

This rule and its justification can be further substantiated: Recall that a TFP or HTP Reduction is meant to be used only on traumatic experiences during which the experiencer is aware of the operation of core consciousness. During such anxious, fearful, and stressful experiences the mind's imagination becomes a powerful agent or factor affecting the mental phenomena that appears in consciousness. This includes the imagination's important contributions to the healthy functioning of the mind and also its contributions to the mind's delusions.

Thus, the "natural attitude" results in setting up the conditions that allow the analyst to employ three modes or domains of his or her mind at the same time: the analytical, the intuitive, and the meditative. When making a TFP Reduction the analyst is constantly in the meditative mode at the very same time as he or she is studying, analyzing, and intuiting the various aspects of consciousness. Like a person fishing in a pond on a quiet morning, the TFP analyst's meditative mode is passively watching and waiting to collect the essences and meanings that emerge:

- a) Watching the recursive clarification of core consciousness during the experience by the analytical mode during steps 1 to 8 of the TFP method, shown in Section II.
- b) Awaiting the recursive emergence of the intuitions in steps 9 and 10 that ultimately reveal the essences and meanings of the experience.

7) Bounded rationality, intuition, and meaning and their relationship to a TFP and HTP Reduction:

It should be noted here that the SD-based TFP Reduction can never do full justice to the infinite subtlety of both core and extended consciousness. Think, for example, of a poetic idea or a religious experience. Nevertheless, a TFP Reduction deals with this bounded rationality (Simon 1982) by being an artificially intelligent bootstrapping operation in steps 1 to 6 of the 10-step recursive cycle. This bootstrapping prepares the magnificent human mind for dealing all by itself with the remaining steps 7 to 10 of the recursion. Using the combination of steps 1 to 6 and then steps 7 to 10, the analyst's mind dives, recursively, deeper and deeper toward the infinite subtlety of core consciousness.

It is true that such rationality is bounded: it can never formally capture this infinite subtlety (qualia) of core consciousness, such as "the redness of red" or "the sound of a distant oboe." However, as the TFP Reduction dives deeper and deeper, the mind's intuition is capable of eventually revealing something far more important to the analyst than scientifically understanding qualia: It is the intuiting of the essences and meanings of the experience itself! An example for the case of PMU-16 of intuiting the essences is shown in Sections IV.A, IV.B, and IV.C; and for intuiting meanings see Section IV.E.

8) Specifically, what aspects of SD give TFP the firepower to convert Husserl's work (HTP) into the relatively simple formalized science?

a) SD's multiloop nonlinear feedback structure for the flow diagram is the same structure as the neurophysiological system that underlies consciousness.

b) SD allows the analyst to disaggregate consciousness into many simultaneously operating aspects while integrating and structuring those aspects as a multiloop nonlinear feedback system. Neuroimaging confirms that the neurophysiological system can be disaggregated into many parts and that those parts are operating simultaneously during an experience, just like the variables do in a multiloop nonlinear feedback system.

c) The flow diagram is a map of consciousness for an experience, because the SD method (Forrester 1961) geometrizes the resulting differential equations underlying such a structure. This geometrizing is of great value to the analyst because it compresses and stores into one image vast amounts of very abstract recalled information about consciousness during the experience.

d) The fifth principle of SD (Forrester 1993), “quantification of unmeasurable but important concepts and relationships,” empowers both the use of soft variables and the “natural attitude.”

e) It should also be noted that the incomplete structure of consciousness that presently exists in the flow diagram for PMU-16 and its mathematical model (For example, the archetype of Death has not yet been incorporated into the flow diagram.) are still able to simulate the reference modes of all 23 conscious variables during the 10-hour purgation phase of PMU-16: For example, despite the incomplete flow diagram I was still able to accurately simulate all variables during the 10-hours of purgation, minute by minute (see Figure 2). In addition, for the intense and critically important 60 minute knot removal period of purgation which leads right up to the moment of cessation in mystical union, I was still able to accurately simulate those aspects or variables second by second (see Figure 3). This flexibility of an SD analysis allows the TFP method to operate recursively.

9) Why is the TFP Reduction important?

A TFP Reduction is not a trivial accomplishment. Its relative simplicity and its formalization give seekers of truth greater access to a deep penetration into philosophy, consciousness, depth psychology, and spiritual experience than Husserl’s important – but abstruse and unwieldy - HTP methods. In addition, a first-person analysis of consciousness is the beginning of philosophy, as not only Husserl has held but Augustine, Descartes, Hume, Kant, and various sages and schools of thought from Asia and other corners of the world. It also provides a telescope or microscope for recalling, observing, and mathematically analyzing the changing horizon of one’s own consciousness during a traumatic experience. It also enables the scientific world to formalize the intensity of first-person subjective mental processes for the first time. Perhaps the most important result of this work, though, will be that it begins the process of reestablishing the foundations (Husserl 1970, Gurwitsch 1966) of science, philosophy and religion.

I.B. Insights about performing a TFP Reduction, as illustrated by the history of my eidetic reduction and associated subreductions of PMU-16.

1) The eidetic reduction: Toward the essences of the experience (step 9 of the recursive TFP method).

The word eidetic is based on the Greek word, *eidos*, which, according to Webster’s Dictionary, means form or shape or image or figure or idol or essence. How does a TFP Reduction perform the eidetic reduction? What, specifically, is the *eidos* of an experience of core consciousness?

The first thing to do is to perform the *epoche*: bracket-out extended consciousness and focus on core consciousness. The next thing is to recursively use steps 1 to 6 of the TFP method to obtain the *noema* or structure for core consciousness, called the flow diagram. For the case of PMU-16, the *noema* or flow diagram is shown in Figure 1. Next, the analyst recursively examines

the flow diagram to intuit its various eidos or intentional objects. These intuited objects are mental images and archetypes, which are the various intentionalities of core consciousness.

It sounds fairly easy, but the intentional objects for PMU-16, a somatosensory mental image and an archetype, were not easy for me to discover, particularly the mental imagery of the heart opening against knots. It took me twelve years! In 1987, three years into my TFP Reduction of PMU-16, I showed my model to a leading system dynamicist. He asked me: "What do HeartOpenness and KnotsInHeart mean or refer to?" I was perplexed by his question, because I did not comprehend Brentano's (1874) concept of intentional inexistence. Indeed, I had never even heard of it. (Intentional inexistence will be explained at Section IV.A.2.d). Nevertheless, the system dynamicist's question remained in the back of my mind. The turning point came in 1999 while I was reading Ellis (1995) on mental imagery. Suddenly I realized that those two state variables or stocks represented the key parts of a mental image. This intuition brought about a revolution in my understanding of consciousness and a deepening of my understanding of the TFP Reduction of PMU-16. For example, once the mental image for purgation was intuited, two further intuitions or insights occurred during the ensuing 2 or 3 months:

a) I understood how the mind uses imagination during purgation for practical, indeed, survival purposes: To be specific, in the first few hours of PMU-16 I was in a state of great anxiety: Fear without an object. This anxiety activated my imagination. It quickly went to work to supply that object or objects. First off, I need to say that there was an inherent inclination in me to pray to That which is formless, like a soldier in the trenches under intense bombing. But such prayer needed a structure and a scenario, particularly if one is experiencing great anxiety. As a result my imagination began to conjure up a structure whose intentional objects were a somatosensory mental image of the heart opening against knots and an archetype of Death. These two image-like products or objects of the imagination are modeled using state variables or stocks. They enabled me to deal with the great stress, fear, and anxiety of PMU-16. If my anxiety-driven imagination had not succeeded in conjuring up the structure, the scenario, and their associated images, I believe the dynamics of my consciousness and imagination would have become unstable and disintegrate into a serious psychotic episode (Deikman1971).

b) Then, a few months later I came across a quote from Sherrington (1906) on reflexes associated with heart muscles that I used to intuit how the mental image is related to the neurophysiological system. Specifically, how the mental image is reified in antagonistic heart muscles (see Section IV.A.2.a).

Prior to these two intuitions, my work was vulnerable to the accusation of solipsism, which, at present, is wrongly dismissed as an erroneous procedure in Western philosophical and intellectual circles (Stace 1952). Thereafter, insights followed quickly and led to the physical, behavioristic, and other subreductions. I want to emphasize here that my TFP Reduction began with what Husserl called transcendental solipsism in 1984 and continued along productively, using the natural attitude, until slowly, by means of the eidetic reduction, it made the transition, described above, to becoming a science around 1999. The archetype of Death was recalled and recognized in 2000.

The mental image and the archetype were the centers of my attention throughout PMU-16. Of course, there was also the appearance in core consciousness of relatively minor aspects or elements of consciousness: what Husserl called hyle. Hyle appear to be variables in the feedback loops associated with the intentional object. In SD hyle are modeled using rates, auxiliary variables, and table functions. For PMU-16, hyle are such variables as fear, stress, prayer, forgiveness, etc. Each of these variables would increase from time to time to become an intense focus of consciousness and then recede to the 'fringe of consciousness' (James 1950) during the

twelve cycles when the knots were being purged. The mental image is also dynamic. It changed throughout PMU-16 with the knots in the heart slowly ratcheting down one by one and the heart slowly opening or widening. Nevertheless, the various eidos in the form of the mental image or intentional object and the archetype, remained the center of my focus. This is why the key to the various eidos are the state variables, the essential organizing variables underlying the feedback loops and their associated hyle.

Eidetic Reduction Overview:

The TFP Reduction's recursive road to the eidetic reduction initially traveled through the region of transcendental solipsism. For example, in my analysis of PMU-16 the transcendental solipsism region was traversed very productively from 1984 to 1999. However, my feeling of lack of scientific groundedness in that solipsism region ultimately drove me to the eidetic reduction and the various subreductions. Key intuitions were made to achieve this: My first step was to recursively construct, during the transcendental solipsism period, a fairly good flow diagram (1984-1994). Meditation on that flow diagram led to the recognition of the mental image (1999) and the archetype (2000). The eidetic reduction continued while the various subreductions began emerging in parallel with it. That is, once the initial neural correlates for the mental image were discerned (1999), the analysis began to travel toward the physical (1999), psychological or behavioristic (2001), and other subreductions. These subreductions then led to the neurophysiological, behavioristic, etc. correlates of core consciousness. Therefore, during the period of the recursive eidetic reduction a transition was made in 1999 from the transcendental solipsism phase (1984 – 1999) to the scientific phase (1999 – present) of the TFP Reduction. So far, the eidetic reduction of PMU-16 has revealed the following eidos or essences:

- a) The flow diagram or noema.
- b) The two intentional objects:
 - 1) The mental image of the heart opening against restricting knots.
 - 2) The archetype of Death.

