Omni-Living

– Life is Like a Dream and There is a Way to Wake Up

Omni-Living League

To All

Contents

Preface

This book has two parts. The first part discusses why I claim our life is like a dream, and the second part talks about how we can wake up from this dream.

It all started with a party at my old college buddy's house more than fifteen years ago. After playing a couple rounds of video games, we sat down and started chatting. During the conversation, he mentioned that he took a non-Euclidean geometry course back in college. I immediately showed my respect because I know it is the difficult math behind the theory of General Relativity, which even Einstein had trouble with. He said, "nah, it is not that bad. Of course, it is much harder than Special Relativity. If you are interested in relativity theories, you can start with the theory of Special Relativity." He then gave me a textbook on Special Relativity. It turned out an easy read. Its math is at high school level. However, its implication is profound. Space and time should never be considered as two unrelated entities ever since Einstein discovered Special Relativity. They are two sides of one unity – spacetime. Therefore, how we travel in space has a direct effect on how we travel in time. How marvelous and unbelievable it is!

Inspired by newly acquired knowledge, I went on studying the mind-boggling Quantum Mechanics. It has always been a subject which is fascinating, intimidating, mysterious, and yet extremely attractive to me at the same time. After studying Quantum Mechanics, I realized that we cannot ignore the influence from the subjective side when we attempt to investigate the quantum world. How we measure will affect the result of measurement. The so-called "measurement problem" is at the heart of Quantum Mechanics. Even today, physicists still cannot agree upon what measurement is and how it happens. I feel that the key lies in how and why we humans can observe the external world in the first place. If Quantum Mechanics is pointing to the direction that we can no longer assume completely objectivity when conducting observation, we should then stop separating the subjective and the objective, and stop pretending that we can watch the world as a bystander watches a movie. Instead, we should consider ourselves as an integral part of the world, observe how our observation affects the world, and further observe the entity that can carry out observation – the observers.

This idea of "observing the observation and observing the observer" marked the turning point of my interest. Before that I had always had a keen interest in natural world, yet little interest in psychology, sociology, or any other social sciences which I considered to lack objectivity, mathematical rigor, or significance. How wrong was I, at least for the last count about significance! After all, we are the ones conducting all sorts of scientific research in the first place. How our mind works should have top priority in research. How could our mind, subjective and non-material, interacts with the objective and material world? What is the interface between the two? How could we human have our human experience? I searched psychology and brain research extensively. However, I could not find a satisfactory answer. The so-called "hard problem of consciousness" is a thorny issue for both philosophers and scientists. My intuition tells me that "hard problem of consciousness" and "measurement problem" are related at a fundamental level because

they both arise during the interaction between the subjective and the objective.

A random search on the internet with Chinese character of "mind" led me to Chinese classics, especially those Buddhism and Daoism canons. Zen koans are also very interesting and insightful. They all seem to indicate the unification of the subjective and the objective. Their conclusions were not merely from philosophical reasoning, but based on practical methods. That is to train our mind in peculiar ways to ultimately reach an awakened mind, so that we could directly experience the unification of self with everything else, i.e., the unification of the subject and the objective. Given the perspective of an awakened mind, our current life which we are experiencing at present is like a dream. When we are in a dream, the person that we dream as ourselves is not the real us, but an avatar created by our dreaming mind. Similarly, the person that we consider as ourselves in our daily life is merely an avatar of the awakened mind. To wake up from this dream-like life that we currently experiencing, we need to train our mind so that we can reach the awakening. Through many years of digging into abstruse classic Chinese texts, I believe I finally found the best mind-training method.

My original plan was to simply apply this method till one day I would wake up from this dream-like life and see everything as what they really are. Only by verifying the results from my own experience, I could be one hundred percent sure about the efficacy of this method and know that life is indeed dream-like. However, implementing the method is much harder than I had originally anticipated. I could not focus my mind to the point which is needed for achieving even the first stage out of the six stages laid out by the method. Now as I am getting old and still have not yet been able to reach any breakthrough, I figure that the most effective way may be to introduce this method to everyone, so that public can learn about this possibility of awakening, and those who become interested can give the method a try. With more people testing out this method, there would be a greater chance for someone to succeed, which could prove the efficacy of this method and our life is indeed dream-like.

After I finish this book, I plan to keep trying this method for the rest of my life. The method requires great concentration of the mind. For that reason, I will stay anonymous so that I would not be distracted by any publicity that might be generated from this book if there is any. I apologize to my readers for any inconvenience it might cause. I also hope you, the readers, will try out the method and hopefully wake up from the dream, so that you can share with the rest of us what it is like and how you have accomplished it.

If you are the kind of people who prefer to know the world through your intuition, I believe this method is more accessible to you. You can simply skip the abstract reasoning presented in Part One of the book and go straight to Part Two, in which the method is explained in detail. Try the method out, you will see the result if you are determined and persistent. If you could focus your mind intensively, you would get result quickly. If you were like me, having too many theoretical thoughts and easily distracted, it could take a very long time. The process of applying this method is like to drill wood for fire, one must apply his or her effort with enough throughput and sustain it long enough to get fire. It is not an easy task by any means. However, the reward of success or even just half way

through is so great that all the hard work is well worth it.

If you are the kind of people who would rather explore the principles and theoretical framework of this method before diving into it, please go through the first part of this book thoroughly. I will try to explain my thought process which winds through philosophy, science, and ancient Chinese literature. I hope that you will enjoy this intellectual journey. In the first part of this book, I will first discuss our life being dream-like from a philosophical perspective. Then I will examine it from a scientific viewpoint. Specifically, I will discuss Einstein's theory of relativity and Quantum Mechanics. Those theories in modern physics, together with philosophical reasoning mentioned above, lead me to my interpretation of Quantum Mechanics, which indicates the dream-like feature of our universe and our own life. Finally, I will provide two types of evidence to support my interpretation of Quantum Mechanics. One is to quote Chinese classics and explain them in modern language, so that readers can see the similarity between ancient wisdom and my interpretation of Quantum Mechanics. The second part of evidence comes from research findings on Exceptional Human Function (EHF) which were conducted by researchers in mainland China and Taiwan. Hopefully, by the end of the first part of this book, you will be inspired and ready to try out the method in Part Two.

Despite all the intellectual discourse laid out in the first part of this book, my intention is to introduce a practical method, which is dramatically different from either a philosophical approach or a scientific approach. The philosophical arguments in this book can logically raise the possibility of how life could be a dream. But they are bounded to the realm of reasonings and speculations, which cannot be put into test. On the other hand, many scientists take the stance of realism or materialism. They tend to take the world as an objective reality to begin their research. And they typically do not question whether the universe could be dream-like at all. The method I introduce here is different from philosophical methods of pure analytical thinking or the scientific method which employs experiments and observations to test against theoretical hypothesis. Instead, it is a mind-training method, which, if successfully implemented, enables us to cut directly through the conjunction of the objective and the subjective and ultimately realize the unification of the two. It differs from philosophy because it is testable by anyone who is willing to try. It is practical and replicable by others. In that sense, it is very much like science. However, it is also different from science because its focus is not on the objective world, or studying the subjective mind in an objective way. Instead, it is to train our mind to function in a way which it has never done before.

Well, time in the dream called life is flying by, without further ado, let's begin our journey!

Part One

Chapter 1 My Dream

I had a dream one night. In the dream, I was a talented writer and a gifted meditator. Before I wrote, I would sit down and enter deep meditation. After meditation, insight sprang up from my mind so rapidly that I could barely write all of them down. I typed so fast that the sound of keystrokes ran like a torrent roaring forth Beethoven's 5th Symphony. Subtle yet powerful words rushed out of my fingertips and flowed into the hearts of millions from all walks of life. They see a door that leads to the realization of the dream-like nature of life and the subsequent new way of life – omni-living. Despite the great success, I remained anonymous. I quietly applied the method that I introduced to my readers, staying in meditation day and night. I push on with great effort, yet without much success till the moment of death. Just then, the great awakening finally arrived at this least expected moment. At last, I knew. Filled with peace and bliss, I woke up from the dream.

