

Nikola Tesla

Chapter 3

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Mastering the Mind's Eye

Overview of Chapter 3

- **Envisioning the Future**
- **Developing the Capability to Visualize**
- **Applying Tesla's Strategy - Creating the Future**
- **Conclusion**

Nikola Tesla

Mastering the Mind's Eye

Physicist and inventor Nikola Tesla (1856-1943) has been called "the genius who ushered in the power age." He is arguably one of the most creative and important inventors of the past century; and certainly one of the most prolific. His 700 inventions include basic developments for the electromagnetic motor, the turbine engine, wireless transmission and remote control devices. His discovery of the rotating magnetic field in the late 1800's is the basis of alternating-current which has made the widespread distribution of electric power possible throughout the world. It was Tesla who designed the first electric power station at Niagara Falls (his system was chosen over Thomas Edison's direct-current system). Known as a visionary futurist, his notebooks are still studied by scientists and engineers today, as a number of his ideas and principles are still far in advance of present day technology. *

Similar to Leonardo, Tesla's genius lay in his ability to discover hidden, unseen principles, or deep structures, in nature and then to apply those principles tangibly, through the creation of useful inventions. Using the psychological modeling tools of Neuro-Linguistic Programming we can discover some of the key cognitive processes underlying his impressive creativity. In this way we can unearth some of the invisible mental strategies that Tesla used to make his discoveries and inventions.

*It is rumored that Tesla actually figured out how to generate electricity from the Earth's magnetic field (thus potentially creating a free and limitless source of electrical power). After demonstrating it, however, he refused to disclose anything about it and took the secret with him to his grave.

Section 1: Envisioning the Future

As it turns out, Tesla himself had a lot to say about his own thinking process. In an interview conducted in 1919, Tesla provides some remarkably revealing information regarding the development of his creative thinking process.

In my boyhood I suffered from a peculiar affliction due to the appearance of images, often accompanied by strong flashes of light, which marred the sight of real objects and interfered with my thought and action. They were pictures of things and scenes which I had already seen, never of those I imagined. When a word was spoken to me the image of the object it designated would present itself vividly to my vision and sometimes I was quite unable to distinguish whether what I saw was tangible or not. This caused me great discomfort and anxiety...

To give an idea of my distress, suppose that I had witnessed a funeral or some such nerve-racking spectacle. Then, inevitably, in the stillness of night, a vivid picture of the scene would thrust itself before my eyes and persist despite all my efforts to banish it. Sometimes it would even remain fixed in space though I pushed my hand through it. ¹

Obviously, Tesla is describing a very pronounced and powerful ability to visualize from an early age. He emphasizes that these images "were pictures of things and scenes which I had already seen, never of those I imagined." The term "eidetic imagery" is used for remembered internal images that have the quality of being so vivid that they appear real. This type of imagery is often associated with the right, or 'non-dominant', side of the brain.

While the lifelike quality of Tesla's imagery certainly sounds remarkable, it is not uncommon for children to be frightened by graphic mental pictures that they cannot control, nor is it uncommon for children to have difficulty distinguishing between their internal experience and external reality. Most children, however, eventually learn to squelch or suppress this degree of vividness as

they grow up in order to 'more effectively deal with reality'. Tesla, however, seems to have learned to cope with the issue differently:

To free myself of these tormenting appearances, I tried to concentrate my mind on something else I had seen, and in this way I would often obtain temporary relief; but in order to get it I had to conjure continuously new images. It was not long before I found that I had exhausted all of those at my command; my "reel" had run out, as it were, because I had seen little of the world—only objects in my home and the immediate surroundings. As I performed these mental operations for the second or third time, in order to chase the appearances from my vision, the remedy gradually lost all its force.

Then I instinctively commenced to make excursions beyond the limits of the small world of which I had knowledge, and I saw new scenes. These were at first very blurred and indistinct, and would flit away when I tried to concentrate my attention upon them, but by and by I succeeded in fixing them; they gained in strength and distinctness and finally assumed the concreteness of real things. I soon discovered that my best comfort was attained if I simply went on in my vision farther and farther, getting new impressions all the time, and so I began to travel—of course, in my mind. Every night (and sometimes during the day), when alone, I would start on my journeys—see new places, cities and countries—live there, meet people and make friendships and acquaintances and, however unbelievable, it is a fact that they were just as dear to me as those in actual life and not a bit less intense in their manifestations.²

Here Tesla describes how, rather than turn off his process of visualization, he learned to consciously direct his ability to visualize by "instinctively" applying the process of 'pacing and leading'. Rather than try to suppress the disturbing images in his mind's eye, Tesla attempted to shift his internal images to 'something else'. He relates how he was able to develop the skill of constructing mental images in his mind's eye and "see new scenes" which were "beyond the limit of

the small world" with which he was familiar. This allowed him to shift his attention from the upsetting remembered images (V^r) to constructed visual imagery (V^c). Tesla points out that the skill took time to develop. He mentions that the constructed images "were at first very blurred and indistinct, and would flit away when I tried to concentrate my attention upon them, but by and by I succeeded in fixing them; they gained in strength and distinctness and finally assumed the concreteness of real things."

What is significant in his comments is that Tesla actually consciously learned to use another part of his brain. [In the model of NLP, constructed mental images are typically associated with the left, or 'dominant', cerebral hemisphere of the brain.] Tesla apparently developed his ability to 'daydream' to a very high degree - the quality of the inner imagery he describes has many similarities to what are called "positive hallucinations" in hypnosis. The fact that he mentions that the characters in his fantasies "were as dear to me as those in actual life," implies that there were also probably feelings attached to those visual fantasies. This intimate connection between images and feelings may have been an important factor in his later ability to manifest those 'daydreams' as concrete inventions.

It is interesting to note that his descriptions of his ability to fantasize are quite reminiscent of another famous scientist and genius, Albert Einstein, who claimed that he always thought in images rather than words or mathematical equations. Einstein maintained that the theory of relativity grew out of an adolescent fantasy in which he tried to imagine what reality would look like if he were 'riding on the end of a beam of light'.

Tesla's attempts to deal with internal images also led to another important development for his creativity strategy.

My early affliction had, however, another compensation. The incessant mental exertion developed my powers of observation and enabled me to discover a truth of great importance. I had noted that the appearance of images was always preceded by actual vision of scenes under peculiar and generally very exceptional conditions and I was impelled on each occasion to locate the original impulse. After a while this effort grew to be almost automatic and I gained

*great facility in connecting cause and effect. Soon I became aware, to my surprise, that every thought I conceived was suggested by an external impression. Not only this but all my actions were prompted in a similar way.*³

By tracking his mental processes back to external events ($V^e \longleftrightarrow V^i$), Tesla was able to establish an invaluable practical connection between his thoughts and reality. This connection no doubt kept his incredible imagination from becoming simply a form of "escape" and made it possible for him to convert his own mental science fiction into inventions that transformed the world.

Tesla's preoccupations with his mental imagery also led him to develop a high degree of what we have called 'metacognition'. As a result of his observations of how his own mind input, processed and responded to the "external impressions" around him, Tesla formed the idea of a machine that could do the same thing. He was the first person to conceive of what we today call "robotics." Consider his prophetic description of "self-controlled automata" which would "act as if possessed of reason" and "create a revolution in many commercial and industrial departments."

*In the course of time it became perfectly evident to me that I was merely an automaton endowed with power of movement, responding to the stimuli of the sense organs and thinking and acting accordingly. The practical result of this was the art of telautomatics which has been so far carried out only in an imperfect manner. Its latent possibilities will, however, be eventually shown. I have been since years planning self-controlled automata and believe that mechanisms can be produced which will act as if possessed of reason, to a limited degree, and will create a revolution in many commercial and industrial departments.*⁴

It was Tesla's ability to connect his mental processes and internal maps to physical reality, combined with his extensive practice at stabilizing and strengthening constructed images, that led to his success as an inventor in his adult life. As he explained:

I was about seventeen when my thoughts turned seriously to invention. Then I observed to my delight that I could visualize with the greatest facility. I needed no models, drawings or experiments. I could picture them all as real in my mind. Thus I have been led unconsciously to evolve what I consider a new method of materializing inventive concepts and ideas, which is radically opposite to the purely experimental and is in my opinion ever so much more expeditious and efficient. The moment one constructs a device to carry into practice a crude idea he finds himself unavoidably engrossed with the details and defects of the apparatus. As he goes on improving and reconstructing, his force of concentration diminishes and he loses sight of the great underlying principle. Results may be obtained but always at the sacrifice of quality.