2) The Physical Subreduction

In 1996 I presented a poster on my system dynamics analysis of consciousness during PMU-16 at the Tucson II conference on consciousness. The central theme of that conference was Chalmers' (1995) hard problem (Crick 1995). During the conference I realized that the various aspects of consciousness in my flow diagram for PMU-16 and their simulations were what the scientists in the field of consciousness studies were seeking: It was, indeed, the long-sought-for method for making a formalized first-person analysis of consciousness and it also showed in detail how the method was used to make some of the eidetic reductions for PMU-16. I also saw that those aspects of consciousness in the flow diagram could be reduced to neurophysiology, particularly centered around the physiology of the neurocirculatory system and the central nervous system (CNS) [see Figure 4 on page 25]. These would illustrate the third-person analysis of consciousness that the Tucson II scientists were also looking for. A neurologist (Guha 1991) had informed me of these third-person implications of my work in 1991. However, I did not press my solution to the hard problem in 1996, because my mind and emotions were not yet ready to fully accept a physical reduction of my religious experience. However, once I had made the key reductions of PMU-16 in 1999, which was the intentional object or mental image with its neural correlates in antagonistic heart muscles, my respect for science surged into parity with my respect for religion to become the two, equally dominant, factors in my work.

A TFP Reduction is capable of solving the hard problem for the case of core consciousness during PMU-16 (see Section IV.A; IV.B; and IV.C below). This is a key result of my work.

Among other things the solution to the hard problem for PMU-16 resolves the four-centuries-old conflict between science and religion. Whether or not the scientific world and the religious world are willing to accept this resolution of the controversial conflict is another question. Acceptance is predicated on the strength and boldness of those in both the scientific and religious worlds who are struggling to uphold what Searle (1993) calls the Western Rationalistic Tradition. Nevertheless, once the scientific world gets wind of the power of the TFP method, work on the archaeology of core consciousness could begin.

Consider how deep the physical subreduction for PMU-16 could go if scientists applied the Guyton Model (Guyton 1972). The Guyton Model is an:

"...extensive model of the entire circulatory system first developed in 1971 and continually updated since. ... Basically, the model consists of [about 500 equations] covering circulatory dynamics, body fluid control, and the various systems that control the circulation, including nervous, hormonal, and local tissue controls... [For example, the model] deals with the interplay of many factors required for control of body fluid volumes, including thirst, salt appetite, natriuresis, renal autoregulation, hemodynamic factors, regulation of interstitial fluid volumes, reflex control of the circulation, etc."

Using insights gained from the TFP analysis of purgation, a Guyton Model systems analysis could be performed to understand how the mystic's cardiovascular and neurocirculatory system were regulated during PMU-16. For example, it could explain the terrific thirst I experienced on the flight from LA to Boston (see the narrative of PMU-16 at Section III).

3) The Psychological or Behavioristic Subreduction

The flow diagram or noema for PMU-16 details the autonomous mental imagery, ideation, and mediating processes between a stimulus and a response that provides the mystic-to-be with the conditioned learning needed to become a mystic (compare Figures 1 and 4). There are an estimated twelve cycles of autonomous reinforced conditioned learning, centered around the Forgiveness-Response. These twelve cycles of purgation are nested within one cycle of consummatory reinforced conditioned learning centered around the mystical union response. This set of reinforced conditioned learnings is important, because it underlies the subsequent religious teachings of the large number of mystics throughout the world who have experienced PMU (see Appendix A1).

4) Toward the meanings of the experience (step 10 of the recursive TFP method):

The present state of my efforts to obtain the meaning of PMU-16, using the TFP Reduction, is based on reflections from the very beginning of my study of the experience in 1984 to the present time. Key focus was reflection on the critical moment when core consciousness during purgation made the sudden transition to consciousness during mystical union. The resulting insights into meaning, shown in Section IV.E, were intuited during a one year period between 1999 to 2000. They include the intuition of the nature of God, the meaning of life, and the essence of faith. The intuition of these insights gave me great satisfaction. I had earnestly sought them since the beginning of my religious journey as a 25 year old in 1957. It was then that a tragedy had occurred, leading to the collapse of the purpose and meaning of my life (see Appendix A1).

II. The Recursive 10-Step Transcendental Feedback Phenomenological Method (TFP):

The TFP method is for use only on deep traumatic experiences during which the experiencer is aware of core consciousness. Because of the deeply meditative characteristic of a TFP Reduction, the procedure takes time: The recursive 10-step TFP procedure that follows loops relentlessly over a period of years. In the process the eidetic reduction, along with the physical, psychological, and other subreductions, are intuited from time to time. These intuition of essences

in step 9 then culminate in the intuition of a great deal of the meanings of the experience in step 10. To clarify the procedure given below, Sections III and IV illustrate its application to PMU-16. Experiences of PMU are found in all cultures (See Table I in Appendix A1).

Here are the 10-steps of the recursive procedure:

1. Make the “epoche” by bracketing-out extended consciousness and focusing on core consciousness. Then take “the natural attitude” when performing the process of recalling from the preconscious various aspects of core consciousness during the experience. This recall is greatly aided by an SD technique for organizing the recall, termed causal loop diagramming. This technique helps the analyst see the elements of the recall as sequences of cause and effect, structured as a set of positive and negative feedback loops.

2. The recall in step 1 releases pent-up energy (cathexis). This places the analyst in the position to write a spirited narrative of the experience. An Engineer’s Story, a narrative of the religious crisis leading to PMU-16, can be found at [<http://world.std.com/~awolpert/gtr17.html>]. For a narrative of PMU-16 only, see the excerpt from An Engineer’s Story at Section III below.)

3. Use other techniques from SD - such as stocks, flows, and auxiliaries, together with one of the SD software packages - to convert the causal loop diagram of step #1 into an SD flow diagram. In the process of choosing the state variables or stocks of the flow diagram for a subjective experience, it will be helpful to determine the intentionalities of the experience. For example, intentionalities of PMU-16 are about mental images and archetypes. They are modeled using state variables or stocks.

4. Establish mathematical relationships between linked variables in the model (e.g., In the model of PMU-16, the intensity of the variable WillingAttention is dependent on the intensity of the variable FearOfDeath). The flow diagram together with the mathematical relationships between the linked variables form a multiloop nonlinear feedback system.

5. Use the resulting flow diagram and its mathematical model – together with an SD software package - to simulate the model's variables. For example, there are 38 variables in the model of PMU-16 at present, 23 of which represent an aspects of consciousness during the ten-hour experience. One can use the software package to display the simulations of sets of variables side-by-side on graphs to get a moment-to-moment view of various aspects of consciousness as a function of time throughout the experience.

6. The recall of the actual experience is called the reference mode. When the simulations of step 5 and the reference mode fail to match, first fine tune the model structure and eventually adjust constants in the equations and manipulate table functions. This is done recursively, recalling at subtler and subtler levels until the sets of simulations accurately match the reference mode. This step takes much time and effort, but, among other things, it succeeds in focusing the analyst’s mind so that he or she can recall finer and finer, second by second details of the experience. Note here that traumatic experiences are retained permanently in episodic memory.

7. Focus on each element of the flow diagram developed in step 6, while at the same time always being aware of the entire flow diagram or map or total structure. This gives a comprehensive focus to the analyst's mind so that his or her thought about core consciousness during the experience can proceed to more and more subtle and deep levels.

8. Study relevant literature and scientific papers to gain additional perspective and depth of insight about the various elements or aspects of consciousness shown in the flow diagram or map of consciousness.

9. Allow intuition to reveal the experience’s essences. Such essences may include, but are not limited to:

- a) The eidon: the flow diagram or noema; and the intentional objects, such as archetypes, mental images, and their relationship to associated hyle.
- b) The reification of consciousness in the body revealed by the physical subreduction.
- c) The reification of consciousness in the body revealed by the psychological or behavioristic subreduction.

10. Allow the meditative mode to collect the intuitions of the meanings of the experience: In the meditative mode the analyst passively watches the work of his or her analytical mode in steps 1 to 6 and watches his or her intuition of essences mode in steps 7 to 9, while always awaiting the emergence of further intuitions that ultimately reveal the meanings of the experience. This meditative mode is always going on automatically in the mind of the seeker of truth during the desperate years of the TFP Reduction.

III. Narrative of the Experience of Purgation and Mystical Union.

[This excerpt from *An Engineer's Story* (Wolpert 1996, 2002) narrates the 16-hour experience of PMU-16. This experience occurred in 1962. The excerpt is preceded by the following events: The engineer had just completed a stressful and technically difficult hi-tech project. He then took a 10 day vacation from his job in the Boston area, traveling to a monastic retreat in Los Angeles. PMU-16 begins at the narrative's third paragraph as the engineer leaves that monastery around noon on Sunday to return to Boston.]

"The Heart Begins to Open

"The purification resulting from renunciation came about by a supreme effort of the will and by Grace, but the second stage of the purification that followed proceeded passively. A force began to manifest itself in me and I could do nothing but pray. My will was powerless to effect this Force. It began in the following way:

"I returned to Southern California at the end of March 1962 for another 10-day vacation, this time after successfully completing the project. I was still running true. I was charged and in a state of openness. On this visit I went to another monastery run by the same Order of monks. Again I found myself in a holy atmosphere. I had a deeply restful, enchanting, profoundly moving week, many times bubbling over with mirth and on one occasion, hearing a beautiful piece of religious music, I was unable to contain a weeping which became a prolonged sobbing from the bottom of my heart.

"Around noon on Sunday I left the monastery to return to Boston for work the next day. I was to take a cab to the Los Angeles airport and then a non-stop flight to Boston. I had plenty of time. The cab stand was about a half-mile away. I was walking down a hill with a small suitcase in my hand. As I walked reflectively and in peace down that hill in the warm and brilliant Southern California sun, my heart slowly began to feel full. My mind was drawn inward. In this mood I arrived at the cab stand. I told the driver my destination. He was a rather cool and playful young man in his early twenties. I noticed that I was very friendly and mirthful - quite unusual for me since I usually never spoke to cab drivers. During the ride I was joking and at times giggling and had a great time for the half hour drive to the airport. At one point the driver asked me if I had had a "joint" before getting into the cab.