Even though the great feeling felt in the dream still lingered in my mind when I woke up the next morning, I immediately knew that it was merely a dream. The dream was vivid and realistic. The people and the places in the dream were full of life. In comparison, my bedroom in real life seemed a little lifeless and even unfamiliar when I first opened my eyes. Only after a while, the feeling of alienation melted away and I fully came back to my real life. I remembered who I am, where the alarm clock was, where my bed was, and where my toothbrush was. By then my rational mind was already fully in charge, and the fuzzy feeling from the dream faded away without a trace. I started to ponder, "if all the events in that dream were played out during my waking hours, they would feel just as real as the events in my real life. They did not feel like illusions from a dream at all." This very fact intrigued me. How could a dream feel so real? Many of my dreams are incoherent or even absurd. However, some dreams do feel very much the same as the real life, often more exciting and alive if not more real. If there is no way to tell whether what I have experienced is real or merely a dream based solely on its content or its feel, I wonder how I can tell whether my current waking state is not a dream. Maybe the life that I have been living for so many years is just a really long dream? Could that be the case? As absurd as it sounds, it seems to be a very legitimate question. The more I think about it, the more difficult it is to dismiss this question as nothing but a silly thought. Is it possible to find a definite answer? I wonder.

Chapter 2 The Butterfly Dream

Around the 4th century BC, there was a famous Chinese philosopher called Zhuang Zhou (369 ~ 286BC). He is the most eminent follower of Lao Zi (Lao-Tzu), and one of the two founders of Daoism, the other one being Lao Zi himself. Zhuang Zhou lived during the period of "Warring States" (476 ~ 221BC) in China. It was a chaotic time during which many states were fighting against each other to gain dominance until the State of Qin[1] finally conquered all of them and unified China in 221BC.

During that time, Zhuang Zhou was living in the State of Chu, a large state in southern China. After hearing Zhuang Zhou's erudition, the king of Chu sent two senior officials to invite Zhuang Zhou to serve at a high-rank position in his imperial court. When they arrived at Zhuang Zhou's village, Zhuang Zhou was fishing. The two officers greeted him politely, "Our king would like to burden you with the affairs of the State." Zhuang Zhou, with his fishing pole in hand, did not even turn around and replied, "I heard that there was a divine turtle in the State of Chu. It was already three thousand years old when it died. The king wrapped its shell with fine silk, then put it in a bamboo box on the high altar of the national temple. Do you think the turtle would rather die with its shell to be honored in such a way, or would it rather live and shake its tail in the mud?" The two officials said "Of course, it would rather live and shake its tail in the mud." Zhuang Zhou then said, "Please go back and tell your king! I am going to shake my tail in the mud."

In ancient China, becoming a government officer would bring great wealth and honor. King's invitation was a golden opportunity toward such a noble life. However, Zhuang Zhou, as poor as he was, did not even turn his head around when such an opportunity was presented right in front of him. To put this into perspective, let's find out how poor Zhuang Zhou was. It is illustrated in the following story.

Zhuang Zhou ran out of food one day, so he went to the Marquess River Superintendent to borrow some grains. The Marquess said, "Okay. I am going to get the income from my fief. And I will then lend you three hundred ounces of gold. Will that work?" Zhuang Zhou replied angrily, "On my way here yesterday, I heard a voice calling me. I looked around and saw a carp in the carriage rut. So, I said, 'Carp, what brought you here?' the carp replied, 'I am the Aqua Minister in the East Sea. Sir, do you have a gallon of water to keep me alive?' I answered, 'Okay. I will travel south to meet the Kings of Wu and Yue, and then (with their permission) reroute the West River to you. Will that work?' The carp burst with anger, 'Having lost the proper element, I cannot survive. If only I could get a gallon of water, I would be able to keep myself alive. Sir, you'd better look for me in a stall of dry fish than carrying out your plan!'"

Apparently, Zhuang Zhou was so poor that he had to borrow rice to keep himself alive. Then why didn't he grasp the golden opportunity to become a noble? Nobody knows exactly. My guess is that he has such deep understanding of life so that the small matter

[1] After his grand victory, Emperor Qin built the Great Wall to defend nomads from the north. He also built his lavish tomb guarded by the terra-cotta army. Both places are now must-see tourist attractions in China.

of wealth and fame does not appeal to him at all, and even the possible starvation could not deter him. He, as the co-founder of Daoism, lives his life in accordance with the Dao – the ultimate principle behind all phenomena in Daoism. Nowadays, no one would even remember that king's name if he weren't the supporting role in the story about Zhuang Zhou.

When Zhuang Zhou was dying, his disciples planned an elaborate funeral for him. However, Zhuang Zhou said to them, "I will have heaven and earth as my coffin, the Sun and the Moon as a pair of jade, the stars and constellations as pearls and jewels, together with everything else as my funerary objects. Wouldn't those provisions for my funeral be magnificent and complete? Why bother adding more!" His disciples said, "We are afraid that your body might get eaten by crows and kites." Zhuang Zhou replied "Above ground, it will be eaten by crows and kites. Below ground, it will be eaten by mole crickets and ants. You want to rob the food from one and give it to the other. How biased you are!"

Whether living or dying, Zhuang Zhou is apparently not burdened by any worldly possessions. He is united with the Dao, thus he is complete and free. His philosophy of life is well explained in *Zhuang Zi (or Chuang Tzu)*, a collection of his essays. In the first essay of that book, *Wandering with Freedom*[2], Zhuang Zhou described what the ultimate freedom is.

> If instead he had risen through the naturalness of Heaven and Earth,
> travelled on the six elemental forces and voyaged into the unknown and
> unlimited, he would have had to depend upon nothing! As the saying goes
> the perfect man has no self;
> the spiritual man has no merit;
> the holy man has no fame.

I do not know if Zhuang Zhou has reached the level of having "no self," "no merit," and "no fame" mentioned in his *Wandering with Freedom*, but his name and merit are certainly well-known even after more than two thousand years. The stories and fables in *Zhuang Zi* are short and seemingly very simple, even a little child can read and understand them. Yet at the same time, they are so profound that they make even well-versed scholars ponder.

After reading the stories about Zhuang Zhou mentioned above, you probably already have a good idea about what kind of person he is. Now, let's me tell you the story that made me ponder.

> Once, Zhuang Zhou dreamed he was a butterfly, a butterfly flitting and
> fluttering about, happy with himself and doing as he pleased. He didn't
> know that he was Zhuang Zhou. Suddenly he woke up and there he was,
> solid and unmistakable Zhuang Zhou. But he didn't know if he was Zhuang

[2] Using the version translated by Martin Palmer with Elizabeth Breuilly, Chang Wai Ming, and Jay Ramsay in The Book of Chuang Tzu, 2006, published by the Penguin Group

> Zhou who had dreamt he was a butterfly, or a butterfly dreaming that he was Zhuang Zhou. Between Zhuang Zhou and the butterfly there must be some distinction! This is called the Transformation of Things. [3]

To me, Zhuang Zhou's perspective is quite eccentric, even absurd. Of course, it was Zhuang Zhou who dreamed of butterfly, not the other way around. However, Zhuang Zhou and butterfly seem to be somehow interchangeable in this peculiar way. One can dream of being the other and experience what the other experiences in his or its own life, almost like they are avatars to each other. Zhuang Zhou calls this mutual embodiment "the Transformation of Things." The invisible Dao, the source of everything in Daoism, can take either the form of Zhuang Zhou or the form of a butterfly. The difference between Zhuang Zhou and the butterfly lie at the phenomenon level. Fundamentally, the dream state and awake state are of no difference, and the butterfly and Zhuang Zhou are at equal footing. They both are transformations of the Dao. They are experiencing their individual human or butterfly life in their own peculiar way, manifested by the Dao.