*My method is different. I do not rush into actual work. When I get an idea I start at once building it up in my imagination. I change the construction, make improvements and operate the device in my mind. It is absolutely immaterial to me whether I run my turbine in thought or test it in my shop. I even note if it is out of balance. There is no difference whatever, the results are the same. In this way I am able to rapidly develop and perfect a conception without touching anything. When I have gone so far as to embody in the invention every possible improvement I can think of and see no fault anywhere, I put into concrete form this final product of my brain. Invariably my device works as I conceived that it should, and the experiment comes out exactly as I planned it. In twenty years there has not been a single exception. Why should it be otherwise? Engineering, electrical and mechanical, is positive in results. There is scarcely a subject that cannot be mathematically treated and the effects calculated or the results determined beforehand from the available theoretical and practical data. The carrying out into practice of a crude idea as is being generally done is, I hold, nothing but a waste of energy, money and time.*⁵

Tesla's strategy has some remarkable similarities to the strategy for composing described by Mozart, who claimed he first composed his music in his head and, when it was finished, merely 'transcribed' it onto paper (see *Strategies of Genius Vol. I*). According to Mozart, he saw his music in mind's eye such that it stood, *"almost complete and finished in my mind, so that I can survey it, like a fine picture or a beautiful statue, at a glance...For this reason the committing to paper is done quickly enough, for everything is, as I have said before, already finished; and it rarely differs on paper from what it was in my imagination."*⁶

On the other hand, Tesla's strategy for invention was quite different from that of his contemporary and one time colleague Thomas Edison - whose methods Tesla is probably referring to in his criticism above. Edison, who claimed that "invention is 1% inspiration and 99% perspiration," tended to put his ideas immediately into a tangible form and work with them. Edison, for example, spent fourteen solid months trying different materials in order to find the one that would be the best filament for his electric light bulb. Tesla called Edison's trial-and-error approach the "needle-in-the-haystack" method of experimentation and eventually became his archrival. While both strategies were obviously effective, Tesla's internal visualization strategy probably allowed him to deal more effectively with intangible entities (such as magnetic fields) which are beyond the realm of our immediate sensory world and thus also beyond our ability to work with physically.

There is an interesting anecdote about Tesla describing how he was once challenged on his assertion that he could build his machines in his mind, and that there was "no difference whatever" whether he ran his turbine "in thought" or tested it in his shop. To respond to the challenge, Tesla reportedly "built" an imaginary turbine engine in his mind and ordered another to be constructed physically. Both the real and the imaginary machines were started at the same time. A month later, Tesla disassembled the turbine engine in his mind and noted in precise detail the wear and tear on the pieces in his imaginary machine. When the real engine was disassembled and examined Tesla's description was found to match the real machine in every detail!

In a remarkable description of his own subjective cognitive processes, Tesla actually describes in minute detail the qualities of his internal imagery during the process of invention:

*"When I close my eyes I invariably observe first, a background of very dark and uniform blue, not unlike the sky on a clear but starless night. In a few seconds this field becomes animated with innumerable scintillating flakes of green, arranged in several layers and advancing towards me. Then there appears, to the right, a beautiful pattern of two systems of parallel and closely spaced lines, at right angles to one another, in all sorts of colors with yellow-green and gold predominating. Immediately thereafter the lines grow brighter and the whole is thickly sprinkled with lots of twinkling light. This picture moves slowly across the field of vision and in about ten seconds vanishes to the left, leaving behind a ground of rather unpleasant and inert gray which quickly gives way to a billowy sea of clouds, seemingly trying to mold themselves in living shapes. It is curious that I cannot project a form into this gray until the second phase is reached."*⁷

This intriguing description has some rather interesting parallels to Leonardo's description of his method to "stimulate and arouse the mind to various inventions." In his explanation of the technique, da Vinci maintained that if you "...look at any walls spotted with various stains or with a mixture of different kinds of stones...you will be able to see in it a resemblance to various different landscapes adorned with mountains, rivers, rocks,...divers combats and figures in quick movement, and strange expressions of faces...an infinite number of things which you can then reduce into separate and well-conceived forms."⁸ Leonardo seems to be describing an external visual "crutch" that can be used to help achieve the "ground of inert gray" that Tesla beheld internally.

Section 2: Developing the Capability to Visualize

NLP maintains that the critical factor in genius is *how* we use our nervous system and that the mental strategies of a particular genius can be learned by others and applied towards other contents. By gaining some insight into the thought processes of exceptional people like Nikola Tesla, we can learn to identify those special abilities when they occur naturally in others. Perhaps more importantly, we can cultivate and develop those capabilities in ourselves. Cognitive skills, such as those described by Tesla can be taught to children. Tesla clearly states that he was a child when he developed the key mental strategies he was to use later in life as a physicist and inventor. He describes how he would see pictures so clearly in his mind's eye as a child that they frightened him.

As I mentioned earlier, this is not an unusual experience for many children (as a father of a three year old and a six year old, I am quite familiar with it). A common response from parents is to impress upon the child that "It is just your imagination," or "It is a bad memory that will eventually pass," and to attempt to reorient the child as much as possible to 'reality'. Rather than downplay or suppress his memory or imagination, however, Tesla learned to pace and lead his internal pictures by fostering and actually strengthening his capability to visualize. By observing, or developing a 'meta position' to his own mental processes and their relationship to "external impressions" Tesla learned to harness and direct his memory and imagination (his 'left' and 'right' brain) to a degree that seems truly remarkable.

Very often children are told not to daydream. In school they are not supposed to be thinking of anything except what the teacher is telling them. They are encouraged to bridle their memories and imaginations and to focus only upon the task at hand. Yet, if Einstein had followed that advice we might never have received the benefits of the discoveries produced by his 'daydreaming'.

Unfortunately, unlike Tesla, Einstein, Mozart and Leonardo, many of us have learned to curb our ability to visualize and use our internal representational systems. We are left to look with awe

upon the seemingly incredible representational capabilities of people like them, as if those abilities were something almost 'supernatural'.

It is my belief that everyone was born with these capacities. Almost every child that I have ever met has an exceptionally robust contact with their minds' eyes, ears and feelings. People often ask, "How do you use NLP with children who don't know anything about cognitive psychology and the senses?" My response is that children are actually the real experts on it! They are usually much more in touch with their senses and their imaginations than are adults. In fact one way to help adults reactivate some of these capabilities is to help them get back in touch with their childhood.

It is important to realize, however, that these cognitive capabilities did not necessarily come easily even for the exceptional individuals mentioned above. Tesla, for instance, indicated that a combination of "instinctive" insights and "incessant mental exertion" was at the basis of his visual ability. In fact it is only recently that cognitive technologies, such as NLP, have provided the understandings and models necessary to bring such mental skills out of the shadowy realm of chance and render them to be something that can be consciously learned and practiced, as one would with any other skill.

NLP, in fact, provides several methods with which people can learn to develop and enhance their ability to visualize (or more fully use any of their representational systems for that matter). These methods include the utilization of:

Adjusting Physiology

Pacing and Leading Reference Experiences

Chunking

Reducing Interferences from the Other Senses

Encouraging Positive Overlap with Other Senses

Clearing Personal History and Limiting Beliefs

Adjusting Physiology

The great psychologist William James laid down the "general law that no mental modification ever occurs which is not accompanied or followed by a bodily change." According to James, the body