"At the airport, however, the warmth or power in my heart began to deepen. I was sitting in the waiting area for the flight but found I could not stay seated. I got up and began to pace the floor of the waiting room. I was well dressed and groomed in a fine conservative suit. Perhaps it was a rather strange sight. The thought occurred to me I was on the verge of a heart attack but I was only thirty and in good health so dismissed the idea.

"The plane was quite full. I took my assigned seat by the window. After the plane circled LA and turned East, the Force in my heart began to get intense. My heart was opening!! There was a struggle going on in my heart. The Force was opening my heart and, because of my fear, my will was waging a losing battle to close it. The opening of my heart brought about a fear - indeed - a terror. At the same time I felt a degree of love for all, forgiveness, brotherhood and sisterhood for all.

"I called for the stewardess. I told her something was wrong with my heart. She got me out to the first aid area and gave me oxygen, but it had no effect. She took me to the first class area where there were fewer passengers and I could be alone. The Force continued to try to open my heart and I was in a state of terror for fear I would die shortly. I kept getting up and walking to the drinking fountain to quench the fire in my breast. I must have drunk at least two gallons of water during the five and one-half hour flight.

"A few times the stewardess came by to see how I was. Once she sat down next to me. She seemed quite curious about me. She was about 24 or 26. Under the ceiling spotlight I could see her features were delicate but her beauty had now passed its peak. There were the first signs of tension wrinkles around her eyes and mouth. Close up I could sense something about her that had gone cold and there was a sadness underneath her makeup. She was neglecting what I could see was a precious soul. In the course of our quiet conversation I told her, in a somewhat oracular way, 'Please leave this terrible job.' She asked me why I thought it was so terrible. I said, in effect, she was being paid to be pleasant and gay to the passengers even though her heart and soul didn't feel it any more. She needed an honest job. With my heart so open, I knew my intuition was sure and I could see these things clearly, quite in the same way that the lay of the land can be seen and understood better when standing at an elevated place. Under ordinary circumstances such a conversation would have set the stewardess' teeth on edge, but with my heart so open she seemed to sense my good will and took what I said to heart.

"Nevertheless, when I arrived in Boston about 10:30pm, I was met by a well-built and rather serious airport state police officer. He was about 35 or 40 years old. He escorted me from the plane ahead of the others and led me to the airport shelter. Normally I was rather aloof from police officers, indeed I didn't like authority of any kind, but when the officer met me my heart was so open I felt all men were my brothers. As I walked aside of him to the shelter, I found myself putting my arm around his broad shoulders I became aware of the gun at his holster but it made no difference to me. In the state of mind I was in, I felt toward him like toward an elder, beloved brother meeting me at the plane. I chatted with him and thanked him for his trouble and great courtesy and assistance. I told him I had just left a monastery and was overwhelmed by being in a crowd of people and that I would be alright once I got home. Besides being an optimistic prognosis to calm myself it also seemed to be an appropriate way of explaining my openness and feelings of brotherhood and also of avoiding being detained. Ordinarily this tough, no-nonsense police officer would have given me a difficult time but instead, like the stewardess, he seemed to sense the integrity of my feelings.

The Dark Night of the Soul: The Heart is Purified and Prepared for the Culminating Experience

"I took a cab and arrived about 11pm at my South End lodgings. They consisted of two rooms on the second floor of an almost deserted rooming house overlooking the extensive federal housing project near the Cathedral. The dull red brick buildings and barren clothes-lines at the edge of the project could be seen from my front window by the light of the street lamps. The window faced a large, tree-lined, but neglected, park called Blackstone Square. Next door was a

Syrian Church with a domed roof overhung by a huge tree now bare of leaves. A light quietly emanating from the ornate glass window in the dome soothed my soul as I paced the rooms.

"Finally I was alone. I lay down on my bed. I knew very little about the writings of the mystics at the time. I did not know that I was now entering the Refiner's Fire or the Dark Night of the Soul that would purify my heart and make me fit for Union with God.

"But who may abide the day of His coming,
And who shall stand when He appeareth?
For He is like a Refiner's Fire." Malachi 3.2

"The events in the cab and on the plane were the beginning but the Dark Night of the Soul began in earnest when I laid down on my bed. As I have said, the fire in the heart led to the opening of the heart. The heart continued to open slowly and inexorably, step by step, like a flower. As it did, it produced forgiveness - forgiveness of those I felt had wronged me, who had teased and mocked me. These vexations departed from my heart one by one as they came to my mind - like water drops from a lotus leaf. At the same time there came to my mind, one by one, things I had done which lay buried in my consciousness undermining my life. I prayed for the Lord to forgive me and He did so, one by one.

"Simultaneous with this forgiveness was terror and joy. I was in terror of losing my life. The Fire or Force was opening my heart and I was naturally terrified since my heart had never been open that wide. Fear keeps the heart closed so if the heart is opened beyond its normal position it produces terror. To alleviate this terror I had to forgive. It allowed the heart to tolerate being opened at that degree of opening. As this proceeded, hatred slowly left my heart and it slowly became more purified.

"Then the heart opened more. More terror. More sin and error came to my mind one by one and I asked the Lord to forgive me and He did so one by one. The terror lessened. The heart opened wider. More joy. More terror. More prayers. And as the heart opened ever wider my joy increased to ecstasy or rapture.

"At the same time I was dealing with another aspect of the terror of losing my life: the dread or remorse that I would lose my worldly ties. I would die in this lonely place never to see my dear ones again. My worldly hopes and dreams would end here never to be fulfilled. Clinging to life, I begged the Lord, "Oh save me. Let me live."

"This Prayer of Salvation during such an emotional crisis deepened my attachment to God with Form. To confirm and permanently establish this attachment I made a Covenant with God with Form. Once this firm attachment was made I could remove myself from worldly attachments and all its associated complexities and my fears could more easily be borne. Only the most simple and fundamental structures of the mind-heart system were now being employed. This stabilized my mind and enabled my heart to continue the process of opening. It opened amidst joy, ecstasy, terror and anxiety while at the same time there was a fierce attention of my mind and being on that which was within.

The Great Silence

"Gradually, then, over a period of about an hour this Refiner's Fire succeeded in bringing about an opening and purifying of my heart and bringing along with it peace to my conscience. As a result, my thinking process was able to rest. As this occurred, all of my mind - all of my being - was freed to focus on the present moment within where there existed the blessed open heart. In this undistracted, dramatic state my mind became one pointed. That was its natural, purified state.

Then, suddenly, all action within me ceased. The pumping of my blood, the beating of my heart, the quivering or hum of my nerves (or perhaps the latter was my body shaking) ceased quite abruptly and I was left in a state of profound silence. I had crossed over to the Great Silence.

"In that state I no longer felt the previous terror, joy, or anxiety. Instead I felt I had come into my True Home, where I was Free. I had left the World and was in a state of Pure Being. In that state my mind could not think; it could only observe inwardly and record. I had no power to recall or analyze. All of my mind and being continued to focus on the present moment within during the transition into the Silence and at the Silence. In that state of mind and being, my system was satisfied that it had penetrated to the core. Its energy then ran out. It let go and I fell into a swoon, a deep and abiding sleep.

"It was the silent night, the holy night.

"Presently I awoke. It was daybreak. All was peace, bliss. Within me lapped the Living Waters: a serene, wave-like energy of such a subtle frequency that it was capable of flowing evenly throughout my head and body as if they were both made of one substance. I was in such a state of peace and bliss, pervaded by a feeling of inner goodness, that the experience has led me to believe this is what is known as Heaven. My sincere and earnest search for the Truth during the previous five years had finally been satisfied. I no longer felt that I must seek the ground of my life, the base upon which to build a sound life. I felt I had found the Ground of My Being: the philosopher's stone, the Formless, the Timeless, the Unconditioned, Knowledge, Bliss.

"This I now feel is God: no more, no less. Reflection on those blessed hours since April 1962 has led me to that conclusion."

IV. Applying Transcendental Feedback Phenomenology (TFP) to make a TFP Reduction of core consciousness during (PMU-16).

IV.A: Eidetic Reduction: How the essences or eidos for PMU-16 are obtained.

In this section the noema (IV.A.1) and somatosensory mental imagery (IV.A.2) for PMU-16 will emerge from the eidetic reduction. The archetype of Death, which is also an essence or eidos and thus a part of the eidetic reduction, will only be briefly discussed in the Future Work Section (IV.D.1.a) because it has not yet been incorporated into the flow diagram model or noema.

IV.A.1: Figure 1. The noema or flow diagram: A STELLA II system dynamics model for core consciousness during purification or Dark Night:

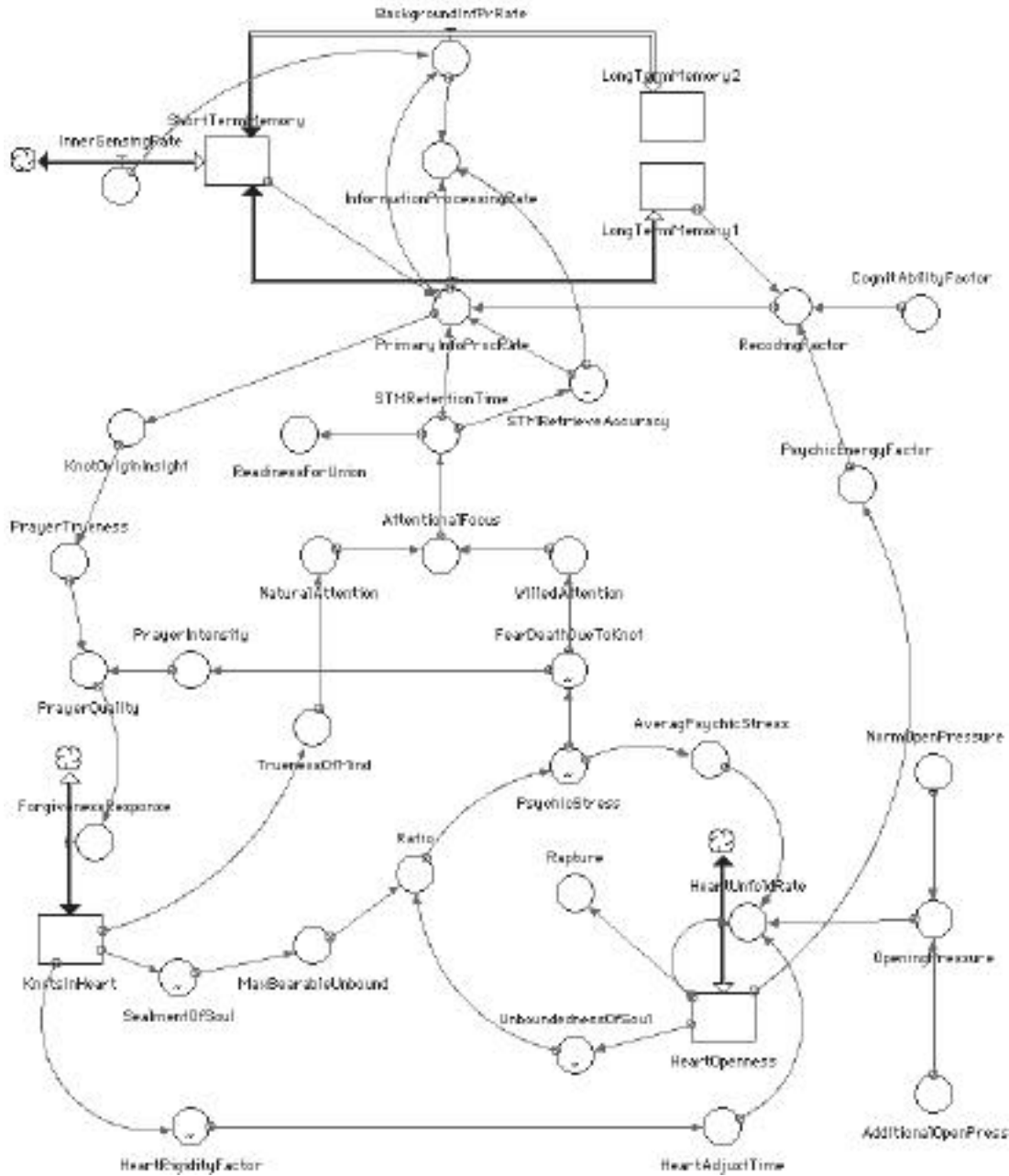
The present SD flow diagram for PMU-16 is shown in Figure 1 on the next page. Husserl's name for the flow diagram is noema; the rates, auxiliaries, and table functions are called hyle (Follesdal 1998). Stocks or state variables are associated with intentional objects. For example, the two stocks, KnotsInHeart and HeartOpeness, together represent the core of an intentional object, called a somatosensory mental image. The mathematical model associated with the flow diagram is given in Appendix A2.

a) The architecture of the flow diagram:

The architecture of the flow diagram has a quickly operating (milleseconds to seconds) parallel processing cognitive mechanism in the upper sector that interacts with a relatively slow system (seconds to hours) in the lower sector that is embodied. The former originates in the thalamocortical system (see Figure 4) and is nonconscious; the latter originates in the limbic-brainstem and neurocirculatory system and is mostly conscious. Jackendoff (1987) called the former the computational mind and the latter the phenomenological mind. Communication

between these two sectors of the model is provided by the transducers or transition variables, WilledAttention and PrayerTrueness. These transducers are conscious, but didn't appear to really be under my control. For example, fear was driving willed attention.

Figure 1: Flow diagram or noema for PMU-16:



Representations for my consciousness are located in the lower sector. The core of the somatosensory mental image is represented by the stocks, HeartOpenness and KnotsInHeart. The hyletic variables include such variables as FearDeathDueToKnot, PsychicStress, ForgivenessResponse, etc., and the set of feedback loops associated with them. The 11 variables representing the nonconscious cognitive mechanism are located in the upper part of the model, above a semicircle that goes just above KnotOriginInsight, AttentionalFocus, and

PsychicEnergyFactor. This cognitive mechanism sector is mostly invented. It is only modeled phenomenologically where it is designed to integrate with the phenomenological sector. It incorporates the concept of redundancy from engineering: The background processor is always available in case of a temporary failure in the primary processor. The cognitive mechanism also incorporates Miller's (1956) concepts from information theory concerning channel capacity, recoding, and 'the magical number seven.' In addition it also incorporates the retrieval accuracy of short term memory concept developed by Schouten and Bekker (1967) and critiqued by Wickelgren (1979) and Luce (1986).

In lieu of definitions for the core consciousness variables (see Section I.A.6), tentative definitions for each are given in the mathematical model shown in Appendix A2. The constants in the equations and the table functions have been tuned to give an accurate simulation of my consciousness during the 10-hour Dark Night or purgative stage right up to the moment just preceding mystical union. (See step 6 of the 10-step TFP procedure in Section II.) Of the 38 variables, 23 are aspects of core consciousness. The simulations of these 23 aspects of consciousness are all simultaneous. For example, simultaneously, the mystic-to-be is conscious of various changing aspects of his core consciousness: an opening pressure within his heart, an opening heart, the presence of knots in his heart, a rising intensity of fear of death, psychic stress, intensity of his prayer, attentional focus, etc. Neuroimaging confirms this: Many parts of the brain are operating simultaneously during an experience.

b) Dynamics associated with PMU-16:

When I compare the maximum openness of my heart during PMU-16 with its openness in my normal life, I estimate that at Time = 0 HeartOpenness was stable at 5% of maximum possible openness. In addition I estimate a stable set of twelve KnotsInHeart at Time = 0. These initial values are shown at Time = 0 in Figure 2 on the next page. Then, at Time = 0 the phenomenological mind undergoes a change in such a way that OpeningPressure jumps from its NormalOpeningPressure of 5% all the way up to 80%. This is reflected by the fact that I have programmed AdditionalOpeningPressure to go from 0 to 75% at Time = 0. To understand the initial dynamics of the model at this point, keep in mind that the flow diagram in Figure 1 and its mathematical model that produces the simulations for the 10-hour experience of PMU-16 is only one subdivision of what will eventually be a larger multisubdivision flow diagram of either the five-year religious crisis or the entire 70+ year lifetime. Therefore, I assume the step input in AdditionalOpeningPressure comes from either a shift in loop dominance (Forrester 1985) or a bifurcation (Strogatz 1994) associated with one of the projected, but not yet modeled, adjacent subdivisions. This step input causes limbic-brain stem variables in Figure 1, such as HeartOpenness, PsychicStress, FearDeathDueToKnot, KnotsInHeart and the like, to change from a stable state to a 12-hour transient state, all coordinated by the mental imagery and the memories at the core of the feedback structure.

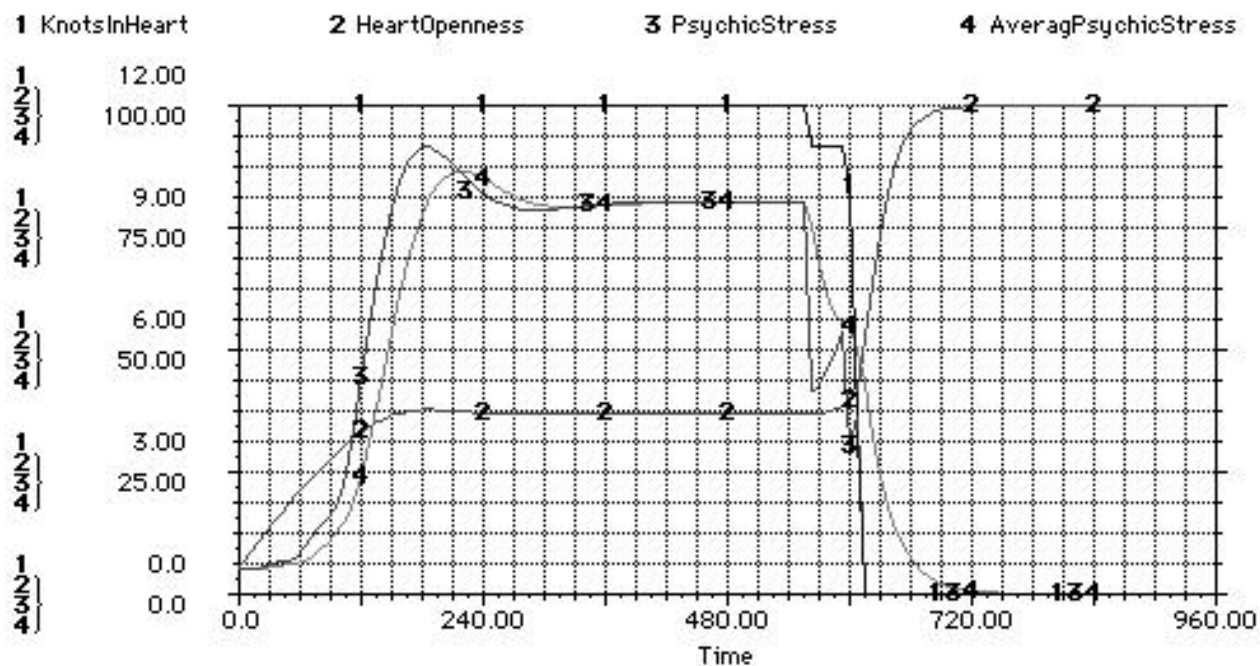
KnotsInHeart, HeartOpenness, and the three memories in the cognitive mechanism are modeled using what mathematicians call state variables. In SD terminology they are called stocks or levels or accumulations. Each stock has the characteristic of accumulation, analogous to a bathtub accumulating water. Example: 'How open is the heart at this moment?' is analogous to 'How full of water is the bathtub now?' ForgivenessResponse, HeartUnfoldmentRate, PrimaryInformationProcessingRate, and BackgroundInformationProcessingRate are examples of rates. Each acts like either the bathtub's inlet or outlet faucet. In a STELLA II (Richmond 1992) display of the flow diagram, such as in Figure 1 above, the direction of flow of the rate is indicated by the direction of the unshaded arrow. For example, HeartUnfoldmentRate causes HeartOpenness to increase its opening. It acts like a bathtub inlet faucet. Whereas, ForgivenessResponse acts like a

drain, causing KnotsInHeart to decrease its number of knots. The smaller arrows associated with auxiliaries, rates, and table functions indicate causation. For example, the arrows coming from the auxiliary variables PrayerTrueness and PrayerIntensity and pointing at the auxiliary PrayerQuality indicate that the first two variables determine the value of PrayerQuality at any time. Specifically, the mathematical model gives the following definition of PrayerQuality:

$$\text{PrayerQuality} = 0.5 * (\text{PrayerTrueness} + \text{PrayerIntensity}) \dots \dots \dots \text{equation 1}$$

When PrayerQuality reaches 100%, which is the 'forgiveness threshold', the ForgivenessResponse is triggered and one KnotInHeart is removed in a ratchet-like fashion. Action then shifts to a negative feedback loop associated with HeartOpenness: The removal of this one knot has the effect of both slightly unsealing the soul (inverse of SealmentOfSoul) and slightly loosening the restricted or rigid or tight heart (HeartRigidityFactor). The former causes PsychicStress to decrease rapidly, which then causes the HeartUnfoldmentRate valve to open. This causes HeartOpenness to fill or open further, causing PsychicStress to rise again as the heart begins to encounter the next knot. As a result FearDeathDueToKnot, and then PrayerIntensity, and WillfulAttention, begin to rise again. The rise in fear and attention leads to a shift in loop dominance: Action shifts to the cognitive mechanism, which acts in this particular instance as part of a negative feedback loop concerned with problem solving (Ellis 1995.) The psychic energy, fear, and attention driven PrimaryInformationProcessingRate in the cognitive mechanism speeds up, leading to an increase in KnotOriginInsight. This increasing insight is concerned with the solution to the following problem: What is the particular sin, guilt, or hatred that is at the origin of this next knot? The gradual solution to this problem and its gradual acceptance lead to greater PrayerTrueness and then increasing PrayerQuality until the latter reaches the 'forgiveness threshold,' triggering the ForgivenessResponse again. Then, the next knot cycle begins.