As absurd as this little fable may seem to be, it got stuck in my mind. I have not forgotten it ever since I heard it in my childhood. It seems to strike a chord deep in my heart. Do you also feel its mystic charm?

Reflecting upon my own dream and pondering Zhuang Zhou's two-thousand-year old fable, I started to see how the dream state and the waking state are extremely similar. In both states, we consciously experience our interactions with an "external world," or at least we thought it is external. The two states are so similar that we often mistakenly take our dream world to be real when we are still in the dream. That is because the dreams feel the same as the real life. We see, hear, smell, talk, and move around in the dream in the same way as we carry out such sensations, perceptions, and actions in our real life. And the dream world does provide surrounding objects for us to see, hear, and smell etc. We can also act out in the dream world and it responds to our actions. So basically, dream world interacts with our dreaming self in the same way as the real world interacts with the waking self. Scientific studies show that the brainwave in waking hours is very similar to that during Rapid Eye Movement (REM) sleep during which dreams are most likely to happen. Brain uses equal or even more amount of energy in REM sleep than in waking. Those physiological signals of dreaming brain strongly indicate the similarity between dreaming and waking state.

Could the dream state and the waking state be equal at a fundamental level? If so, why do we always think the dream world is illusory? It is mainly because our dream is neither consistent nor coherent, therefore we think it is just an illusion. Our experiences during waking hours form a continuous story. Each person we saw yesterday looks exactly the same as we see them today, even though they have aged by one day. Each object we see also looks the same as they looked a day ago, even though they also have gone through wear and tear for yet another day. We cannot really notice subtle changes which happen daily in human or objects, thus we think every person and object have a continuous

[3] Using the version translated by Watson, Burton. Zhuangzi: Basic Writings (3rd ed.). 2003, New York: Columbia University Press

existence. And such continuity and consistency reinforce our belief that our life is real. On the other hand, our dreams vary greatly. Most dreams have dramatically different contents. Last night's dream did not follow the dream that happened the day before yesterday. They do not form a coherent collection of experiences as our daily waking experience do. Therefore, we naturally consider them illusory.

What if someone could have a coherent and continuous dream night after night, would it make the dream more real, even to the point that it is as real as our waking life? Let's run a thought experiment to investigate this possibility.

Imagine a guy who does dream coherently and continuously night after night. Suppose our main character is Leon. Leon is a professor at a renowned university in US. During the day, he works hard on his research in cosmology. He teaches introductory cosmology courses to undergraduates and more advanced astronomy and physics classes for graduate students. He talks about the search for extraterrestrial intelligence (SETI) with such a zeal in his classes that many students are aspired to pursue a career in cosmology, aerospace engineering, or other related fields.

At night, he lives another life in his dreams. As soon as he lies down on his bed, he immediately falls into sleep and starts dreaming. In his dream world, he wakes up in the morning at a beautiful monastery on a mountain. His name there is Noel and he is a monk. He and his fellow monks live a simple life. Besides daily religious rituals, the monks also grow vegetables and olive trees at the back of the monastery. His brother, a farmer at the nearby village, sometimes visits him and brings some fresh homegrown fruits to him. Noel is well respected by people around him since he is selfless and egoless. He never gets angry and has a genuine concern of others' wellbeing.

Leon and Noel's life progresses day by day, or should I say, night by night depends on their perspectives. Leon's day is Noel's nigh and vice versa. Leon and Noel have very different occupations. Thus, they are experiencing completely different events in their lives. However, the essences of the processes of their lives are the same. They both perceive their own worlds and react to them. Various things take place in their lives as time goes by, they experience those events and interact with surroundings. They watch their lives unfolding day by day. Besides the "minor" differences in the details of contents of their lives, Leon's life and Noel's life are pretty much interchangeable. To wake up in Leon's world is just to fall into the dream in Noel's world, and to wake up in Noel's world is just to fall into the dream in Leon's world. In fact, they both refer the other world as the "dream world." Here we assume that both Leon and Noel have perfect memory about the two worlds they live in. They do not forget what happens in their dreams, so they know what is going on in each other's life.

So, what do you think? If Leon/Noel indeed experiences this kind of double life in two worlds, which world is more real? Which life is the real one? It is hard to say since those two lives are in complete symmetry, aren't they? They look equally real, or equally illusory.

No wonder Zhuang Zhou wondered "if he was Zhuang Zhou who had dreamt he was a butterfly, or a butterfly dreaming that he was Zhuang Zhou." However, in Zhuang Zhou's case, we do not know if the butterfly knows anything about Zhuang Zhou's life, yet Zhuang Zhou does have the memory of himself being a butterfly in his dream. So, there is an asymmetry between the two. In our daily life, we forget most of our dreams. But some people do have repeated dreams and remember them well. To understand how memory of dreams affects the situation, let's add a twist to our thought experiment about Leon and Noel. Let's assume that Leon/Noel's memories about their dream life are not good. They will remember a little bit of their dreams when they just wake up and will soon forget about it once they get into their busy life of the day. That is the typical scenario for most of us regarding our dreams. Here is how it goes for Leon and Noel.

When Leon gets up, he quickly enters his role as a professor, especially if it is a busy day. He jumps out of his bed when alarm clock wakes him up. He does a quick rehearsal of his class in his mind while having his breakfast. After dressing himself up in a semi-formal attire, off he goes, completely forgets about his dream as a priest. Some day when there is no class, no research meetings, and no deadlines for grant proposals, Leon lies on the bed enjoying his well-deserved moment of relaxation, suddenly he remembers bits and pieces of the dream he had last night. "Did I dream about that monastery on the mountain again?" Leon said to himself. "That is funny. I dreamed myself to be this priest yet again. Why do I repeatedly dream myself being a priest? Maybe I was a priest in another life."

Likewise, Noel does not remember much about his dream life as a professor either. Every morning Noel gets up at 4am to perform his morning ritual with other monks. The schedule is the same every day throughout the year. There is no Sunday or holiday break. Life in a monastery is strict. Noel does not have time to even think about his dreams except occasionally he might suddenly recall bits and pieces of his dreams during his afternoon meditation. When he is quietly meditating, sometimes images of his dream from previous night flash back in his mind. "Did I dream about being a professor again? Passionately talking about finding aliens in the outer space. That is so funny. I dream about being a professor multiple times a year. What is that about? Am I a professor in some other life?"

As you can see, by introducing the complete symmetry between the two lives that Leon/Noel are living in this thought experiment, it is obvious to see that there is no way to judge which life is more real than the other. And by blocking the memory of their dreams, it is also easy to see that why Leon/Noel will consider the life which he is current in as being more real than the other one. When living as a priest, he will consider his life as professor is unreal because he barely remembers anything about it. While living as a professor, he will consider his life as a priest is just a vague, repeating dream. Apparently those two judgments are contradictory to each other. If he could remember both lives in complete details, he would not consider one life being more real than the other. Lacking the memory of the other life makes Leon/Noel to draw incorrect conclusions.

What does this thought experiment tell us then? It shows that there is no way to know

whether we are living in a dream right now by analyzing the information that we perceive and remember at current moment. That information is merely the content of our current life, which is of no significant difference from the content of a series of coherently progressing dreams. Therefore, based on the content of our experience, the only conclusion we can draw is that such an experience can be happening during waking life, in a dream, a virtual reality simulation, or any other situations in which a subjective self or avatar perceives and interacts with an environment which is considered as an external world by the self or avatar.