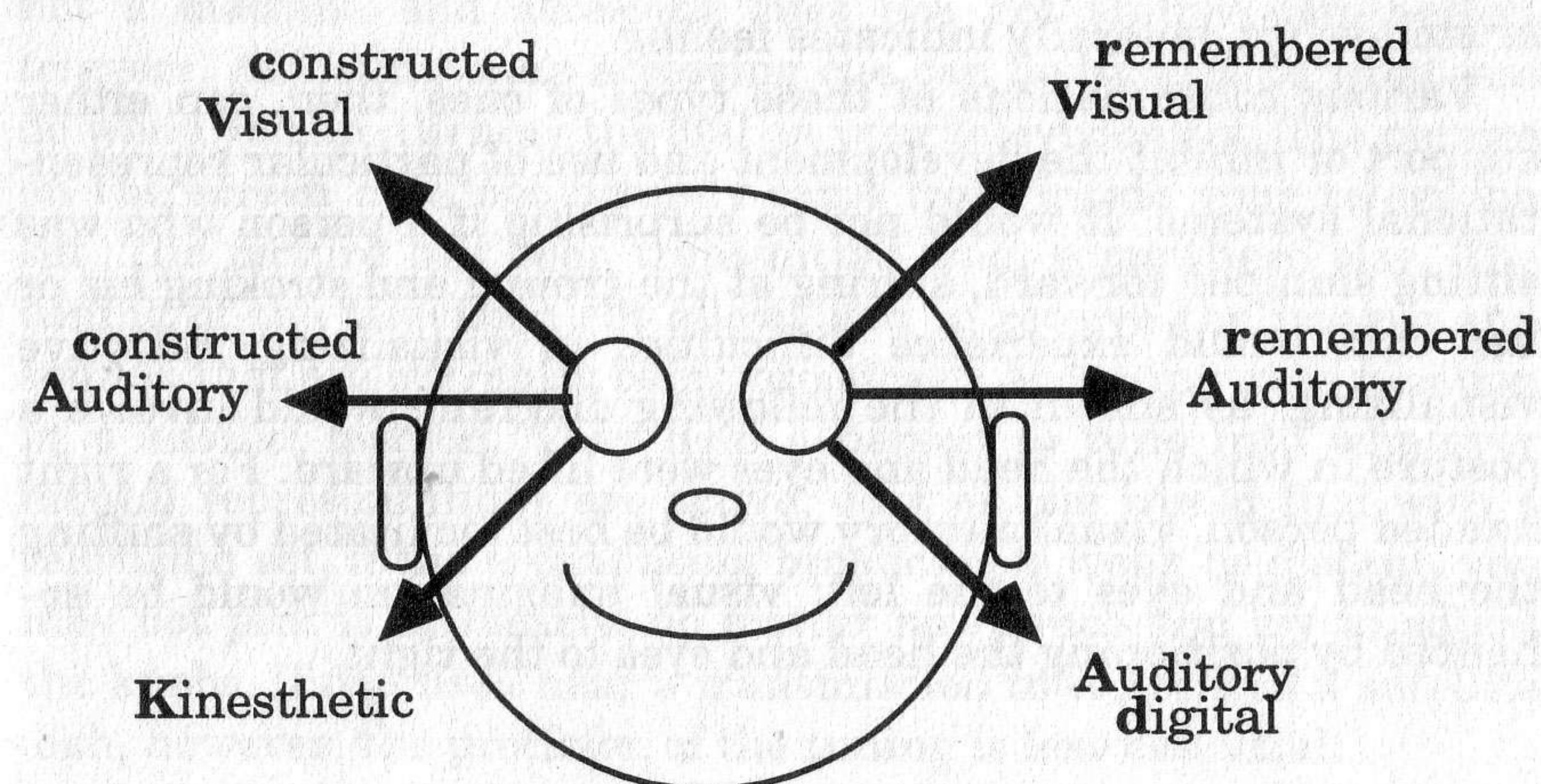
and mind were intimately interconnected systems. He believed that, in the same way that the mind could influence and direct the body, certain positions and movements of the body could also facilitate, inhibit or direct the mind and one's mental representations. As he explained:

*In attending to either an idea or a sensation belonging to a particular sense-sphere, the movement is the adjustment of the sense-organ, felt as it occurs. I cannot think in visual terms, or example, without feeling a fluctuating play of pressures, convergences, divergences, and accommodations in my eyeballs...When I try to remember or reflect, the movements in question, instead of being directed towards the periphery, seem to come from the periphery inwards and feel like a sort of withdrawal from the outer world. As far as I can detect, these feelings are due to an actual rolling outwards and upwards of the eyeballs, such as I believe occurs in me in sleep, and is the exact opposite of their action in fixating a physical thing...it would follow that our entire feeling of spiritual activity, or what commonly passes by that name, is really a feeling of bodily activities whose exact nature is by most men overlooked...The peculiarity of the adjustments would be that they are minimal reflexes, few in number, incessantly repeated, constant amid great fluctuations in the rest of the mind's content, and entirely unimportant and uninteresting except through their uses in furthering or inhibiting the presence of various things, and actions before consciousness.*⁹

James' observation that thinking in "visual terms" is accompanied by a "rolling outwards and upwards of the eyeballs" describes a classic 'accessing cue' for internal visualizing in the model of NLP. *Accessing cues* are subtle behaviors that accompany the activation of a particular representational system. NLP identifies a number of types of micro behavioral cues, involving one's eyes and other physical features, that are associated with cognitive processes - in particular, those involving the five senses. As James' definition indicates, accessing cues are "minimal reflexes, few in

number, incessantly repeated, constant amid great fluctuations in the rest of the mind's content, and entirely unimportant and uninteresting except through their uses in furthering or inhibiting the presence of various things, and actions before consciousness."

Eye movement patterns, for example, are one of the most interesting of these "minimal reflexes" or micro behavioral cues; and the one most associated with NLP. It has been said that "The eyes are the windows of the soul" In NLP, the eyes are considered to be a window to the mind. The movement of the eyes up and to the left or right tends to accompany visualization. An upward eye movement to the left typically coincides with the recollection of visual memories, whereas a movement up and to the right would accompany the formation of constructed imagery or fantasy. Horizontal movement of the eyes tends to go along with listening. Eyes down accompany feeling. An eye position to the left hand side is often indicative of memory, while a movement to the right hand side indicates imagination. These cues are summarized in the following diagram.

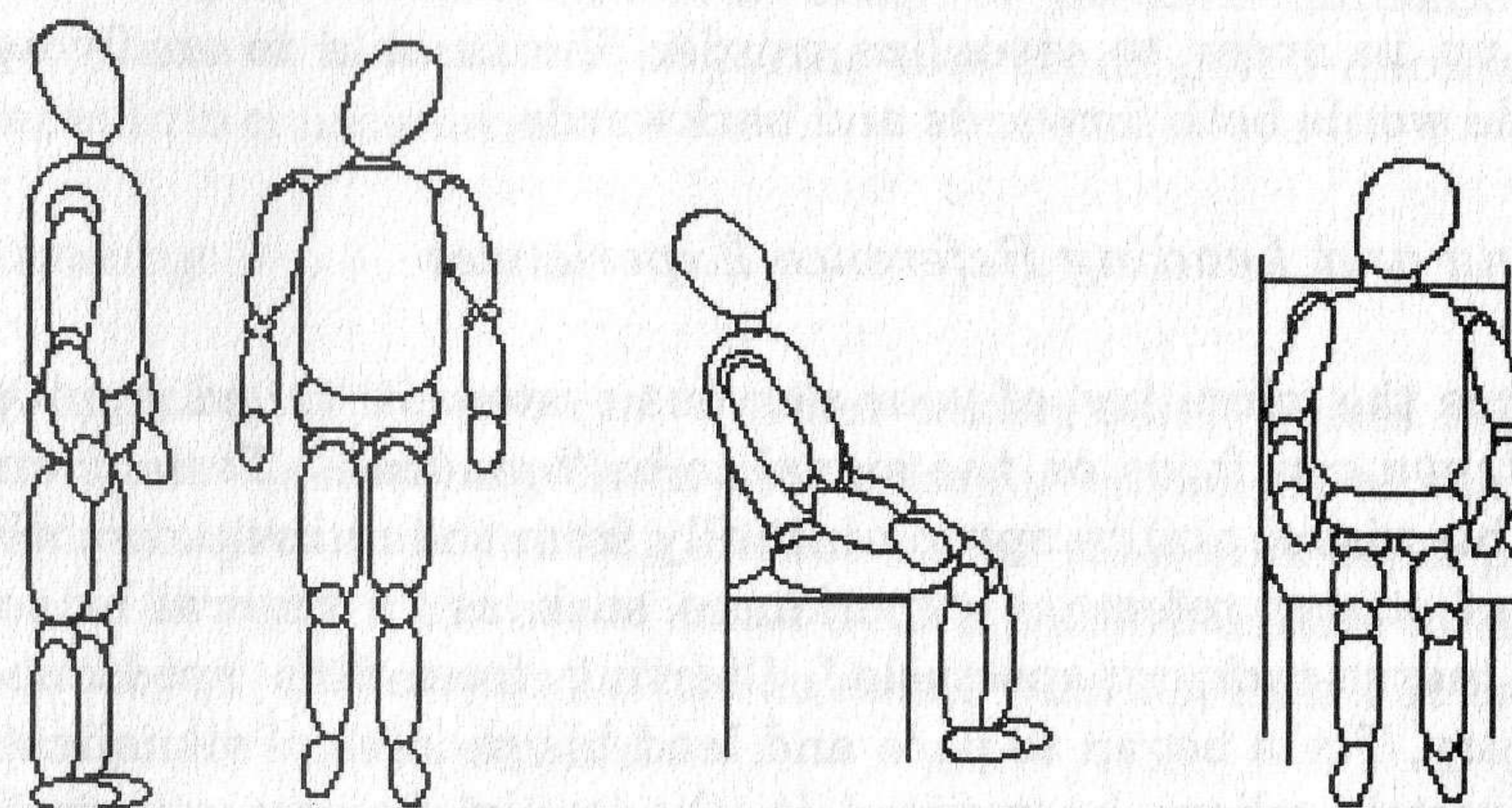


Basic Relationships Between Eye Positions and Cognitive Processes (For a Right Handed Person)

Body posture is another important influence and reflection of a person's internal processes. For example, most people would probably find it very difficult to be creative with their head down and their shoulders hunched forward. If you put yourself into that physiology you will find it's going to be difficult to feel inspired. NLP has discovered that when people are visualizing they tend to be in a more erect posture. When people are listening, they tend to lean back a bit with their arms folded or head tilted. When people are having feelings, they tend to lean forward and breathe more deeply. These cues won't necessarily tell you if the feeling is positive or negative; only that an individual is accessing feelings. So somebody might be feeling very relaxed and have the same general posture as somebody who's feeling depressed.