Figure 2: 960 minute simulation of 4 of the 23 aspects of core consciousness during PMU-16. (This experience is narrated in Section III:)



Estimated timetable for the PMU-16 simulations above:

- 1) 0 minute mark to the 60 minute mark: The simulation begins at noon Pacific time. It starts with a 15 minute walk from the monastery to the cab stand, during which the heart began to open, and extends through to the arrival of the cab at the Los Angeles airport.
- 2) 60 minute mark to the 120 minute mark: The one-hour wait at the airport.
- 3) 120 minute mark to the 450 minute mark: The flight from LA to Boston, leaving LA at about 2:00pm and arriving at Logan airport around 10:30pm Eastern time.
- 4) 450 minute mark to the 555 minute mark: The trip from the airport to my apartment plus about one-hour of preliminaries - thinking, pacing the floor, etc. - before lying down on my bed.
- 5) 555 minute mark to the 615 minute mark: The unstable period during which the 12 KnotsInHeart are purged.
- 6) Mystical union, lasting anywhere between 4 to 7 seconds, occurred around the 617 minute mark.
- 7) 617 minute mark to the 960 minute mark: Deep sleep.
- 8) Awaken to the divine state at the 960 minute mark.

c) A closer look at the knot removal mechanism:

Figure 3: Two-minute simulations of four of the 23 aspects of core consciousness during the 60 minute knot removal period of the Dark Night of the Soul or purgation:

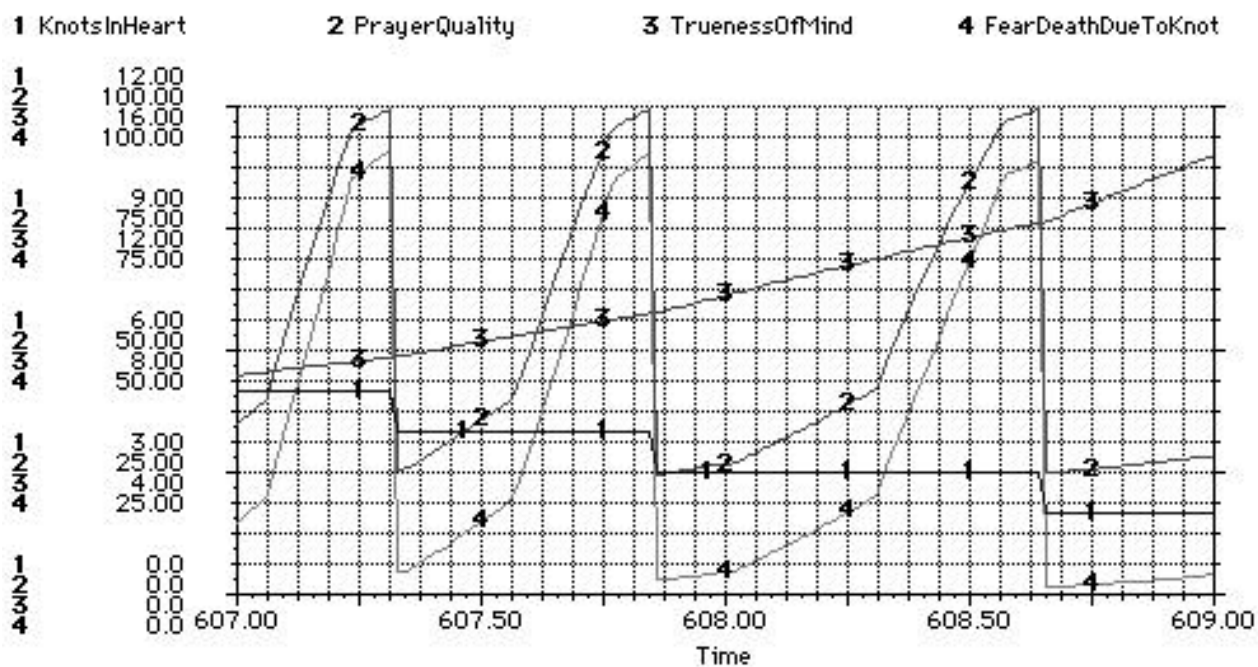


Figure 3 above shows a simulation of an intense two-minute period of PMU-16. It is part of the 60 minute unstable period (555 to 615 minute mark). During those two minutes the 5th, 4th, and 3rd knots in the heart are purged. For example, the 4th from last knot is removed at the 607.84 minute mark as shown by curve 1. Then begins the 3rd from last knot period, a 47 second period from the 607.84 to the 608.63 minute mark, during which curve 4, FearDeathDueToKnot, rises because of rising PsychicStress caused by the heart opening against a knot restriction. This fear

and trembling associated with a rising $\text{FearDeathDueToKnot}$ leads to a rise in PrayerIntensity . When a rising PrayerIntensity approaches 100% it is like the focused prayer of a drowning man who believes that God will save him at the last moment if only his prayer is true. In behavioristic terms this “sets” the $\text{ForgivenessResponse}$. PrayerTrueness represents the insightful quality of focused prayer. [Its simulation and PrayerIntensity 's simulation are not shown in Figure 3.] PrayerQuality , shown as curve 2, is made up of both PrayerIntensity and PrayerTrueness [see equation 1].

At the end of this 47 second period - just before the removal of the 3rd from last knot at the 608.63 minute mark - the culminating point of the 3rd knot removal period occurs when, in fear and trembling, the mystic-to-be accepts in the depths of his heart the deep insight into his sin, hatred, or guilt. This high value of PrayerTrueness is what is needed to bring PrayerQuality to 100%, the 'forgiveness threshold,' and trigger the quick, on/off action of the $\text{ForgivenessResponse}$: This causes the removal of one knot, the 3rd from last knot, at the 608.63 minute mark.

Then PsychicStress and $\text{FearDeathDueToKnot}$ drop suddenly from a very high value all the way down to close to zero. At that relatively peaceful, blissful, and rapturous state there is thankfulness to the Lord. This thankfulness comes about because the blessed Lord has answered his earnest prayer, granted forgiveness, and thus saved the pilgrim from impending death due to the stress, fear, and anxiety caused by the presence of the third from last knot. The Christian mystic, John of the Cross (1574), gives us an idea of this rapture and thankfulness to God in an excerpt from his poem, *Dark Night of the Soul*:

"Forgetful of myself,
My head reclined on my Beloved,
The world was gone
And all my cares at rest,
Forgotten all my grief among the lilies."

Then the 2nd or next to last knot period begins, as the cycle repeats itself in this purgation or dark night of the soul. Meanwhile, TruenessOfMind (curve 3) is rising inexorably as the knots are purged, leading eventually to mystical union after the last knot is removed.

d) Dynamics associated with mystical union (tentative):

The flow diagram incorporates an insight that is based on my experience of PMU-16: Mystical union cannot occur by WilledAttention . It can only occur when the heart has been purged of all knots. This insight brings into play a concept I am calling NaturalAttention . It works like this: Toward the end of the purgation at the 615 minute mark the last or twelfth knot had been purged from my heart and the heart was opening, paced by a delay time in the variable, TruenessOfMind . Because $\text{KnotsInHeart} = 0$ now, the intensity of PsychicStress and hence $\text{FearDeathDueToKnot}$ and hence WilledAttention had all dropped to zero. AttentionalFocus was increasing now only because of a rise in NaturalAttention . The rise in NaturalAttention had resulted from a pure, knot-free heart ($\text{KnotsInHeart} = 0$) that had caused TruenessOfMind to go into a deep and powerful exponential rise. This resulted in an increasing NaturalAttention and then increasing AttentionalFocus , which caused a steadily decreasing of the STMRetentionTime in short term memory (STM) or working memory. As the STMRetentionTime decreased, RetrievalAccuracy associated with short term memory decreased until it eventually reached the 'insufficient accuracy' shutoff point, triggering the $\text{PrimaryInformationProcessor}$ in the cognitive mechanism to shut down at the 617 minute mark. However, because of redundancy built into the cognitive mechanism, it immediately switched over to the $\text{BackgroundProcessor}$. The shutdown in the PrimaryProcessor caused the cessation of all sentience or inner sense, including the inner sense

of time, the ability to think, to imagine, to will, and to make immediate recall. My conjecture here is that these are associated solely with that part of the mind's operation that is processed by what I am calling the primary processor. At the moment of shutdown, and for the next 4 to 7 seconds, I found myself in mystical union. This is indicated when the value of the artificial output variable, ReadinessForUnion, goes off to a very high value.

e) The background processor (tentative):

The cessation of operation of the primary processor during the state of mystical union left me without the sense of inner time and the ability to think, imagine, will, and make immediate recall. However, during this state the cognitive system associated with the background processor - working automatically - allows me to be timelessly aware of the holy Ground for a duration of from 4 to 7 seconds. This state of unsurpassable greatness is experienced within the heart and soul. The name the experiencer gives for this unsurpassable greatness depends on his or her native culture. The experience is the same; the name varies: God, Brahman, Allah, The Holy Grail, etc. The background processor processes and records into LongTermMemory2 details about the experiencer's awareness of the divine Ground. Later, when I descended from the state of mystical union and correspondingly the primary processor returned to operation, I could use the primary processor to recall the information recorded by the background processor about mystical union. I then had the opportunity to endlessly examine that experience, because the information processed and stored in LongTermMemory2 is preconscious. Such information is permanently available for conscious recall.