Some people may argue, "Okay, based on your thought experiment, it is true that we hardly can tell whether our life is real or not just merely from its content. However, your analysis is based on an imaginary thought experiment, which is hypothetical in the first place. In real life, dreams are neither consistent nor coherent, not even repeating for most people. Therefore, your conclusion lacks empirical evidence."

Yes, most people do not have consistent dreams night after night. However, exceptions do exist. A recent case is about a famous Chinese philologist, philosopher, and revolutionist, Mr. Zhang, TaiYan (1869~1936AD), also known as Zhang, BingLin. Throughout his entire life, Mr. Zhang had been hunted by dictatorship governments for seven times and put into prison for three times due to his revolutionary activities. He had never given up his pursuit for democracy and free speech even in the face of torture. He was also the last great literati of classical Chinese and a prolific writer whose work was hugely influential.

In Aug. 1913, Mr. Zhang, TaiYan sensed President Yuan, ShiKai's appetite for dictatorship. Therefore, he travelled to the president's residence, wielding a fan with a big medal as the fan pendant, criticized President Yuan's wild ambition publicly. In Chinese culture, scholars fight with a fan as a bow and shoot their speech as arrows. That is the reason why Mr. Zhang was wielding a fan. His action drew great publicity. President Yuan was scared, so he put Mr. Zhang under house arrest at Dragon Spring Temple in the outskirts of Beijing. President Yuan did not dare to treat Mr. Zhang too shabbily due to his renown, or maybe the president wanted to bribe Mr. Zhang. Either way, he ordered extravagant service for Mr. Zhang. One chef and two servants were hired to take care of Mr. Zhang. The allowance for his meals were five hundred silver coins each month. As you can imagine, the food was luxurious. However, Mr. Zhang was so worried about the fate of China that he paid no attention to the fine dining. He ate only two dishes right in front of him and did not even bother to touch other dishes a little further away. As time went by, those two servants noticed his behavior pattern, so they put a couple of vegetable dishes right next to Mr. Zhang and placed all the expensive delicacies far away. Their scheme worked perfectly. Mr. Zhang ate only the two vegetable dishes and did not even touch anything else. After Mr. Zhang finished his meal, the two servants would enjoy the delicacies by themselves. Later Mr. Zhang's student, Mr. Qian, XuanTong found the servants' misbehavior during his visit. He reported to the government and got them fired.

Mr. Zhang was kept under house arrest until President Yuan died in 1916. In 1915, Mr. Zhang was forced to write a letter to "persuade" President Yuan to ascend to the throne.

He then wrote the following:

> The oath you made on April 8th of the first year of the Republic still echoes in my ears. Now you suddenly give rise to such a wild ambition of stealing the throne. You are not only a traitor to the Republic of China, but also a traitor to the Qing Dynasty[4]. I am now prisoned in Beijing. It is a living death! I hope that you will decapitate me as soon as you receive my letter. My death will be even more honorable than dying in the hands of those evil bureaucrats of Qing Dynasty!

It is said that President Yuan was furious upon reading the letter and then laughed it off, "He is just a lunatic, why would I take him seriously?"

Even though Mr. Zhang was not afraid of being decapitated by the president, yet he was deeply troubled by something "illusory." During years under house arrest, Mr. Zhang was furious at President Yuan and deeply worried about the future of the newly established Republic of China. Probably out of anxiety, he started to dream himself being a judge in afterlife. It bothered him so much that he wrote a letter to Zen Master Zong Yang to ask for a solution in March 1915. Here is my translation of part of Mr. Zhang's letter. The texts that are not translated are indicated by ellipsis.

> March 30th,
> Venerable Master,
>
> … Here is a detailed description of my dreams and I wish to hear your advices. Last December, I had a dream in which an attendant carried a business card of his master to invite me to have lunch with him. I looked at the card and the name on it was Wang, Ao (1450-1524 AD, a famous minister during Ming Dynasty). When I arrived at his place, many carriages parked outside. I walked into his house and the banquet had already begun. There were many guests, including Chinese, Indian, and European. Everyone showed their business cards. Chinese guests were Mr. XiaHou, Xuan (209-254 AD, a famous general of State Wei during Three Kingdom period) and Mr. Mei, YaoCheng (1002-1060 AD, a famous minister in Song Dynasty) etc. I asked Mr. Wang, "I have read Chinese history and know your virtue. However, we have never met before, why am I invited here?" Mr. Wang replied, "We will be doing some legal work together! Mr. Mei is the attorney general and we are judges. Nine of us oversee the criminal cases in five continents. You and I are in charge of east Asia." I asked, "Everyone's lifespan is based on their karma. Even gods cannot control

[4] Qing Dynasty is the last imperial dynasty of China preceding the Republic of China. Yuan, ShiKai was the prime minister of Qing Court. When revolutionary army liberated half of the China, he represented the imperial Qing to negotiate with revolutionaries, and finally became the Provisional president of the Republic of China in 1912. That is why Mr. Zhang call president Yuan a traitor of both the Republic of China and the Qing Court when he wanted to become an emperor.

> theirs. How could we be in charge?" Mr. Mei answered, "There is no one controlling the course of life and death. We just process the lawsuits here. Those who receives citations do not necessarily die. Only those who are arrested will die. After the sentence is done and time served, they will be reborn in whichever realm they should go. There is no one controlling anything." ... from that day on, I would dream to be a judge every night except Sunday night. There are no major cases, majority of them are armed fight, murder, fraud etc. I got very tired of these dreams, so I burned an absence excuse letter one day and I did not have such a dream that night. ... This spring I bought some ginseng since I heard it can calm down the mind. I also meditate for one hour after dinner for the hope that those measures will get rid of my dreams. However, the dreams persisted. ... In principle, I know that those dreams are mere illusions. However, I cannot get rid of those illusions that I am directly experiencing. Through my reflection, I think they are caused by anger in my mind. ... I hope that you can teach me how to deal with those dreams. I tried to contemplate "what is the substance of the events that I hate? What is the form of the mind that can hate?" However, I still can't get rid of those dreams. ...
>
> Sincerely,
>
> Zhang BingLin

Whether the afterlife judgment exists or not is beyond the scope of our discussion here. However, it is intriguing to know that some people, for instance, Mr. Zhang, have had very coherent and continuous dreams which feel as real as the real life. Mr. Zhang had to go through those dreams even though he did not want to. The dream did not stop until his term serving as an afterlife judge ended.

From Mr. Zhang's example, we can see that our thought experiment of Leon/Noel's double life is not too far-fetched after all. Now, think about our own life. Could there be a slight possibility that our life is a big dream from which we have not yet woken up? Even if we are willing to dig deeper on this possibility, how do we conduct our investigation? It seems that we do not have any effective method to progress. In the next chapter, we will see how an ingenious western philosopher attempts to solve this problem.

Chapter 3 Descartes' Dream and Demon

The possibility that our life could be like a dream has been considered not only in the East, but also in the West. Coincidentally, French philosopher Rene Descartes also seriously doubted whether the human experience is real. In his book *Meditations on First Philosophy*, he gave the famous "Dream Argument," pointing out that all the information that we gained through our senses should be casted into doubt. Why? It is because everything perceived in a dream feels as real as our waking life, yet in fact they are illusions generated by the dreamer. That being the case, how can we be so sure that everything we sense right now is indeed real? They could be just a dream too. Here are Descartes' own words:

> As if I were not a man who sleeps at night, and regularly has all the same experiences while asleep as madmen do when awake - indeed sometimes even more improbable ones. How often, asleep at night, am I convinced of just such familiar events that I am here in my dressing-gown, sitting by the fire when in fact I am lying undressed in bed! Yet at the moment my eyes are certainly wide awake when I look at this piece of paper; I shake my head and it is not asleep; as I stretch out and feel my hand, I do so deliberately, and I know what I am doing. All this would not happen with such distinctness to someone asleep. Indeed! As if I did not remember other occasions when I have been tricked by exactly similar thoughts while asleep! As I think about this more carefully, I see plainly that there are never any sure signs by means of which being awake can be distinguished from being asleep. The result is that I begin to feel dazed, and this very feeling only reinforces the notion that I may be asleep.