People also frequently gesture to the sense organ that is most active for them in a moment. People will touch or point to their eyes when they are attempting to visualize something or when they get an insight. People gesture toward their ears when they are talking about something they heard or are trying to hear. Likewise people will touch their mouth when they are thinking verbally (like Rodin's *The Thinker*). When people touch their chest or stomach it generally indicates feeling.

Various constellations of these types of cues, then, can either support or inhibit the development and use of particular representational systems. It would not be surprising if a person who was sitting slumped forward, staring at the ground and stroking his or her chin would experience difficulties in visualizing. Effective visualizing, as shown in the following diagram, would involve a posture in which the head and eyes were lifted upward. For a right handed person, visual memory would be best facilitated by shifting the head and eyes to the left; visual imagination would be enhanced by positioning the head and eyes to the right.



Physiology Most Conducive For Constructed Visual Imagery—Head and Eyes Up and to the Right

Incidentally, trying out these cues is not going to automatically make one start seeing technicolor fantasies. Our nervous system is not a machine and accessing cues are not simple cause-effect triggers. Adjusting one's accessing cue can be likened to what you do when you are turning the dial on your television set. The picture on the screen does not actually come from inside your television set. The picture has been transmitted from somewhere else. The tuning of the television set allows you to receive the images and sounds that are currently being broadcast. Accessing cues function in a similar fashion. They help a person to tune into whatever mental representations are active. Just as one would find with a television set, if the signal being broadcast is weak or distant, you may not pick it up clearly, no matter how much you try to adjust the knobs. If one lives near a transmission tower or has a satellite dish, however, the precision of the tuning is less essential.

The point is that if you want to develop the skill of visualizing, you should make sure that your 'equipment' is tuned properly. Many people, for instance, find it strenuous or uncomfortable to put their eyes in certain positions. By practicing and becoming aware of the body postures and cues that facilitate visualization, one can help to facilitate the natural development of that capacity.

At the age of three, for example, my daughter already knew how to look up in order to visualize words. She is able to easily spell simple words both forwards and backwards.

Pacing and Leading Reference Experiences

Once the 'circuitry' of your nervous system is 'tuned' appropriately, you can focus on the signal to be 'broadcast'. Tesla claimed that his visual ability sprang initially from the uninvited recollection of strong reference experiences such as "a funeral or some such nerve-racking spectacle." Starting from this spontaneous imagery, Tesla began to pace and lead his process of visualization to direct it where he wanted it. Obviously, images attached to strong negative emotions, such as Tesla mentioned, are uncomfortable—and unnecessary. But it is useful to find images that are easy and natural to bring into the mind. Even if someone is not a good visualizer, there will usually be some mental images that he or she is aware—of dreams, for instance.

By starting with one image, even one that is very simple, or "blurred and indistinct," one can eventually succeed in "fixing" it so that it does not "flit away." By returning to this basic reference image and incrementally adjusting it, it will eventually gain in "strength and distinctness." For example, close your eyes and see what images you can bring up naturally. Maybe it is easy to recall the faces of people you love, a favorite movie character, an emotionally charged experience from your past, a special vacation spot, the sunset, your automobile or a simple household object. Once you have such a picture, even if it is at first very indistinct, keep coming back to it, seeing if you can add more depth, detail or color.

Often, people have access to a great deal of visual information, even if their conscious mental imagery does not have "the concreteness of real things." I have worked with many people who initially claim that they cannot visualize. One of the first questions I ask is, "If you could visualize, what would you see?" For instance, "If you could visualize a big balloon suspended in front of you, what would it look like, if you could see it?" Most people will begin to respond, "Well, it would be red and round, about this far away from me..." and so on. The point is that the information and details may be

there, but just not as a conscious image or 'positive hallucination.' From there it is a matter of pacing and leading the unconscious images into consciousness.

Chunking

'Chunking' is the process of either taking small pieces of information and assembling them into a larger whole, or of taking a complete object and breaking it into smaller elements. Some people are able to make a picture of small details but are unable to see the whole object. Other people can envision whole scenes but cannot form a picture of the details.

Sometimes, when I am helping a person learn to visualize, I will say, "Let's start with something simple, and then we will 'chunk up'." Let's make the picture of a ball." Once he or she can imagine the ball or some other simple object, then we will add another ball and then another, until he or she is able to make a stack of balls in the shape of a pyramid or some such composite. Other times, I might have a person start with just a vague image or outline of a person, and then look for details such as the buttons on his or her shirt.

I will then continue pacing and leading, either adding more complexity or detail to the picture. I might say, "Well, if you saw this ball in front of you, where would the shadow be? Where is the light source?" To "see" something in external reality we need light. The same principle holds true for our internal images. In my own internal images, I always make sure I have light and a light source. To try to picture mental images without an internal light source is like complaining because one cannot see an object in a dark room. Since, light casts shadows, I frequently have people look for the shadow cast by an object in their mind first. When they are able to find where the shadow would be, it makes it much easier to see the object.

Reducing Interference from the Other Senses

One common problem people experience, when they are attempting to learn to visualize, is interferences from the other sensory representational systems. This often happens when a

person is trying so hard to visualize that the person gets in his or her own way. For instance, a person may have a critical internal voice that says, "What's wrong with me? I can't do anything right. Why can't I see this image?" Rather than helping the situation, the voice produces interference to the imaging process because it is clogging up the person's representational channels.

Another source of interference is from external stimuli. In fact, one of the purposes of 'accessing cues' is to help reduce the interference coming from external sensory input. As one woman once expressed to me during a conversation, "I really feel that I can see what you are saying better when I don't look at you as I listen." William James pointed out that the movement of his eyes during visualization was "the exact opposite of their action in fixating a physical thing."

Encouraging Positive Overlap with Other Senses

This does not necessarily mean that the other senses and the external world need to be completely shut out however. The overlap and support of other senses can in fact be valuable resources if they are aligned to the task of visualizing. For instance, if a person is having difficulty visualizing an object, I will often ask the person to reach out his or her hands and 'sculpt' the space the object would take up; as if the person were tracing the edges of the object with his or her hands. By doing so, the person will often be able to 'sense' the space of the object, even if they can't yet consciously visualize it.

If the person is extremely verbal, I might ask him or her to describe the object in detail while looking at it in his or her mind's eye. To use the sense of hearing, you can imagine you are a bat, and send out a sound that you can hear echoing off of the object like a little inner radar. This can help to get a better sense of the object that you are trying to visualize.

Rather than have it be a distraction, a person can use his or her interaction with the outside world to help develop mental visualization. One suggestion I often make to people who want to learn to visualize better is to practice drawing. Leonardo offered many suggestions about how to develop the skill of "seeing" through the interactive process of drawing. Similarly, I often suggest to people

who want to develop their internal auditory ability that they should start by learning to play a musical instrument.

I know a woman who is doing some fascinating work that involves teaching 'learning disabled' children how to develop the ability to visualize. One of the things she found was that many learning tasks presuppose cognitive micro-strategies that are tacitly assumed but never directly taught. Most of us have learned by experience that when an object is moved further away from us, it appears to get smaller and less distinct. But it is not guaranteed that everyone will learn such fundamental perceptual principles simply through their life experiences. Remember that it was only a few hundred years ago that renaissance artists, like Leonardo, figured out the mechanics of three-dimensional visual perspective. This woman, for instance, found that many learning disabled children have not acquired some of these fundamental cognitive micro skills. This makes it even more difficult for them to form the mental representations required for classroom learning.

So she starts with real objects and has the children first learn these basic micro skills. She might say, "Look at this block of wood that I am holding. I am moving it further away, what do you see? What happens as it gets farther from you?" Then she might say, "Now if I keep it the same distance, but turn it, what do you see?" The size stays the same but the shape seems to change as it is rotated. She may even have them overlap their senses by putting their fingers on the object as it moves. The children begin to understand the interactions between various visual characteristics, or 'submodalities'. Once the children are able to experience the perceptual relationships in the external world, they are more able to do it in their own minds.

Obviously, by teaching them basic perceptual principles she is not attempting to teach them about the object, but about their own minds. As Tesla's experience demonstrates, once the capacity to visualize is unleashed, it can be applied in many different ways. You can change a person's life by teaching them how to take a box in their minds and rotate it so that they can see it from different angles, because it is not about the content; it is about the capability.