Not only is the mind aware of the divine Ground in mystical union, it is also apprehending the ego-ideal or what Plato called the Forms: supreme trueness, freedom, integrity, grounding, love. As the mind is aware of and apprehending the state of mystical union, the cognitive mechanism is utilizing what I am calling the background processor. The watcher that is aware of and apprehends consciousness during mystical union has been known of from time immemorial. Hindus have called it the purusha or saksin (Hiriyanna 1932); ancient Greeks have called it nous (Guthrie 1978, Aristotle 1941); Spinoza (1982) called it: 'that part of the mind that is eternal.'

IV.A.2: The somatosensory mental imagery in the lower sector of the flow diagram:

a) How somatosensory mental imagery appears in the mind:

The following quote from Sherrington (1906) gives the key neurophysiological basis for the somatosensory mental image associated with PMU-16:

"...the contractions of particular sets of muscles in the heart must entail the suppression of activity of other muscles for coordinated movements of the heart to emerge."

Inhibition or suppression of muscles in the heart are caused by neural signaling originating in the parasympathetic nervous system. These muscles could possibly be associated with neural stretch receptors located at one or more locations or regions of the heart. The action of these muscles were represented by my imagination simply as a knot in my heart. The SD model, via the flow diagram in Figure 1, converts that suppression of muscles to the stock or state variable, KnotsInHeart. The contraction of muscles, which cause opening movements in the heart, was represented by my imagination as an opening of the heart. SD converts that image of an opening heart to the stock, HeartOpenness. These contractions are caused by neural signaling originating in the sympathetic nervous system. The imagination then generates a somatosensory mental image (not a visual mental image). This somatosensory mental image was one of the intentional objects of my consciousness during PMU-16.

The image was both dynamic and orderly, because what Damasio (1999) calls the proto-self is constantly monitoring the body's inner states. In this case the proto-self is monitoring the movements of these sets of heart muscles. The imagination, which perhaps also gets signals from the protoself, then generates an image that has its biological correlates in antagonistic sets of heart muscles. This physical basis for the mental image gives orderliness to the dynamic functioning of the somatosensory mental imagery, allowing it to be modeled using SD. It is the internal analogue to Helmholtz's (1971) insights on the orderliness of dynamic visual mental imagery produced by moving external objects.

Thought and imagination then add more detail to the somatosensory mental image: My mostly nonconscious understanding had spent some period of time on the airplane from LA to Boston and in my rooms in Boston [see the narrative of PMU-16 in Section III] feeling and exploring the beginning of this novel somatosensory mental image. Eventually enough feeling-type data was collected in memory to allow my imagination to - mostly nonconsciously - plan or create the following scenario: The dynamics of the entire mental image that appears in my mind is an opening heart that is restrained by a sequence of knots in my heart that need to be untied one by one as my heart opens. These knots are to be represented by my imagination as a collection of sins, guilts, hatreds, or grievous errors. The untying is to be accomplished through prayer and forgiveness. This hyletic, feeling-type data, is incorporated into the feedback loops associated with the core of the image, KnotsInHeart and HeartOpenness, to form the rich somatosensory mental imagery for PMU-16. Thus, the mental image is one of the basic building blocks of consciousness (Ellis 1995) during PMU-16. The other mental image appears to be the archetype of Death.

b) Purgation's critical fork in the road to mystical union: The relationship of mental imagery and problem solving to the stabilization of the anxious and overstressed mind.

By creating the above scenario and its associated dynamic somatosensory mental image, my imagination had designed a structure with enough hyletic leeway in it to enable a precise integration of the mental imagery with the movements of my antagonistic heart muscles. With that flexible structure available, my mind was no longer overwhelmed by the moment to moment dynamics. Most of the huge amounts of novel information I was dealing with during PMU-16 could be "compressed and stored" in the mental image.

Now, I could focus on the most pressing problems associated with PMU-16. These pressing problems desperately needed immediate attention:

- 1) The anxiety, dread, and terror associated with the knots in the heart and the possibility of my approaching death at any moment.
- 2) My sin, guilt, grievous errors, or hatreds associated with the knots, that lay deep within my conscience.
- 3) My prayers to the Lord, like prayers of a drowning person going down for the last time.
- 4) My awareness that I was in the presence of an image or archetype (Jung 1967) of Death: The archetype that appeared was a silent, watchful, divine, dark, austere, male Judge. This Judge, who I felt was a close and intimate agent of the Lord, could grant me forgiveness and pardon me from death, if He saw fit to do so. But He was a firm taskmaster: He required that my prayers to the Lord be both true and backed up by all my heart and soul. [This is the image or archetype of Death missing from Figure 1 that will be included later in a refined version of the model.]

My conjecture is that the somatosensory mental image and the archetype, with their ability to compress and store information for the scenario, together with the grace of being granted forgiveness, led me to the way toward mystical union rather than the way toward a psychotic episode. (Deikman 1971).

c) Problem solving and the emergence of the mental image:

Further reflections on the experience of PMU-16 reveal that core consciousness and its associated thought, emotion, feeling, and somatosensory mental imagery arose in my mind in response to a problem (Ellis 1995). The problem was not pain, just a hard-to-describe intense opening pressure. The pressing initial problem I presented to myself was: What has caused this arousal in my heart? Then, in great anxiety I asked myself: How long will it last? Will it ever end? Am I going to die? Without these problems the stress, fear, and anxiety components of my consciousness, perhaps, would not have arisen. Perhaps, my state of mind would have remained relatively unconscious and problem free. Perhaps, this problem solving is what causes the cognitive mechanism (thalamocortical system) and the phenomenal mind (limbic brainstem and neurocirculatory system) to work together to produce dynamic consciousness.

d) Intentional inexistence:

The somatosensory mental image for PMU-16, the heart opening against knots, brings out the subtlety of the mind and imagination: This somatosensory mental image is called an intentional object, because throughout the 10-hours of purgation consciousness was essentially about the mental image of the heart opening against knots. This mental or intentional object is not a physical object. Brentano (1874) called this characteristic of intentional objects 'intentional inexistence.' However, one must be careful here: Eventually, when the physical reduction of PMU-16 was performed, as explained above, it revealed that the mental image does ultimately have physical or neural correlates: Its reification in antagonistic heart muscles. Nevertheless, the mental image itself does not physically exist as such. It only exists intentionally. Hence, it has intentional inexistence. (Let me note in passing that from the above insights I take the position that all of consciousness, including mental images and archetypes, must ultimately have neurophysiological correlates.)

IV.B: Physical Subreduction.

(A neurophysiologist, rather than a rank amateur like myself, could greatly improve this section.)

1) The variables in the lower sector of the model represent consciousness or the phenomenological mind. These variables represent the feeling that the heart is opening against a restriction or knot. The knot causes restrictions to the opening of the heart and causes stress. When stress is rapidly rising to high levels, anxiety (fear without an object) and fear of death develops. This leads to prayer. Ten hours later at the end of the dark night all restrictions or knots have been released through forgiveness and the heart is fully open; all stress, fear, and anxiety have vanished. What could be the neurophysiological correlates of this deep traumatic sequence?

Neurophysiologists, such as LeDoux (1996), now know that stress, fear, and anxiety have their biological correlates in an archaic part of the brain called the limbic-brainstem system, particularly the amygdala and its central and lateral nucleuses and the stria terminalis. The central nucleus of the amygdala has projections to the autonomic nervous system, including nerves associated with the heart, particularly the vagus nerve. However, the sequence for purgation goes in the opposite direction: During my experience of purgation the heart opened against a restriction first, then stress, anxiety, and fear arose. Nevertheless, because of the bidirectionality of neuronal signaling in the amygdala (Guyton 1991), it is possible that there are also projections from the vagus nerve to the amygdala. It may be possible that this prediction could be tested (see Section IV.D.3 below).

2) The upper sector of the model, called the computational mind by Jackendoff (1987), represents thought processing. This cognitive mechanism includes variables such as processing rate, working memory, and retention time in working memory. These have their neural correlates in the thalamocortical system.

3) The transducers are intermediaries between the above two sectors: These transducers bring about an integration and coordination between the two sectors. They are represented by the two key variables for prayer and attention, PrayerTrueness and AttentionalFocus. According to LaBerge (1995), attentional processing is associated with the superior colliculus and the thalamus.

4) Conjecture concerning blood flow in the vascular network: During stress, fear, and anxiety hormones [chemicals, peptides] are released. These hormones could increase cardiac output, dilate blood vessels, increase blood pressure, and increase oxygenization of the lungs. This would allow the cardiovascular system to greatly increase its ability to irrigate the organism with nutrients, remove debris, and, hence, bring the system up to optimum functionality. This would have the purpose of preparing the organism and its nervous system for the experience of mystical union. This conjecture is prompted by the fact that I was internally driven to drink huge amounts of water during purgation while I was on the flight from Los Angeles to Boston [see the excerpt from An Engineer's Story at Section III]. A Guyton Model analysis could eventually confirm or reject this conjecture. The Guyton (1972) model was discussed in Section I.B.2.

IV.C: Psychological or Behavioristic Subreduction.

1) Conditioned learning: The flow diagram for PMU-16 details the autonomous mental imagery, ideation, and mediating processes between a stimulus and a response that provides the mystic-to-be with the conditioned learning needed to become a mystic (compare Figure 1 with Figure 4). There are an estimated twelve cycles of reinforced autonomous conditioned learning that are centered around the ForgivenessResponse. These twelve cycles of purgation are nested within one cycle of consummatory reinforcement due to mystical union.

The sensory receptor of the stimulus (see Figure 4) is AdditionalOpeningPressure. It sends signals which cause a somatosensory stimulation of heart muscles driven by both the parasympathetic and the sympathetic system. This stimulation tends to increase cardiac output (HeartOpenness). Of course, the parasympathetic system opposes this tendency (KnotsInHeart). This antagonistic stimulation generates the kind of somatosensory mental imagery and its associated ideation and mediating processes between the autonomous stimulation and the ForgivenessResponse that produces the conditioned learning.