Indeed, just as Descartes said, the piece of paper, the fireplace, the dressing-gown, and everything else we see in real life can also be seen in the exactly same way as in dreams. All the actions we take to verify whether we are dreaming, such as shaking our head or stretching our hands can be done in a dream too. We just can't tell whether it is a dream or not through those means. Theoretically, there is nothing in the real life that cannot be reproduced in a dream. So, how could we ever know for certain that our current life is not a dream!

In addition to his "Dream Argument," Descartes gave another analogy, the so-called "Evil Demon Argument" to describe the possible illusory nature of our world. He said there could be an evil demon who used his power to deceive Descartes on all that he knows. It may sound a little farfetched to modern readers, but it is actually an effective tool for Descartes' philosophical analysis. To make it easier to understand, let's use magic trick as an analogy to illustrate Descartes' point. Remember the last time you watch a magic show? You might see a lady levitating in the thin air or an elephant disappearing in a blink of eye. You know what you see cannot be real. Apparently, the magician tricks you into perceiving an illusion. Despite your best effort, you still cannot see through his trick. In this sense, Descartes' evil demon is like a super magician who creates an illusion of the entire world with illusory people in it. Not only does he feed all that phantom information

to Descartes' senses, this deceitful demon also conjures a complete illusion of Descartes' own physical body. While in reality, there is no external world and Descartes does not have a physical body either. All his sensations about the world and his own body are illusions created by this demon. Facing such a powerful and deceitful demon, what can Descartes do to avoid being fooled by it? Descartes came up with a radical solution. To avoid being deceived by this evil demon, Descartes believed that the only way out is to throw away all that he knows and do not trust a single bit of information gained through his senses.

Does Descartes' approach seem too extreme? Isn't the information we gain from our senses truly reflect an external world? To better understand it, let's look at some examples. Consider someone who eats psychedelic mushrooms by mistake or on purpose. Assume that he is staring at blank wall after enjoying his mushroom salad. Under the influence of the mushroom, he might see various non-existing images popping out on the wall, he may even see the wall itself rippling and breathing like a living organism. In such a case, we can think of the psychedelic mushrooms as the powerful demon, causing the person to perceive something out of nothing.

Another example is people with Charles Bonnet syndrome (CBS). People with severe vision loss sometimes see hallucinations, such as cartoons, human faces, animals or color patterns, even though they have perfectly normal mental function and are aware what they see are hallucinations. This disease is called Charles Bonnet syndrome(CBS). The hallucinations can blend into background and typically do not affect patients' daily life. The disease was documented in 1760 by Swiss naturalist Charles Bonnet and was named after him. He described his grandfather, an 89 years old man, nearly blind, perceived people, animals, buildings, and scaffolding patterns out of thin air. Apparently, people with CBS are perceiving something out of nothing. We can think of CBS as the powerful demon which creates illusory visual inputs and feed them to patients' minds.

Some readers might protest that all the above examples are about either people with illness or someone under the influence of hallucinatory substances. We normal people certainly do not perceive something out of nothing. We should be able to trust our senses. So, why do we want to apply Descartes's radical method? In fact, normal people can also hallucinate under certain circumstance. In a recent research conducted in 2004, scientists blindfolded 13 volunteers for four days. They can still hear, walk and talk to people during that time. At the end of the experiment, 10 out of 13 people reported seeing hallucination like that of CBS, such as geometric patterns, people, and buildings, etc. Apparently sensory deprivation could cause even normal people to perceive something out of nothing.

Now, let's imagine that the entire world we perceive suddenly disappears right in front of our eyes. Such a scenario would be the ultimate case of sensory deprivation for us. What do you think our mind would do? It is highly likely that our mind would create an illusory world as shown in the study mentioned above. Once that illusory world is created, we will be sensing and interacting with it much like what we do in our dreams. Based on this reasoning, could our current world be such a self-created illusion and our

current life be like a dream?

On one hand, it seems that we cannot completely rule out the possibility that we might be perceiving illusions in our waking life. On the other hand, we all have the firsthand experience to know such a possibility. When we dream, we create the entire dream world, populate it with many living beings, and decorate it with various objects. Everyone and everything do feel real until we wake up from the dream. Therefore, we can understand why Descartes pushed his method of radical doubt all the way through, namely to throw away anything that has slight possibility of being illusory, including the physical world and his own body. After casting everything into doubt, Descartes did find something that he thinks is indubitable. He asserted the very existence of himself as a thinking entity. Here is his argument in his own word.

> I have convinced myself that there is nothing in the world — no sky, no earth, no minds, no bodies. Doesn't it follow that I don't exist? No, surely I must exist if it's me who is convinced of something. But there is a deceiver, supremely powerful and cunning whose aim is to see that I am always deceived. But surely I exist, if I am deceived. Let him deceive me all he can, he will never make it the case that I am nothing while I think that I am something. Thus, having fully weighed every consideration, I must finally conclude that the statement "I am, I exist" must be true whenever I state it or mentally consider it.

His argument can be summarized by his famous Latin quote "Cogito ergo sum," or in plain English "I think, therefore I am." Rene Descartes' conclusion is very compelling and appealing at the same time. Don't we all want to assert our own existence? If we ourselves did not exist, life would be meaningless, wouldn't it? If we do exist as Descartes had proven through his "cogito ergo sum," then there is at least a part of our life is not dream-like, namely ourselves as a thinking entity.

However, I think there is a problem with Descartes' logic. Let me use a thought experiment to illustrate my view. Assume a college student John just studied Descartes' "Cogito ergo sum" in his philosophy class, he was fascinated by Descartes' great insight. John thought to himself, "What a genius Descartes is! He proved the existence of self with pure reasoning!" Later that night, exhausted by the studying during the day, John fell into a dream as soon as he lied down on the bed. In the dream, he was a famous philosopher named Desi. Desi was a genius. He invented a philosophical method – methodic doubt. He systematically doubted everything that is doubtable, that is basically everything perceived through his senses, such as the Sun, the Earth, and his own physical body. All those things may not exist because they could be illusions created by a dream. By applying this methodic doubt, as if peeling an onion, he threw away everything dubious until he realized that there had to be an entity carrying out such doubting and thinking. Thus, Desi drew his famous conclusion – "I think, therefore I am." He also published it in Latin, the elegant academic language, "Cogito ergo sum." Thrilled by the joy of his great accomplishment, Desi suddenly disappeared! John woke up at that moment. The joy still lingered in John's mind, yet he felt a little confused. Didn't Desi

just proved Desi's own existence through his rigorous logic, the same logic used by Descartes? Nonetheless, Desi was gone with the dream. The only thing left is a confused John lying on the bed.

Let's figure this out for John. Desi claimed that even though the world he lives in could be just a dream or a demon creation, however, he himself definitely exists. Why? Cogito ergo sum. Yet, when John woke up next morning, he immediately knew that both Desi and Desi's world did not exist. Desi only existed in John's dream. What went wrong in Desi's logic, or actually Descartes' logic? I think it is because Descartes takes the conclusion from his thinking process as real. Using thinking as a proof to support the existence of Desi is flawed. Thinking process is a "garbage in, garbage out" (GIGO) process. The term GIGO is typically used in computer science or information technology to describe the fact that a computer will not provide correct answer if the inputs are incorrect. In Desi's case, his thinking process is "illusion in, illusion out" (IIIO). Not only his external world, his sensation and perception are all illusory, but also his thinking is illusory too. How could Desi reach the truth about his own existence through his thinking process? He does not even know who or what Desi really is. Therefore, "Cogito ergo sum" is still very much doubtable.