Clearing Personal History and Limiting Beliefs

Another possible interference to the development of a cognitive capacity such as visualization has to do with blocks relating to one's personal history or beliefs. Some people may believe that if they really let their dreamer loose, they will spend the rest of their lives in a dream world, dreaming instead of doing. It may be that a person has such a belief because he or she had a parent that behaved in this way. I remember working with somebody who had a really hard time hearing anything in her mind. It turned out that she had a brother who heard voices all the time and was put into a mental institution. So she was afraid of hearing anything internally. It was important for her to first accept that the capability of hearing something in the mind's ear was simply a skill, and not the cause of her brother's condition.

I have also worked with several people who have had trouble remembering visual images because they had been children during the second World War. They had been given very explicit messages, "If you remember what you have seen, or tell anyone about it, someone will be killed or hurt." They may have also seen many things that they do not wish to remember.

Usually, the issue in these types of interference is, "If I turn on these images, will I be able to turn them off?" Thus, paradoxically, sometimes the best way to help somebody turn on a capability is to teach the person how to turn it off. Then the person knows that he or she is in charge of the process and is not afraid of losing control. Remember, the motivation for Tesla to develop his skill of imagination was to deal with distressing visual memories that he could not turn off.

The earlier section of this book about Freud offers a number of different suggestions about how these types of interfering issues and beliefs can be dealt with.

An Example of Developing the Ability to Visualize

In his classic work *Principles of Psychology*, William James cites a description by G. H. Meyer of some of the issues involved in learning to consciously see internal visual images. Notice how many of the principles and methods I have described above

(chunking, pacing and leading reference experiences, reducing interferences, etc.) that Meyer spontaneously applied while developing his ability to visualize.

With much practice I have succeeded in making it possible for me to call up subjective visual sensations at will. I tried all my experiments by day or at night with closed eyes. At first it was very difficult. In the first experiments which succeeded the whole picture was luminous, the shadows being given in a somewhat less strong bluish light. In later experiments I saw the objects dark, with bright outlines, or rather I saw outline drawings of them, bright on a dark ground. I can compare these drawings less to chalk drawings on a blackboard than to drawings made with phosphorus on a dark wall at night, the phosphorus would show luminous vapors which were absent from my lines. If I wished, for example, to see a face, without intending that of a particular person, I saw the outline of a profile against the dark background. When I tried to repeat the experiment of the elder Darwin I saw only the edges of the die as bright lines on a dark ground. Sometimes, however, I saw the die really white and its edges black; it was then on a paler ground. Sometimes, I could soon at will change between the white die with black borders on a light field, and a black die with white borders on a dark field; and I can do this at any moment now. After long practice...these experiments succeeded better still. I can now call before my eyes almost any object I please, as a subjective appearance, and this in its own natural color and illumination. I see them almost always on a more or less light or dark, mostly dimly changeable ground. Even known faces I can see quite sharp, with the true color of hair and cheeks. It is odd that I see these faces mostly in profile, whereas those described (in the previous extract) were all full-face. Here are some of the final results of these experiments:

1. *Some time after the pictures have arisen they vanish or change into others, without my being able to prevent it.*

2. *When the color does not integrally belong to the object, I cannot always control it. A face e.g., never seems to me blue, but always in its natural color; a red cloth on the other hand I can sometimes change to a blue one.*
3. *I have sometimes succeeded in seeing pure colors without objects; they then fill the entire field of view.*
4. *I often fail to see objects which are not known to me, mere fictions of my fancy, and instead of them there will appear familiar objects of a similar sort; for instance, I once tried to see a brass sword-hilt with a brass guard, instead of which the more familiar picture of a rapier-guard appeared.*
5. *Most of these subjective appearances, especially when they were bright, left after-images behind them when the eyes were quickly opened during their presence. For example, I thought of a silver stirrup, and after I had looked at it a while I opened my eyes and for a long while afterwards saw its after-image.*

These experiments succeeded best when I lay quietly on my back and closed my eyes. I could bear no noise about me, as this kept the vision from attaining the required intensity. The experiments succeed with me now so easily that I am surprised they did not do so at first, and I feel as though they ought to succeed with everyone. The important point in them is to get the image sufficiently intense by the exclusive direction of the attention upon it, and by the removal of all disturbing impressions.¹⁰

Section 3: Applying Tesla's Strategy - Creating the Future

Of course, the purpose for developing a capability such as visualization is to be able to apply it. Tesla used his newly acquired skill to "make excursions beyond the limits of the small world" in which he lived at that time. When he developed the skill further, he used it to imagine a future full of glittering lights powered by electrical generators, of 'self contained automata' revolutionizing industry and of global communications based on invisible waves of magnetism.

These visions have now essentially all come true. [As science fiction author Arthur C. Clark says, "The future just isn't what it used to be."] To continue to move into the future we need more visions and visionaries like Tesla. The following is a transcript of a meditation that helps people to apply Tesla's strategies of visualization to the creation of new visions for the future.

Place your body in a comfortable and relaxed position. Sit in a posture and physiology that would really support your ability to dream. If your physiology were able to put you in a state in which you could really let out the dreamer in you, how would you be sitting? What direction would your head be tilted? Where would you be breathing? What kind of muscular tension would you feel in your body?

What would be the quality of your internal voice if you were really able to dream? Would it be excited and whispering? Or would it be just sound? Maybe it would be encouraging or questioning. Or maybe it would sound very confident. Tune your internal voice to a quality of voice that leads you to your dreams and points you towards them.

And then you can begin to visualize a special kind of dream. A dream for the planet. If you could make a beautiful dream for the planet, what would it be? And since it is just a dream, you needn't worry about whether it is possible or practical. You can dream freely. If you could dream up your

own version of a utopia, what would your vision be? How would technology fit into this global dream for the planet? What would happen to war? How would your children be educated? How would people of different parts of the world communicate with each other? In what ways would we use the tools that we have in the service of the planet, and of the people on it, in an ecological and creative way?

Allow your dream to move you into the future. What would medicine be like? Would people still go to doctors as we have them now? Would there still be hospitals anymore? If you could change the world just by dreaming it, by visualizing it, how would you transform the hospitals and the schools and the companies? What is the office of the future going to look like? Would there even be offices? Or would everybody be connected together through their homes? How would people travel in the future? There's no need to limit yourself by today's technology. Imagine that you live on a planet where anything that you imagine could automatically become reality. The only limit would be the limits of your imagination.

How would we treat animals and the plant life in the future? Would we need lawyers or therapists? What would be the most important job in the future?

What kind of music would you be listening to in the future? What would the museums of the future be like? If you went to a museum where you saw artifacts of today, which one would be the most amusing to the people of the future?

What could you dream that would change the world the most? Which parts of our lives have the most space to change?

Imagine you could change the world through something that you yourself did. Dream about what you would do, and what would change in the world.

And let your unconscious mind continue that dream in the way that is the most appropriate for you—in a way that gives you an inner sense of pleasure, excitement and hope.

Then, for a moment, allow your mind to shift from the future to the past. Think back over your life and find a time when a dream came true for you. Remember something that at one time had just been a dream for you. Then later on, you discovered that somehow it had come true.

For instance, twenty years ago, when I was first getting involved in NLP, I had a dream that maybe some day, creative, intelligent, and committed people, would be gathering together sharing a common interest and understanding of the mind and the strategies of the worlds greatest geniuses; and that they would be working together to change the world. By reading this book, you have become a part of making that dream come true.

There was a time, many years ago now, when my mother wasn't expected to live another six months. I had a dream that maybe it was possible for her to find her own inner resources and heal herself in a way that hadn't been thought possible before. Today, she is another one of my dreams come true.

My children are certainly a dream come true for me. And perhaps each of you has had dreams that have come true. And maybe if you find one, you will start realizing, "Oh yes, there is another one!" Maybe there are even dreams that have come true that you have forgotten were actually just dreams at one point in your life because they are just normal reality now—another lousy day in paradise.

And maybe we have an unconscious competence as individuals or as a collective group of people that can make these dreams come true if we could give ourselves the permission to dream them.

As you look at the world around you, notice how many of the things that you see around you, are actually dreams that have come true; the room in which you are sitting, the electric light by which you may be reading, the chair upon which you are resting, the book you are holding in your

hand. All of these things were at one time just a dream in someone's mind, but now they have come into being.

We live in a world of dreams which have come true. Perhaps you yourself have helped others to make their dreams come true. Maybe you are somebody's dream that came true. Perhaps your parents dreamed of you before you were born. Perhaps you have entered someone's life at the very moment they needed someone like you.

So cherish your dreams. Cherish those dreams that have come true. And as you return to the present at the rate of speed that is the most appropriate for you, maybe you can feel yourself standing in that exciting position, on the threshold of a new dream. Behind you are the dreams that have come true. Ahead of you are the new dreams that give your life meaning.