Perhaps, the most critical of PMU-16's autonomous ideations and mediating processes revolves around the ForgivenessResponse. For example, the threshold or limen for the ForgivenessResponse is at PrayerQuality = 100%. A rise in PrayerIntensity occurs first, but even a high value of PrayerIntensity of around 80% to 100% of maximum is still subliminal. It does not evoke a response, because the equation for PrayerQuality in the mathematical model indicates that for the ForgivenessResponse to occur there is need for a summation at the synapses (see eq. 1):

Thus, PrayerIntensity 'sets' the ForgivenessResponse. That is, it is set in the direction of finding a way to remove the knot in the heart. Then comes the increasing subtlety of ideation originating in the central nervous system (CNS) which is associated with PrayerTrueness. PrayerTrueness incorporates ideations of sin, guilt, etc. Such ideation aids in the eventually elevation of PrayerQuality until it reaches the ForgivenessResponse threshold and elicits the response, which is the removal of a 'knot in the heart.'

Woodworth (1911) clarified the above sequence for the case of a cat trying to get out of a cage to get food: (words in brackets show the analogy of the cat's dilemma with the mystic-to-be's dilemma during PMU-16)

"The animal desires ... to get out and reach the food [removal of knots in heart]. Whatever be his consciousness, his behavior shows that he is, as an organism, set in that direction [PrayerIntensity aimed at removing a knot]. This adjustment [set] persists till the motor reaction is consummated [PrayerTrueness rises until PrayerQuality reaches 100% and the

ForgivenessResponse occurs], it is the driving force in the unremitting efforts of the animal to attain the desired end [removal of knot]. His reactions are, therefore, the joint result of the adjustment [set, PrayerIntensity] and of stimuli from various features of the cage [problem solving, PrayerTrueness]. Each single reaction tends to become associated with the adjustment [set]."

The learning is reinforced after the ForgivenessResponse occurs by the reduction in stress (PsychicStress), fear (FearOfDeath), and the increase of rapture (Rapture). This same kind of conditioned learning is repeated for each of the 12 knots removed during the 10-hours of purgation. In conjunction with this, a structured memory trace of new neural connections is made (Hebb 1958).

In summary, the mystic-to-be undergoes the following conditioned learning:

- a) The reinforced conditioned learning about the purgation-based aspects of the religious life: a life based on heart-centered prayer and forgiveness of sin, hatreds, guilt, etc.
- b) This conditioned learning is confirmed through consummatory reinforcement by the experience of the unsurpassable greatness during mystical union.

2) Unconditioned learning or revelation: Mystical union not only provides consummatory reinforcement for the conditioned learning of purgation. It also provides unconditioned learning! The unconditioned learning is about the revelation of what Plato called the Forms or what is referred to in psychiatry as the ego-ideal: The mystic-to-be learns by experiencing the supreme form of freedom, trueness, integrity, love of God, purity and depth of character, etc. These Forms serve as reference for the mystic. They have the potential to guide and be a standard for his or her life and his or her judgements from that moment forward.

IV.D: Future work:

1) Refinements of the flow diagram or noema: Much progress still must be made on the flow diagram for purgation. Here are two such improvements:

a) Any system dynamicist will note that there are at least two missing stocks or state variables at the center of the phenomenological mind sector of Figure 1. [The important second mental image, the archetype of Death, will be modeled into Figure 1. It was discussed briefly at Sections IV.A.2.b and I.B.1]

b) Work by cognitive neuroscientists on the cognitive mechanism over the past few decades (Simon 1993) could be incorporated into the model, expanding the complexity and detail of that sector [see Section IV.A.1.a]. To incorporate this new and more complex cognitive mechanism into the flow diagram, the lower sector of Figure 1 could be used as a "test stand." Constants in the equations for the new cognitive mechanism could be tuned to obtain the reference mode. (This tuning is steps 5 and 6 of the 10-step TFP recursion listed in Section II.)

2) Additional Subreductions:

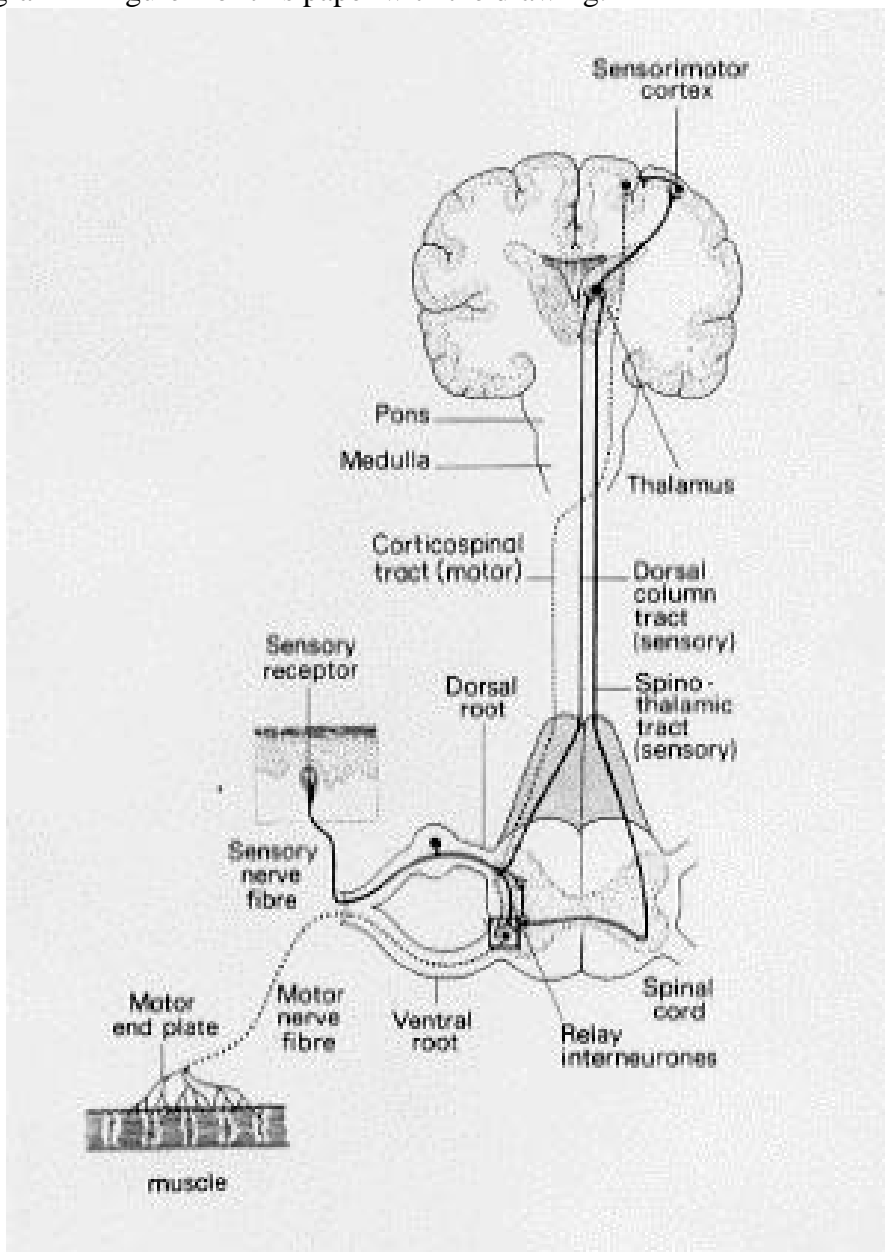
Additional, but tentative, subreductions include the visceral subreduction and the nonlinear dynamics subreductions. These tentative subreductions can be viewed in their present form at [<http://world.std.com/~awolpert>]

3) Testing the Model for PMU-16: The flow diagram for PMU-16 gives indications of the feedback patterns of the neurophysiological correlates of consciousness during a stressful situation and could give insights into neurobiological feedback circuitry during stress. For example, recall that during PMU-16 the heart opened first [vagus]; then stress and fear [amygdala] arose. It is known only that projections exist from the amygdala to the vagus (Guyton 1991). So a test of the TFP Reduction of PMU-16 could be made by using neuroimaging to see if my prediction of bidirectionality (Guyton 1991) actually exists between the amygdala and the vagus.

Figure 4: Basic circuits in the Central Nervous System (CNS):

[Modification of Fig 1.3 from Stein (1982)]

The drawing below gives insights into how a somatosensory mental image could be reified in the CNS. It indicates how a forgiveness response located in the spinal cord, antagonistic heart muscles, and the thalamocortical system could work together to condition the mystic: Compare the flow diagram in Figure 1 of this paper with the drawing.



IV.E: Toward the Meaning of the Experience:

The TFP Reduction of purgation and mystical union (PMU-16) includes the eidetic reduction and the physical and psychological or behavioristic subreductions. These meditations on the TFP Reduction have enabled me to intuit the following meanings of the experience. It was toward insights like those that follow that my mind has been directed ever since I began this study in 1984, indeed, ever since I began the religious journey or search in December 1957.

1) The nature of God:

Focusing on the transition from purgation to mystical union gives powerful insights: During purgation my imagination produced mental imagery and the emergence of an archetype when I really needed it. These products of my imagination played a central role in stabilizing my mind during the experience of purgation. However, they suddenly ceased functioning at the moment of cessation in mystical union. The fact that God was experienced then, after those two aspects of the imagination had shut down, conflicts with the present position of both the scientific community and the Western psychological community. The Western psychological community's extensive study of the mind has convinced them that God is a product of the imagination. My position is that we must go deeper: The experience of God originates at a much deeper level:

During mystical union inner sense ceases; including the inner sense of time, the ability to think, to imagine, to will, and to make immediate recall. Simultaneously, one has an ecstatic experience of merger with the essence of one's inner self or inner Being. This timeless essence or Immensity or Ground cannot be conditioned, either by society or authorities or by anything else. The ecstatic experience of this Ground, occurring after purgation when my heart had been purified and fully opened, is an experience of an unsurpassable Greatness that fully satisfied my desperate search for groundedness.

Immediately after, when I came down from mystical union and ordinary consciousness partially returned, I was in a heavenly state. This state is called bhava by the Hindus and 'the Peace that passeth all understanding' or 'Beulah land' or heaven by Protestant mystics. It is a state of supreme bliss.