However, even though Desi does not exist, John does exist. John creates Desi and the associated dream world in John's dream. It still takes a dreamer to create the dream world and his avatar in the dream. In this deeper sense, Descartes still has a point. Unless we assume that thinking could exist without any thinking entity, otherwise we must conclude that "I" may not exist, but "thinking" may still need to be carried out by an entity. We just do not know what that entity is. So, Descartes' slogan should be modified as "thinking exist, therefore thinker exists." However, the thinker might not be "I."

Now, some readers might protest that John does not really exist either. It is true. He lives in a thought experiment that I just brought up in previous paragraphs. But it still takes my mind to create him. So, a dreamer (John) could be created by a deeper dreamer (me, the author). Maybe I am also just an avatar of another dreamer at a deeper level. This process of backtracking will lead to either a final source of everything, every thought, and every thinker (put your favorite deity here) or infinite levels of dreamers. The second possibility is well illustrated by the following "World Turtle" story.

A physicist once gave a talk about astronomy to public. He described how the Earth, a sphere, revolves around the Sun, and the entire solar system circles around the center black hole in our galaxy – the milky way. After the talk, an old lady came up to the physicist and said, "What you said is wrong. The Earth is flat and sits on the back of a giant turtle." The physicist smiled, "What is this giant turtle standing on?" "You're very clever, young man, very clever," responded the old lady. "But it's turtles all the way down!"

As absurd as the old lady's argument sounds to modern readers, that is a legitimate method to answer any backtracking question of first cause. Logically, one must either assign an ultimate source that has no cause of its own, or provide an infinite or circular

causal chain that cannot be traced back to the very beginning. In ancient times, people assign various deities as the source of creation depending on their religious believes. Nowadays, physicists hypothesize that everything originates from an infinitely small, yet infinitely dense point called singularity, then it explodes – so-called "big bang" – forms the universe we see today. As different as singularity and deities can be, they both serve the same purpose in their corresponding world view – to provide a beginning of the causal chain, also to put an end to endless backtracking.

With modern technology, we can appreciate these abstract philosophical arguments in a more direct and visual way. The 1999 sci-fi movie *The Matrix* did bring out Descartes' Dream Argument in front of our eyes. Take a look at what Morpheus said to Neo when he tried to get Neo out of the Matrix, "Have you ever had a dream, Neo, that you were so sure was real? What if you were unable to wake from that dream? How would you know the difference between the dream world and the real world?" Doesn't it sound familiar? That is exactly Descartes' Dream Argument.

Interestingly, the idea of humans being deceived by mainframe computer Matrix is very similar to Descartes' Evil Demon Argument. Just replace the "evil demon" by "the Matrix," you will have the exact same scenario. Nothing in the world created by the Matrix is real. The sky, the earth, even Neo's own body in the Matrix are computer simulations. So, in Descartes' time, he thought about being deceived by a powerful demon, nowadays we entertain the possibility of being deluded by computers or artificial intelligence. The fundamental principle is the same. No matter what the evil doer is, they all succeed in deceiving us by sending fake information to manipulate our sensations. And unfortunately, our mind cannot tell whether the inputs are real or illusory. That is why dream, demon, and computer simulation could all trick us.

In summary, there is a possibility that our world is not real. Such a possibility is well-explained by Descartes, and well-illustrated by the movie *The Matrix*. So, what do you think? Is the world in which we live and strive at this very moment real or not? How can we know the answer for certain? Instead of just pondering about this possibility, is there a way to find a definite answer? If yes, how?

Chapter 4 Which Path to Take – Your Choice

"How could we ever be able to find a definite answer to the question whether we are living in a dream or not? The Dream Argument is neither falsifiable nor verifiable." One might say.

At the first glance, it may be the case. Some readers will probably give up now. They might say, "Since the question is neither falsifiable nor verifiable, it cannot be solved by scientific investigation, thus let philosophers or theologians worry about it. They will argue to the end of time and still not reach a consensus due to lack of empirical evidence." Other readers might just wield Occam's razor and claim that the assumption of us living in a dream is unnecessary, thus it should be tossed away.

But wait a minute, I think there is a way to analyze the situation and we should dig a little deeper before jumping into a premature conclusion. The key lies at the exact moment when we sense the world. At that crucial moment, our subjective self encounters the objective world, and we sense, perceive, and then react to the external world. At this very moment when the subjective self meets the objective world, we can either assume that the external world we sense is real or we can assume it is dream-like. So which path do you want to take?

One choice is to take the path as Descartes did, we assume that all the information flowing into our senses are not real. What do we do then? We have no other choice but to discard all the sensory inputs because they are ultimately false and illusory. Also learned from Descartes' mistake on "cogito ergo sum," we should not use our thinking mind either. The thinking process is a "garbage in and garbage out (GIGO)" or "illusion in and illusion out (IIIO)" process. Since the raw material for our thinking comes from sensory inputs, which are illusory, we cannot trust anything coming out of our thinking process either. Now, after throwing away our sensory inputs and thinking process, what else can we do? There is only one thing left to do, which I believe will lead to great awakening from this dream-like life. If you are ready to venture down this path, please jump directly ahead to Part Two of this book. I will lay out the details of the method. It is completely different from our usual ways of using our mind, which are to acquire sensory inputs and conduct thinking. Instead, the method is to train our mind so that it can decouple from sensory inputs and thoughts, thereby access the underneath reality. By successfully applying this method, you will ultimately wake up from this dream-like life.

The other choice is obviously to assume that we are not living a dream-like life. Instead, an external world exists, and we are staring at it and interacting with it right now. That is the hidden assumption that we all make by default. We always consider that everything we see, every sound we hear, everything we feel through our senses are real. What's more, we further assume that we are sensing and perceiving those external objects accurately. We have never questioned the reality of the external existence except maybe at the moment when we are reading Descartes's Dream Argument or watching the movie *The Matrix*. However, even if we had a moment of doubt about the reality of our life, we immediately brush away that outrageous idea and move on with our daily chores in this

seemingly real world.

In the rest of Part one, we will take this latter path. We will assume the existence of a physical world and find out where this assumption will lead us to. In Chapters 5, 6, and 7, we will take a close look into our sensations and perceptions. You might be a little surprised to discover how confined and distorted they are due to our inherent limitations. Some of those limitations can be corrected, while others may always stay undetectable. For instance, we always look at the external world through the lens of space and time, which we could never take off. Fortunately, powered by the great advancement in science, we can still take a peek into the deep secret of the world despite the constraints of our limited and distorted sensations and perceptions. In Chapter 8, we will find out how Einstein, with his great insight, unified space and time into a single spacetime and revealed its interaction with energy and mass. While we marvel at this great convergence of everything in our physical world, from space, time, to mass and energy, the newly discovered and mind-boggling quantum phenomena (Chapter 9) further indicate that we cannot consider the external physical world as something existing independent of us. We, as the observer, will define the outcome of our observation by selecting what we observe or measure at the quantum level. A seemingly simple process of measurement in our daily life becomes a thorny issue in the quantum world. Even though the theory of Quantum Mechanics has been verified by numerous experiments and widely applied in almost every modern device, physicists and philosophers still have not yet reached a consensus on its meaning after a century's debate. Their effort to make sense of Quantum Mechanics results many dramatically different interpretations of Quantum Mechanics (Chapter 10).