Section 4: Conclusion

Nikola Tesla's ideas and invention have shaped our modern world, and in many ways, made it possible. These ideas did not arise out of supernatural powers nor a privileged background. Rather, they are the result of the development of basic cognitive skill—the ability to construct internal mental pictures. Through the development of greater awareness and metacognition of the importance and the structure of key mental capabilities such as this, we can more fully bring to life and use the incredible nervous systems that we possess as our birthright. By continuing to model the strategies of past geniuses and developing our own cognitive capabilities we can enrich our own experience of the world and take another step closer to the next ideas and inventions that will revolutionize the world in which we live.

Footnotes to Chapter 3

1. "My Inventions" by Nikola Tesla, *ELECTRICAL EXPERIMENTER*, February, 1919, pp. 696-747.
2. Ibid.
3. Ibid.
4. Ibid.
5. Ibid.
6. *The Life of Mozart Including His Correspondence*, E. Holmes, Chapman & Hall, 1878, pp. 211-213
7. "My Inventions" by Nikola Tesla, *ELECTRICAL EXPERIMENTER*, February, 1919, pp. 696-747.
8. Ms. 2038 Bib. Nat. 22 v. — *The Notebooks of Leonardo Da Vinci*, Edward MacCurdy, George Braliller, New York, NY, 1958.
9. *Principles of Psychology*, William James, Britannica Great Books, Encyclopedia Britannica Inc., Chicago Ill., 1979, pp. 193-195.
10. Ibid., p. 496.

Chapter 4

Conclusion

More Patterns of Genius

In the conclusion to *Strategies of Genius Volume I*, I identified ten 'patterns of genius' based on Aristotle's approach for finding "basic conditions" and "first principles." The approach essentially involved an 'inductive' method for finding common patterns of genius consisting of:

- 1) Collecting a group of individuals who were acknowledged to have been 'geniuses'; and
- 2) Comparing the cognitive processes and strategies of these individuals and looking for qualities and characteristics that they all had in common.

Applying this process, I distinguished ten basic cognitive patterns that appeared to be common to the four individuals that were the subjects of that book: Aristotle, Sir Arthur Conan Doyle's Sherlock Holmes, Walt Disney and Wolfgang Amadeus Mozart. In volumes *II* and *III*, I have examined the strategies of four other acknowledged 'geniuses': Albert Einstein, Sigmund Freud, Leonardo da Vinci and Nikola Tesla. It is appropriate at this point, then, to reflect back over the ten patterns of genius proposed earlier to see if they are still valid for this second set of geniuses and check to see if any other patterns have emerged.

1. *Highly developed ability to visualize.*

This is certainly the case for Leonardo and Tesla, for whom "knowing how to see" and the ability to construct mental images was the core of their respective creative processes. Albert Einstein, too, identified the source of his "productive thinking" as his ability to form images and imaginary constructions. The one exception appears to be Freud, who clearly emphasized the importance of language over all of the other senses. As his analysis of Leonardo and Michelangelo's statue of Moses show, however, Freud did have a powerful imagination and could observe minute visual cues when he wanted to. His emphasis on dreams and symbols certainly acknowledges the importance of visual imagery and indicates that he had the capacity to understand and work with visual constructs.

2. *Have developed numerous links between the senses.*

Whether or not vision is their central focus, geniuses tend to use all of their sensory representational systems to some degree, and to create 'synesthesias' between the senses. Mozart's ability to feel, see and even taste his music is probably the best example of this. It would appear that as long as images stay as simply mental pictures, they are unproductive. Both Tesla and Einstein, for instance, claimed to have derived strong feelings from their internal imaginary constructs. These types of feeling seem to be important in order to make the mental imagery more tangible. Da Vinci's discovery of 'sound waves' came from being able to connect the rings that he saw form on the surface of water, when a pebble struck it, with the sound of a bell. Freud claimed that "words call forth emotions" and described being emotionally moved by works of art and literature. His therapeutic methods of analysis and interpretation were, in fact, developed in order to help people to create links between their emotions and their other mental representations, or to uncover unconscious links that were already there.

3. *Use multiple perspectives.*

An important characteristic of genius is the ability to entertain several different perspectives of a particular subject or process. Genius often comes from finding a new perspective that no one else has taken. Leonardo, in fact, equated "knowledge" with having at least three different views of a particular object or phenomenon. Einstein's theory of relativity is in essence a description of the interaction between different perspectives. Freud's analytic methods, as is exemplified in his study of Leonardo and the Moses of Michelangelo, were designed to find details that did not fit with traditional perspectives, in order to find a completely new point of view.

4. *Highly developed ability for switching between perceptual positions.*

In addition to being able to take different 'points of view', geniuses have the ability to identify with different 'perceptual positions' - i.e., 1st (self), 2nd (other) and 3rd (observer) position. They can get outside of their own beliefs and assumptions, 'step into the shoes' of others and perceive a situation as if they were another person or an observer. Disney's ability to identify with the characters in his animated films as well as with his audience is a good example of this skill. Freud's model and treatment of 'transference' acknowledged the importance of assuming different perceptual positions and keeping them well sorted. Leonardo acknowledged the pitfall of being stuck in one's own perceptual position and specified several ways to shift perspectives (such as using a mirror and changing his internal state) in order to evaluate one's work. Einstein looked at the universe as if he were riding on a light beam or in the reality of a two-dimensional being. Tesla essentially took up a perceptual position in the future, creating new realities from which to view the world.

5. *Ability to move back and forth between different 'chunk sizes' and levels of thinking.*

Geniuses seem to be able to move easily between the broader vision and the specific actions required to manifest the bigger picture. Leonardo, for instance, made an analogy between the

'macrocosm' and the 'microcosm'. He was constantly breaking down the subjects of his studies into their component pieces and then resynthesizing them into new configurations. He was able work with the little pieces and yet keep in mind their "intent" for the whole. Freud's primary mode of analysis was to seek details (such as Leonardo's odd notebook entries and slight anomalies in Michelangelo's statue of Moses) and then use them to make a reinterpretation of the whole. Tesla claimed that his method of "materializing inventive concepts and ideas" allowed him to "embody the invention in every possible improvement" and at the same time not "lose sight of the great underlying principles." Einstein's 'unified field theory' sought to define the connections between every physical phenomenon in the universe, from the cosmos to the atom.

6. *Maintain a feedback loop between the abstract and the concrete.*

Geniuses are also able to move between abstract models and principles and specific concrete expressions of those abstractions. They create their works through a repeated give-and-take between mental constructs and physical reality. This forms a loop that allows them to refine their theories through feedback from the concrete world, and at the same time refine their physical works through feedback from more abstract principles. Leonardo, for instance, sought to embody abstract notions and qualities such as "proportion" and "beauty" in his drawings and paintings. He derived his understanding of "nature's causes" from experience and observation, and then built his machines and made his drawings to "demonstrate" those fundamental principles. Freud built his psychological theories on the basis of his work with his patients, and applied his theories to create new therapeutic techniques. Many of Tesla's inventions involved phenomena that were abstract and invisible, such as electromagnetic energy and wave frequencies, yet the machines he built in his mind ran exactly like the machines in reality. According to Einstein, the sole justification for a theory was the "measure of survey over the experience of the senses we are able to achieve with its aid."

7. *Balance of cognitive functions: Dreamer, Realist & Critic.*

Tesla, da Vinci, Freud and Einstein were all 'dreamers' to a certain degree. That was a large part of their genius. Yet, they also had the ability and the skills to manifest their dreams in concrete expressions and to think critically about their ideas. In some ways, the ability to think critically is as important to the process of genius as the ability to dream. It is what insures that the genius' ideas are truly above average. Leonardo provided a number of strategies for how to learn to draw and how to evaluate one's work, as well as how to dream. The essence of Freud's work was about the relationship of dreams and wishes to external reality and the balancing of the 'pleasure principle' with the 'reality principle' (in fact there are many parallels between his 'id', 'ego' and 'super ego' and the 'dreamer' realist' and 'critic'). Tesla argued that being a thorough 'dreamer' made it easier to realize one's ideas and inventions.

8. *Ask basic questions.*

Geniuses tend to emphasize questions more than answers. Certainly, a key characteristic of all geniuses is their intense childlike curiosity and a high degree of fascination for their subject of study. As we saw in the quotation taken from his anatomical studies, Leonardo wrote innumerable questions to himself in his notebooks; seeking, like Aristotle, to find the "first principles" in nature. Rather than focus on present answers, Tesla created whole new worlds in his imagination and then wondered how to make them manifest. In fact, genius comes more from asking bold questions than finding the 'right' answers. Part of genius seems to be the belief that, ultimately, there are no right answers. According to Einstein, "The real nature of things, we shall never know, never." Instead of trying to seek approval and hold onto what they already know, geniuses seek the areas in which their knowledge is incomplete. For instance, Freud maintained that we must be ready to "abandon a path that we have followed for a time, if it seems to be leading to no good end." Instead of perceiving lack of success as 'failure', they consider it to be feedback for where to look next. As

one inventor I studied put it, "A 'failure' is just a solution to a problem other than the one I am working on at the moment."