A few months later, I gradually returned to ordinary consciousness. Then, in 1985 or thereabouts, I began to search my language for a name for the formless and unsurpassable Greatness experienced in mystical union, because I needed to communicate the insights emerging from this work. Because I was born and raised in the United States and English is my native language, the only name I could find that satisfied my heart and mind was the word, God, the name my precious mother spoke to me about when I was a boy.

If I had been born and raised in a Hindu culture, the name I would have chosen would have been Brahman; If I had been born and raised in a Muslim culture, the name would have been Allah; etc.

2) The meaning of life: Cracking the Code!

There is something driving us to our full potential: to our ultimate end or object; to our telos. This telos is ultimate trueness, freedom, integrity, grounding, and love, but we never seem to attain it. Whatever trueness, freedom, integrity, grounding, or love we attain, we sense it is not enough. We need more.

In my case my full potential, my telos, was temporarily realized when I had experienced mystical union. It was in mystical union that I experienced ultimate trueness, freedom, integrity, grounding, and love. When that occurred I felt my search was over. I was finally satisfied. Therefore, it was this that I had been driven to, unconsciously. The drive toward this goal is mostly hidden from us; it is unconscious: An unconscious life force or entelechy is silently and wordlessly informing us: 'Come to the state of ultimate freedom, trueness, integrity, grounding, and love.

From the point of view of intentionality our lives are about reaching this goal, the state of ultimate freedom, trueness, integrity, grounding, and love. That is, in our daily lives this is the unconscious intentionality of our conscious lives. This unconscious intentionality is driven, in turn, by some sort of unconscious life force.

With these insights the mystic had cracked the code: He had found the structure underlying the dance of life and he had a conjecture on what drives the dance.

3) The essence of faith.

Sometimes, desperate people - when their backs are to the wall facing defeat, death, and/or disintegration - make a miraculous recovery. Examples are found among warriors, businessmen, athletes, people on their death bed, prisoners, former addicts of one kind or another, etc. Do you remember the people of London during the Battle of Britain? Do you remember the people of Grand Forks, North Dakota during the Red River flood of 1997? Do you remember the night Archie Moore came back from a terrific beating in the first round to defeat a powerful Canadian boxer? An Engineer's Story is a narrative that details one person's experience of this mode or capability, including the desperate circumstances that brought it about.

All such people are knowers of a greatness within that has enabled them to function in these situations in a mode far more profound, powerful, and skilled than their ordinary abilities. This human capability probably evolved during the desperate battle conditions of our earliest hominid ancestors. This capability is always available to human beings. To know this is the essence of faith.

Appendix:

A1: Table I: Five year, 14 stage religious crisis associated with PMU-16:

(Table I below lists the fourteen stages of my 5-year religious crisis. PMU-16 begins at the beginning of stage 11 and ends at the beginning of stage 14. A partial list of names for these stages in other cultures or religions are also shown.)

Stage	Time Period	West/English Judeo-Christian	AncientGreek/ Neo-Platonic	Orthodox Christian	Judaic/ Hebraic	Muslim Sufi	Sanskrit/ Hindu term	Buddhist/ Zen term	Chinese term
1	12/57	Tragedy							
2	1/58 to 8/61	Disintegration of moral character					Ianha/ Dukkha		
3	began 2/61	Crisis/Abyss							
4	8/61	Desperation							
5	8/61	Renunciation		Epistrophe	Ieshuvah	Tawbat	Pratyahara		
6	8/61 to 7/62	Spiritual Fire	Pyr		Shekinah		Iejas		
7	8/61 to 11/61	Concentration			Avodah		Dharana	Ekagrata	
8	11/61 (4 days)	Holy Ghost			Shekinah		Diksha		
9	11/61 to 4/62	Absorption or Flow			Hitkalehut	Mur-aqabat	Dhyana		
10	4/62 (9 days)	Holy Ghost			Shekinah		Shakti/Diksha		
11	4/8-9/62 (10 hours: noon PST to 1am EST)	Dark Night of the Soul/ Purgation/ Refiner's Fire/ (Overcoming) Original Sin/ Judgment Day	Katharsis/Passing through the gates between Night and Day, guarded by Justice. (Parmenides' proem).		Overcoming seals or knots/ Hatarat Hake-sharim	(Overcoming) Nats	(Overcoming) Samskaras	(Overcoming) Samsara	
12	4/9/62 (~1am: duration of 4 to 7 secs)	Mystical Union (Born Again/ Virgin Birth)	Unio mystica/ Ekstasis/ Beauty	Ecstasy	Devekut/ Hitachdut	fana al-fana/al-tawhid	Samadhi/ turiya/moksha	Satori/ Enlightenment	Wu-wei
13	4/9/62 (1am to 6am)	Deep Sleep (unconscious)							
14	6am 4/9/62 to 7/62	Divine State/ Heaven			Bittel Hayesh	Esqa	Bhava	mushin/ no mind/nirvana	

A2: Mathematical model for PMU-16:

$$* \text{HeartOpenness}(t) = \text{HeartOpenness}(t - dt) + (\text{HeartUnfoldRate}) * dt$$

$$\text{INIT HeartOpenness} = 5$$

$$* \text{HeartUnfoldRate} = (\text{OpeningPressure} - \text{AveragePsychicStress}) * ((100 - \text{HeartOpenness}) / 100) / \text{HeartAdjustTime}$$

```

* KnotsInHeart(t) = KnotsInHeart(t - dt) + (- ForgivenessResponse) * dt
  INIT KnotsInHeart = 12
* ForgivenessResponse = IF (PrayerQuality is greater than or equal to 100)THEN(1/DT) ELSE 0
* LongTermMemory1(t) = LongTermMemory1(t - dt) + (PrimaryInfoProcRate) * dt
  INIT LongTermMemory1 = 0
* PrimaryInfoProcRate = IF (STMRetrieveAccuracy is less than or equal to 0.5) THEN (0) ELSE
(ShortTermMemory*STMRetrieveAccuracy*RecodingFactor/STMRetentionTime)
* LongTermMemory2(t) = LongTermMemory2(t - dt) + (BackgroundInfPrRate) * dt
  INIT LongTermMemory2 = 0
* BackgroundInfPrRate = InnerSensingRate-PrimaryInfoProcRate
* ShortTermMemory(t) = ShortTermMemory(t - dt) + (InnerSensingRate - BackgroundInfPrRate -
PrimaryInfoProcRate) * dt
  INIT ShortTermMemory = 7
* InnerSensingRate = 4200
* AdditionalOpenPress = 75
* AttentionalFocus = (WilledAttention+NaturalAttention)*.025
* AveragePsychicStress = SMTH1(PsychicStress,25)
* CognitAbilityFactor = 1
* InformationProcessingRate = IF (STMRetrieveAccuracy is less than or equal to 0.5) THEN
BackgroundInfPrRate ELSE PrimaryInfoProcRate
* HeartAdjustTime = 240*HeartRigidityFactor
* KnotOriginInsight = .1*PrimaryInfoProcRate
* MaxBearableUnboundedness = 10/SealmentOfSoul
* NaturalAttention = TruenessOfMind + 36
* NormOpenPressure = 5
* OpeningPressure = NormOpenPressure + AdditionalOpenPress
* PrayerIntensity = FearDeathDueToKnot
* PrayerQuality = .5*(PrayerIntensity+PrayerTrueness)
* PrayerTrueness = KnotOriginInsight
* PsychicEnergyFactor = (100+HeartOpenness)/100
* Rapture = HeartOpenness
* Ratio = UnboundednessOfSoul/MaxBearableUnboundedness
* ReadinessForUnion = .00001/(STMRetentionTime-(1/600))^2
* RecodingFactor = (PsychicEnergyFactor*CognitAbilityFactor*
((LongTermMemory1/140000)^(2/3)))+1
* STMRetentionTime = (4/60)/AttentionalFocus
* TruenessOfMind = 50/SMTH1(KnotsInHeart,1)
* WilledAttention = FearDeathDueToKnot
* FearDeathDueToKnot = GRAPH( (PsychicStress))
  (0.00, 0.00), (10.0, 0.00), (20.0, 1.00), (30.0, 5.00), (40.0, 20.5), (50.0, 85.5), (60.0, 97.0),
  (70.0, 98.0), (80.0, 98.5), (90.0, 99.0), (100, 99.5)
* HeartRigidityFactor = GRAPH(KnotsInHeart)
  (0.00, 0.05), (1.20, 0.05), (2.40, 0.05), (3.60, 0.06), (4.80, 0.07), (6.00, 0.11), (7.20, 0.17),
  (8.40, 0.28), (9.60, 0.44), (10.8, 0.67), (12.0, 1.00)
* PsychicStress = GRAPH(Ratio)
  (0.00, 0.00), (0.1, 1.00), (0.2, 4.00), (0.3, 9.00), (0.4, 16.0), (0.5, 25.0), (0.6, 36.0),
  (0.7, 49.0), (0.8, 64.0), (0.9, 81.0), (1, 100)
* SealmentOfSoul = GRAPH(KnotsInHeart)

```

(0.00, 0.0001), (1.20, 1.70), (2.40, 3.20), (3.60, 5.50), (4.80, 8.40), (6.00, 12.0), (7.20, 19.0), (8.40, 29.0), (9.60, 44.0), (10.8, 66.0), (12.0, 100)

* STMRetrieveAccuracy = GRAPH(STMRetentionTime)

(0.00, 0.00), (0.00167, 0.00), (0.00333, 0.005), (0.005, 0.01), (0.00667, 0.02), (0.00833, 0.04), (0.01, 0.115), (0.0117, 0.275), (0.0133, 0.47), (0.015, 0.61), (0.0167, 0.725), (0.0183, 0.8), (0.02, 0.84), (0.0217, 0.87), (0.0233, 0.895), (0.025, 0.92), (0.0267, 0.94), (0.0283, 0.955), (0.03, 0.965), (0.0317, 0.968), (0.0333, 0.971), (0.035, 0.974), (0.0367, 0.977), (0.0383, 0.981), (0.04, 0.984), (0.0417, 0.987), (0.0433, 0.99), (0.045, 0.993), (0.0467, 0.996), (0.0483, 0.999), (0.05, 1.00)

* UnboundednessOfSoul = GRAPH(HeartOpenness)

(0.00, 0.022), (10.0, 0.023), (20.0, 0.027), (30.0, 0.044), (40.0, 0.11), (50.0, 5.20), (60.0, 49.0), (70.0, 100), (80.0, 100), (90.0, 100), (100, 100)

Use a DT of .005 minutes.

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