I believe that findings in Quantum Mechanics force us to rethink the relation between the observer (us) and the observed (the world). The external world is no longer independent from observer. Instead, it seems to be interconnected with us so closely that maybe we and the world are one unity. If the subjective self and objective world were indeed one, what would that indicate? Wait a minute, the world in a dream and our avatars in the dream are also one unity even though our avatars have never realized that while dreaming. This similarity between dream and quantum world is striking. Doesn't that indicate the real world is also dream-like? To answer that question, I will provide my interpretation of Quantum Mechanics in Chapter 11 and supporting evidences in next two chapters. After you read my theory and its supporting evidences, I hope that you will be convinced that our life could indeed be like a dream and awakening from this dream-like life is worth a try. I will end my theoretical discussion after talking about implications of my interpretation and then usher you into the details of the method in Part Two.

Chapter 5 The Allegory of the Cave

You have chosen to take the stance that there exists an external world and we are sensing and perceiving it in a truthful way. Apparently, there are two assumptions in this approach. First, the world exists independent of us. Second, we, the observers, see the world in a non-distorted manner. For instance, when we saw an apple on the table, we assume two things. First, apple exists no matter if we look at it or not. It exists over there and maintains its shape, color, temperature, position, smell and other characteristics independent of any observer. Second, when we look at it, we have a correct idea of its color, shape, position in our mind. When we smell it and touch it, we also have a truthful mental model of its smell, temperature, and relative softness or hardness etc. We always assume our mental representation about the apple faithfully reflects what the apple really is. Few people have ever questioned whether the apple really exists or whether it exists in the exact way that we sense and perceive it. If anyone were to raise doubt about that, we would consider that person crazy, wouldn't we?

That crazy person is Plato. In his famous *allegory of the cave* in the chapter 7 of *The Republic*, Plato described such a conversation between Socrates and his young follower Glaucon.

> **Socrates:** And now, I said, let me show in a figure how far our nature is enlightened or unenlightened:
>
> Behold! Human beings living in an underground den, which has a mouth open towards the light and reaching all along the den; here they have been from their childhood, and have their legs and necks chained so that they cannot move, and can only see before them, being prevented by the chains from turning round their heads. Above and behind them a fire is blazing at a distance, and between the fire and the prisoners there is a raised way; and you will see, if you look, a low wall built along the way, like the screen which marionette players have in front of them, over which they show the puppets.
>
> **Glaucon:** I see.
>
> **Socrates:** And do you see, I said, men passing along the wall carrying all sorts of vessels, and statues and figures of animals made of wood and stone and various materials, which appear over the wall? Some of them are talking, others silent.

When people pass by the raised way with objects in their hands or on their shoulders, the prisoners can see only those people's shadows casted by the fire because they cannot turn around. If some passers are talking, the prisoners will think that the voices are from the shadows. Ever since their birth, the prisoners have seen only shadows. Thus, their mental representation of the entire world is constructed based on those distorted shadows and the voices which they incorrectly believe to be from those shadows. To the prisoners, the

truth would be literally nothing but the shadows.

Until one of the prisoners was released and set free, he turned around and looked at the source of light – the fire. After adjusting his eyes, he finally saw how the fire casted the shadows of objects onto the wall. He realized that all he knew before were shadows. He had never seen the real objects or people passing on the raised way until then. Later, he was pulled out of the cave and exposed to the bright daylight. At first, he was dazzled and could not see anything clearly. But gradually he adapted to the sunlight and could see the beautiful world in front of him. Looking back at his fellow prisoners, he pitied them for their lack of knowledge and understanding of the real-world due to their dire situation. He went back to the cave to set them free. However, his eyes could not see clearly in the dark cave and his fellow prisoners laughed at his poor eyesight, ridiculing him for losing his eyes while ascending the cave. Of course, they refused to be set free and even threated to kill whoever wants to set anyone of them free.

At the end of this allegory, Socrates says to Glaucon:

> The prison-house is the world of sight, the light of the fire is the Sun, and you will not misapprehend me if you interpret the journey upwards to be the ascent of the soul into the intellectual world according to my poor belief, which, at your desire, I have expressed whether rightly or wrongly God knows. But, whether true or false, my opinion is that in the world of knowledge the idea of good appears last of all, and is seen only with an effort; and, when seen, is also inferred to be the universal author of all things beautiful and right, parent of light and of the lord of light in this visible world, and the immediate source of reason and truth in the intellectual; and that this is the power upon which he who would act rationally, either in public or private life must have his eye fixed.

From his final words in *allegory of the cave*, we can see that Plato thinks “the world of sight” is our prison. The entire physical world we see in front of eyes is merely the shadow of something real. And we need to apply our effort to ascend, to get out of the cave of shadows to see the ultimate truth, to see what the world really is, and to see the source of everything.

Chapter 6 The Limitations of Our Sensation and Perception

Did Plato convince you with his allegory of the cave that we only see distorted shadows of some underlying reality? Is the apple we see on the table what it really is or just a "shadow" of some deeper unknown reality?

Some people may argue that Plato was dead for more than 2000 years, his view is outdated. Back then, he and other ancient philosophers did not have the powerful tools we have today, namely, science and technology. Therefore, they had to do guess work using logic and reasoning based on rather limited empirical evidence. Nowadays we are so advanced in science and technology that we know much more about our physical world than ancients. Armed with our most advanced apparatuses, we are well on our way to discover the deepest secret of the most remote corners in the universe. Even so, we still have not found any deeper reality than our physical world – "the world of sight" in Plato's word. If we haven't detected anything with our powerful equipment, how could Plato know anything about the deeper reality 2000 years ago! This argument sounds reasonable. Surprisingly, modern science may to some degree support Plato's "guess work." Modern science does show that our sensation is very limited, and our perception is often distorted.

6.1 Limitation of Our Senses

Thanks to the great advancement of science, we now know that there is almost infinite amount of information out there, and our senses can only take in an extremely small portion of it. Even though we feel that we are experiencing every detail of our physical world, in fact, we barely see any of it. Let's examine our senses individually to see how limited they are.

Our eyes can only see a very narrow band of electromagnetic wave on the entire spectrum. The wavelength of the visible light is from 400 nm to 700 nm (400×10^{-9} meter to 700×10^{-9} meter). To bring it into perspective, the diameter of a human hair is about 75μm, 2500 times larger than 300nm - the width of human's visible spectrum. In comparison, the entire electromagnetic spectrum we know is gigantic. At the lower end, the gamma rays have wavelength less than 10^{-12} meter. And at the higher end, the wavelength of extremely low frequency (ELF) radio waves can reach 10^{8} meter. We can see only less than a ten-trillionth of all the electromagnetic waves. Furthermore, there is no theoretical limits on either end of the electromagnetic spectrum. There could be some electromagnetic waves with even higher boundaries, which we have not yet detected. Based on our current knowledge, the smallest length we know is plank length (1.6×10^{-35} meter) and the biggest length is the size of the observable universe (8.8×10^{26} meter or 93 billion light-years). So, the wavelength of an electromagnetic wave could fall anywhere in between. If we use those two numbers as the lower and upper limits of the spectrum, what we can see is less than one ten-billion-trillion-trillionth of the entire spectrum. We are literally X-ray blind, ELF blind, infrared blind, and ultraviolet blind. Basically, we are

blind throughout the entire spectrum except the visible spectrum, a tiny section with the width of 300 nm. Can you imagine what we would see if we were equipped with a full spectrum vision?

With the help of an infrared goggle or infrared camera, we can peek into the infrared spectrum, which is from 700nm up to 1mm. The infrared image is dramatically different from the visible light image for the same object. When it is completely dark, an ordinary camera cannot work due to the lack of visible light. An infrared camera enables us to see all kinds of heat sources in the dark, including various animals that generate body heat. That is because an object emits most of its energy in the infrared spectrum when it is not hot enough to radiate visible light. Even though we cannot see infrared, the nerves on our skin can feel the infrared radiation. For instance, the radiator in a car can be very hot after a ride. Even though it looks the same as when it is cold, if we put our hands near it without touching it, we can feel its heat. The heat is transferred from radiator to our palm through infrared radiation. If you look at it through an infrared goggle, you will see the radiator glowing with orange light. However, is infrared radiation really in orange color? Apparently not. If it were indeed orange, it should be just called orange light, which is visible light.