9. *Use metaphors and analogies.*

Geniuses are constantly using metaphors and lateral or non-linear thinking strategies. Metaphor or analogy seems to be at the core of every act of genius. Mozart used the analogy of putting together morsels to create a meal to compose his music. Einstein used metaphorical constructs such as a blind beetle walking on a beach ball, a man in an elevator being pulled through space by some imaginary creature, or a flat world of two-dimensional creatures, in order to formulate and explain his theories. Often, the use of metaphor allows one to focus on the more important deeper structures of a subject. Leonardo, for instance, used the analogy between the earth and the human body as a way to organize his anatomy, and made an analogy with hair in order to understand the principles behind the movement of water. Tesla formulated his idea of robots by drawing an analogy to the functioning of his own nervous system. Freud, of course, concentrated heavily on the metaphorical significance of symbols and dreams as a way to understand his patient's symptoms.

10. *Have a mission beyond individual identity.*

One common characteristic of all geniuses is that they perceive their work as either coming from or serving something larger than themselves. In the introduction to his work on anatomy, Leonardo boldly stated, "I wish to work miracles," even if it meant he would "possess less than other men of more peaceful lives" and "live for a long time in great poverty." Tesla developed his powers of visualization in order to "make excursions beyond the limits of the small world" of which he had knowledge. Of his reasons for studying physics, Einstein maintained, "I want to know God's thoughts, everything else is details." Claiming further that "All means prove but a blunt instrument if they have not behind them a living spirit." Freud believed that "the acceptance of unconscious mental processes represents a decisive step toward a new orientation in the world and in science."

Other Patterns of Genius

It seems that we can confirm these ten patterns as common elements to all eight of the geniuses included thus far in this study. By adding the new members to the comparison, it is also possible to identify some other common patterns of genius that are illustrated more clearly in the context of our new group of individuals.

1. *Develop special states and strategies for access to unconscious processes.*

Practically every genius included in this study acknowledged the importance of unconscious processes in their work. Einstein, for example, claimed that thinking was to "a considerable degree" unconscious. In fact, many creative people claim they get their brilliant ideas in dreams or after they have 'slept on the idea' overnight. A solution to a problem they are working on, for instance, may suddenly come into their mind when they are in the shower in the morning. A number of creative people that I have interviewed have said something to the effect that, "I stuff my mind full of the information that I can find until I am completely exhausted and I can't fit anything anymore in there. Then I go to sleep. When I wake up, I have the answer!" Mozart went so far as to describe his creative state for composing music as taking place in a "pleasing, lively dream". Through his visualizations, Tesla was able to tap into his unconscious to discover new "scenes," "places," "cities" and "countries," making "friendships and acquaintances" with "people" who were all fabrications of his unconscious mind. Leonardo suggested a number of exercises specifically designed to utilize special states of consciousness for stimulating new ideas, promoting imagination and improving memory; including staring at clouds or walls, or reviewing forms and images while in a naturally occurring 'twilight state'. Clearly, Freud believed that unconscious processes were essential to creativity and thinking, and described how he 'resigned himself' to the 'control of his unconscious thoughts' while he listened to his patients.

2. *Encourage and use 'self-organizing' processes.*

Geniuses seem to be able to form mental strategies and models that are 'self-organizing' in that they run on their own, 'in parallel' with their conscious thinking. In other words, they are able to make internal models that operate on their own without conscious direction. It would seem that when a critical mass of elements are reached, the remaining ones begin to 'fall into place'. Once they have set up these internal mental circuits, they are able to maximize their unconscious competence by 'getting out of the way' of the process. Mozart, for example, claimed his symphonies wrote themselves after a certain point was reached. Many writers talk about how they 'check in' on their stories to see how far along they are. Tesla's ability to construct an imaginary engine in his mind and run it for a month is one of the most striking examples of this. Leonardo's strategy of seeing figures in the stains and rock on walls "if you are about to invent some scene" is another clear example encouraging self-organizing processes within the mind and nervous system (the ideas become an 'attractor' against the destabilized background of the wall). Of course, Freud's whole therapeutic approach was based on tapping into and supporting natural self-organizing cycles and change processes through "associative correction."

3. *Acquire familiarity with necessary information through self-managed learning.*

Geniuses often spend an unusual amount of time mastering basic knowledge, as opposed to simply leading edge or fringe knowledge. Obviously, to be effective in some area, and to reach the critical mass necessary for unconscious, self-organizing processes, one needs to have some familiarity with the necessary information. Geniuses are continually updating their knowledge through self managed learning. Geniuses are also rarely 'specialists'. They tend to avoid sophisticated 'lingo' and seek simplicity. They also have a wide range of interests and draw inspiration from many different sources. This is epitomized in Leonardo's voracious appetite for knowledge. Leonardo was the ultimate self-managed

learner. Aristotle is also known for the incredible scope of topics he mastered. Freud too, drew from a variety of fields of knowledge and applied his theories to many different subjects. Einstein spoke and wrote on many other topics besides physics, from the development of language to the subject of world peace.

4. *Incorporate chance or randomness into the creative process.*

Rather than be constrained or tied down by the information they have gathered, geniuses tend to look at it and work with it in different ways. Geniuses often incorporate chance or randomness into the creative process in order to destabilize existing patterns of thinking so that they may be reorganized in new ways. Mozart maintained that his best ideas came when he was out walking or could not sleep. Tesla described how his visual inspirations came from a mental image of "a ground of rather unpleasant and inert gray which quickly gives way to a billowy sea of clouds, seemingly trying to mold themselves in living shapes." Leonardo's constructions of grotesque faces and imaginary animals out of randomly generated combinations of features are an example of another way in which randomness may be used creatively. Geniuses also seem less threatened by uncertainty and have the ability to take advantage of spontaneous occurrences and insights. Leonardo, for example was also able to take advantages of chance associations, such as hearing the bell and seeing the rings of water created by the pebble. Often geniuses report having only a vague idea of where their work is taking them initially. Einstein and Freud, for example, often challenged assumptions without knowing where it would ultimately lead them.

5. *Use of models to approximate reality.*

Even when they are working with very complex processes, geniuses tend to use simple but abstract models as the basis for their thinking. These models are often simplifications of reality, focusing only on certain essential elements. As an example, in his discussion of Isaac Newton's discovery of gravity, J.B. Cohen explains that Newton "started with a mathematical construct that represents nature simplified...The process of repeatedly comparing

the mathematical construct with reality and then suitably modifying it led eventually to the treatment of the planets as physical bodies with definite shapes."¹ Instead of mathematical equations, Einstein often thought in terms of simple pictures of basic shapes (spheres, disks, triangles, etc.). Mozart visualized his completed pieces of music like a painting. Rather than make 'photographic' representations, Leonardo often simplified and stylized various elements (like representing muscles as strings in some of his anatomical drawings). Freud was able to handle a great deal of complexity with his model of the ego and the id.

6. *Operate from dynamic models divided into three interactive elements.*

To simulate dynamic processes, geniuses tend to use models formed of three interacting elements; humorously referred to as 'Holy Trinities' in NLP. These types of models allow a person to replicate complex patterns in a manageable way. According to Buckminster Fuller (a genius in his own right), three elements are the minimum necessary to have structure or patterns. Even though the number of variables is small, if the elements all mutually influence and relate to one another, quite sophisticated interactions may be simulated. Disney's Dreamer, Realist and Critic; Freud's ego, id and superego; Einstein's $E=MC^2$; Leonardo's three perspectives all exemplify dynamic models based on three interrelated elements.

7. *Think systemically.*

One of the most essential patterns of genius seems to be the ability to think 'systemically' rather than 'mechanically'. The mental strategies of geniuses typically allow them to track whole systems of interacting elements. Freud, for instance, viewed mental processes as "merely isolated acts and parts of the whole psychic entity," and claimed that the "meaning" of symptom could only be found in its relation to the larger system. Strategies of genius also tend to operate more in terms of 'loops of interaction' or 'mutual interaction' than 'linear' or 'mechanical' cause-effect. As Isaac Newton explained in his theory of gravitational attraction,

"There is not, for example, one operation by which the sun attracts Jupiter and another by which Jupiter attracts the sun, but one operation by which the sun and Jupiter endeavor to approach each other...there is one action between them by which they both approach each other."² As Newton's comment indicates, geniuses focus more on the 'relationships' between objects rather than objects themselves. As Leonardo put it, they are more interested in the 'processes of the results' rather than 'results of the processes'. Leonardo developed strategies which allowed him to represent and explore complex system dynamics by observing how they behaved under extreme conditions. Einstein rejected statistical approaches to physics because he thought they ignored the deeper dynamics of the system and focused too much on the results. Clearly, Mozart's ability to represent a whole symphony or opera in his mind at one time demonstrates a high degree of systemic thinking capability.

8. *Focus on 'deep structure' as opposed to 'surface structure'.*

Maybe the most definitive characteristic of genius is the commitment to get to the 'deep structure' beyond the 'surface structure'. Aristotle and Leonardo both claimed that they wanted to find the "first principles" of the natural world. Their strategies of observation were designed to 'inductively' find deeper structures by comparing multiple examples of something (like Leonardo's synthesis of his many experiences at the dissecting table). Tesla too emphasized the importance of maintaining focus on the "great underlying principles." Einstein's quest for the unified field theory represented a search for the deepest structures in the universe. Freud continually sought multiple levels of successively deeper structures behind the surface symptoms and behaviors of his analytical subjects.

9. *Map their ideas into some external formal system of representation.*

An act of genius always culminates in some kind of mapping into an external form. Mozart wrote his music as notes. Aristotle lectured and wrote his treatises. Einstein formulated his metaphors and imaginary constructs into mathematical formulas. Tesla wrote his own patents for his inventions. Leonardo kept his

notebooks. Disney made his films. Freud collected his ideas into books. If these people had kept their ideas in their heads we would have never known about their genius.

10. *Harmonize new ideas with existing knowledge.*

Until a new idea is harmonized with what is already known, it will not be put into practice—regardless of how ‘brilliant’ it is. One of the most important tasks of a genius is to make it possible for people to understand ideas which challenge and transform old ways of thinking. This is especially challenging when those people are still thinking the old way. According to the philosopher Arthur Schopenhauer, all great new ideas go through three stages. The first is ridicule; the second is violent opposition; then, finally, they are accepted as having always been ‘self-evident’. None of the geniuses included in this study had their ideas immediately accepted. They all had the experience described by Schopenhauer to some degree.

Molecular geneticist Gunther Stent maintains that much of the struggle related to the acceptance of new ideas and paradigms stems from a “contradictory epistemological attitude toward events in the outer and inner world.”³ Stent identifies these conflicting philosophies as ‘materialism’ versus ‘idealism’. The materialist point of view essentially maintains that there is a ‘real’ external world that exists independently of the mind. The mind is a reflection of that reality and creates an imperfect representation of that real world. From the ‘idealist’ perspective, perceived events and relations have no reality other than their reflection in human thought. From this point of view, reality is a reflection of the mind. The external world is an imperfect representation or projection of ‘pure’ forms of thought. Stent points out that in recent years a third alternative has been emerging, spurred by Chomsky’s theory of transformational grammar and the notion of surface structure and deep structure. He calls this new epistemology ‘structuralism’. As Stent explains:

Both materialism and idealism take it for granted that all the information gathered by our senses actually reaches our mind; materialism envisions that thanks to this information

*reality is mirrored in the mind, whereas idealism envisions that thanks to this information reality is constructed by the mind. Structuralism, on the other hand, has provided the insight that knowledge about the world enters the mind not as raw data but in highly abstracted form, namely as structures. In the preconscious process of converting the primary data of our experience step by step into structures, information is necessarily lost, because the creation of structures, or the recognition of patterns, is nothing else than the selective destruction of information. Thus since the mind does not gain access to the full set of data about the world, it can neither mirror nor construct reality. Instead for the mind reality is a set of structural transforms of primary data taken from the world. This transformation process is hierarchical, in that “stronger” structures are formed from “weaker” structures through selective destruction of information. Any set of primary data becomes meaningful only after a series of such operations has so transformed it that it has become congruent with a stronger structure preexisting in the mind...canonical knowledge is simply the set of preexisting “strong” structures with which primary scientific data are made congruent in the mental-abstraction process. Hence data that cannot be transformed into a structure congruent with canonical knowledge are a dead end.*⁴

Stent’s belief is that many ideas are ‘premature’ if there is no bridge to existing ‘canonical’ knowledge. Thus, for a new idea to become incorporated and accepted it must first ‘pace’ and then ‘lead’ the preexisting models. Einstein’s theory of relativity, for instance, encompassed and acknowledged all of Newton’s laws. In his analytical work, Freud often meticulously acknowledged and respectfully accounted for previous interpretations. For example, rather than attack or ridicule the previous interpretations of Michelangelo’s Moses, Freud’s proposed interpretation incorporated and “vindicated” all of them. In order for Tesla’s robot or Leonardo’s flying machines to be brought into reality, they had to wait for the rest of the necessary knowledge to come into existence.

At its basis, the 'mission' of genius is to widen our maps of the world rather than to formulate the one 'right' answer. This has also been my mission with respect to this series on *Strategies of Genius*. I hope that the time you have spent with Sigmund Freud, Leonardo da Vinci and Nikola Tesla has enriched your map of the world significantly.

Footnotes

1. *Newton's Discovery of Gravity*, Cohen, J. B.; ***Scientific Genius and Creativity***, W.H. Freeman and Company, New York, New York, 1987, pp. 23-24.
2. Ibid. p. 23.
3. *Prematurity and Uniqueness in Scientific Discovery*, Stent, G.; ***Scientific Genius and Creativity***, W.H. Freeman and Company, New York, New York, 1987, p. 102.
4. Ibid., p. 103.

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Afterword

I hope you have enjoyed this exploration into the *Strategies of Genius*. As I indicated during the course of the book, many tools and resources exist to further develop and apply the models, strategies and skills described within these pages. In addition to the tools already mentioned, I am currently planning a collection of tapes, workbooks, computer software and multi media programs to help illustrate and support the types of strategies described in this book. I am also conducting seminars and workshops on *Strategies of Genius* in various parts of the United States and Europe as well as training programs on the applications of NLP for Creativity, Health, Leadership, Effective Presentations Skills, and Modeling.

If you would like to receive further information regarding these tools and resources or any future developments related to *Strategies of Genius*, please contact:

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Appendix A:

Summary of Some Common Meta Program Patterns

1. General Approach
 - Move 'away from,' or 'towards' something
 - Be 'proactive' or 'reactive'
2. Units of Analysis
 - Details - small information chunks
 - Generalities - large information chunks
3. Time Frame
 - 'Short-term' or 'long-term'
 - Focus on Past, Present or Future
4. Basic Cognitive Style
 - Vision
 - Action
 - Logic
 - Emotion
5. Situational Emphasis
 - Task (Procedures - Goals)
 - Relationship (Self - Others)
6. Analytical Style
 - Sort for Similarities - Matching
 - Sort for Differences - Mismatching

[Note: For an overview of basic NLP models and distinctions, refer to **Appendix A** of *Strategies of Genius Volume I* or *Volume II*.]

Appendix B:

Presuppositions of NLP

The Map is not the Territory

1. People respond to their own perceptions of reality.
2. Every person has their own individual map of the world. No individual map of the world is any more "real" or "true" than any other.
3. The meaning of a communication to another person is the response it elicits in that person, regardless of the intent of the communicator.
4. The 'wisest' and most 'compassionate' maps are those which make available the widest and richest number of choices, as opposed to being the most "real" or "accurate".
5. People already have (or potentially have) all of the resources they need to act effectively.
6. People make the best choices available to them given possibilities and the capabilities that they perceive available to them from their model of the world. Any behavior no matter how evil, crazy or bizarre it seems is the best choice available to the person at that point in time - if given a more appropriate choice (within the context of their model of the world) the person will be more likely to take it.
7. Change comes from releasing the appropriate resource, or activating the potential resource, for a particular context by enriching a person's map of the world.

Life And 'Mind' Are Systemic Processes

1. The processes that take place within a person, and between people and their environment, are systemic. Our bodies, our societies and our universe form an ecology of systems and subsystems all of which interact with and mutually influence each other.

2. It is not possible to completely isolate any part of a system from the rest of the system. People cannot not influence each other. Interactions between people form feedback loops - such that a person will be affected by the results that their own actions have on other people.

3. Systems are 'self organizing' and naturally seek states of balance and stability. There are no failures, only feedback.

4. No response, experience or behavior is meaningful outside of the context in which it was established or the response it elicits next. Any behavior, experience or response may serve as a resource or limitation depending on how it fits in with the rest of the system.

5. Not all interactions in a system are on the same level. What is positive on one level may be negative on another level. It is useful to separate behavior from "self" - to separate the positive intent, function, belief, etc. that generates the behavior from the behavior itself.

6. At some level all behavior is (or at one time was) "positively intended". It is or was perceived as appropriate given the context in which it was established, from the point of view of the person whose behavior it is. It is easier and more productive to respond to the intention rather than the expression of a problematic behavior.

7. Environments and contexts change. The same action will not always produce the same result. In order to successfully adapt and survive, a member of a system needs a certain amount of flexibility. That amount of flexibility has to be proportional to the variation in the rest of the system. As a system becomes more complex, more flexibility is required.

8. If what you are doing is not getting the response you want then keep varying your behavior until you do elicit the response.

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