Here we need to remind ourselves that we are not seeing infrared directly with the help of infrared devices. Instead, the infrared image is converted into a visible light image for us to see. The infrared certainly would not look orange. The wavelength of orange light is about 590 nm. The infrared spectrum is from 700nm to 100,000nm. How could it look orange? Unfortunately, constrained by our retina, we have to reduce and convert the much vaster range of infrared radiation to a narrow band of visible light for us to see. The spectrum of infrared may seem to be huge compared with that of visible light. Yet, it is still just a tiny section of the entire spectrum. If we had the full spectrum vision, the world would appear billions of times richer than what we see right now.

It is the same story for our ears. Our ears can hear only a narrow range of frequency from 20 Hz to 20K Hz, which is also a tiny section of the entire acoustic spectrum. The frequency of infrasound can be anywhere below 20 Hz, sometimes as low as 0.001 Hz. Various ultrasound devices operate at frequencies of 20 kHz up to several gigahertz. And the theoretical upper limit of the ultrasound frequency can reach hundreds of thousands of gigahertz. Therefore, our ears can hear only one ten-billionth of the entire range of sound waves.

Young people typically have more sensitive hearing than older people. However, we human cannot hear ultrasound as bats or dolphins do. Can you imagine what it would be like if we were equipped with ultrasound hearing like dolphins? We would be able to detect women’s pregnancy in a similar way as an ultrasound scanner does. Only difference is that the scanner converts the ultrasound signal into visual images. As for species equipped with ultrasound hearing, they will hear the pregnancy directly without the need of signal conversion. On the other end of the spectrum, infrasound, the low frequency sound wave with frequency less than 20 Hz, is used for communication by whales, elephants, and hippos etc. Infrasound can travel a long distance and get around

obstacles with little dissipation. Therefore, it is ideal for long distance communication. For instance, whales can communicate with their friends several hundred miles away. Infrasound is also used to detect earthquake, avalanche and other natural disasters. If we could hear the infrasound of an earthquake, we might be able to run out of buildings before they collapse. That is because the primary wave of an earthquake is less damaging and travels about twice as fast as the slower yet more damaging surface waves. Therefore, if we could hear the primary wave of an earthquake, we might have enough time to run outside before buildings being collapsed by the devastating surface wave which will arrive a little later. The further away we are from the epicenter, the more time we have. In summary, if we could have the full spectrum hearing, the world would sound billions of times richer than what we hear right now.

There is no spectrum for odors, so there is no way to give a numeric description on how our olfaction fits in the entire range of odors. However, we can compare the sensitivity of our sense of smell with that of other animals. An average dogs' olfaction is 10,000 to 100,000 times more acute than us. Dogs can detect some chemicals in a solution diluted to one part per trillion. For instance, we may be able to tell if a teaspoon of sugar has been added in our coffee by its sweet smell, while a dog can smell a teaspoon of sugar added in a million gallons of water.

There are numerous different scents. Theoretically, any material that is volatile enough to send a small number of its molecules into the air could produce a smell if those molecules can bind with scent receptors. If a nose has corresponding receptors to hook up with those molecules flying off the material, a smell will be registered. We human have about 400 types of scent receptors in our nose and it is estimated that human could distinguish one trillion odors. Dogs may have more than 1000 types of receptors, enabling them to detect much more scents. The entire spectrum of odors could be as wide as all the materials in the universe whose molecules can bind with scent receptors. So, again, what we can smell is a tiny fraction of all the odors. Similar limitations are also found in other senses, such as tongue and tactile sensors etc.

Taking the limitation of our senses into consideration, we can be certain that our mental representations of the external world are very limited, to say the least. That is because that majority of the vast information in the universe is out of reach for our senses. Furthermore, the resolution of our senses is also very limited. For instance, we cannot see Moon's surface clearly due to the poor resolution of our eyesight. In fact, before Galileo built his telescope and pointed it to the Moon and stars, human had very little knowledge of those heavenly objects. After Galileo observed the craters on the Moon and published his result, people started to realize that heavenly objects are not perfect spheres as they had once thought. The mysterious veil covers the sky started to fall off. Now, with the help of most advanced telescopes, such as the Hubble space telescope, we can see the faintest light traveling billions of years from the edge of our visible universe. The horizon of our knowable world has expanded exponentially ever since the invention of telescope. On the other end of the scale, human beings were not aware of the vast microscopic world before microscope was invented. We are now able to see the extremely small things, such as bacteria, proteins, or even atoms via various types of microscopes.

With the help of telescope and microscope, our visual world has expanded exponentially on both end of the scale. However, we need to remember that our human vision has not improved a bit. Telescope converts otherwise inaccessible information of faraway objects to accessible images so that we can finally see them with our naked eyes. Similarly, microscope converts information of those extremely tiny objects into something big enough so that we can see. This conversion process is a crucial feature for every type of sense-enhancing apparatus. Infrared goggle converts infrared radiation into visible light. Ultrasound scanner converts ultrasound echoes into visible images. Seismometer converts seismic waves created by ground movement into graphs. An EEG machine converts small electrical signals in our brains into graphs, and an fMRI machine converts blood flow into images. The examples of those sense-enhancing apparatuses are numerous. They all function through a conversion process one way or another.

The conversion process exists not only in sense-enhancing apparatus, but also in devices of sensory substitution, which help patients with impaired senses gather information through other sense organs. Prof. Paul Bach-y-Rita first developed the idea of sensory substitution in 1960s. He built a chair with many solenoids to give tactile stimuli based on the visual image taken by a camera. When sitting in this chair, blind people can “see” based on the tactile sensation they feel on their back. As you can imagine, the resolution of such a device is extremely low. Nowadays, a newer and better device converts visual information into a tingling sensation through an electrode array which sits on patient’s tongue. With the help of such a device, blind people can “see” surroundings at a relatively good resolution. It enables them to grab objects, play tic-tac-toe, or even throw a ball into a trash can. It is amazing to see that blind people can perform well on those tasks with the help of a low-cost device. The input sensors can be switched from cameras to accelerometers. The sensory substitution device will then function as users’ vestibular system. Patients with impaired vestibular system have trouble to maintain balance. They cannot ride bicycles or walk steadily. This device can convert the information from accelerometers into a tingling sensation on patient’s tongue. With its help, those patients can regain their sense of balance and ride their bicycles again.

Both sense-enhancing and sensory substitution devices are based on one principle. That is to convert information beyond our senses to something sensible, thus accessible to us. Therefore, we need to keep in mind that we are not seeing those extremely small or far away objects directly. Instead, what we see are converted images. We are not hearing ultrasound. Instead, it is converted into an image for us to see. Those blind people are not seeing things with their eyes, they feel them through the device on their tongue. Various kinds of previously inaccessible information are collected by man-made apparatuses and converted into sensory inputs that we can perceive through our human sense organs. In this process, the loss and distortion of information are inevitable. Just think about how much resolution is lost when lights from a wide range on electromagnetic spectrum is condensed into a narrow 300nm window of visible light. Our visual range is a ten-trillionth of the electromagnetic waves we have detected so far. It is somewhat like looking at a globe on your desk to get a sense of the Earth. The globe resembles the Earth, but it is much smaller and of much lower resolution than the Earth itself. A typical

globe is about one foot in diameter. It is a model of earth at a scale at 1:41,777,000. So, it is roughly one forty-two-millionth of the Earth. This scale is still much bigger a number than one ten-trillionth – the scale in electromagnetic wave conversion. You can imagine how much resolution we have lost in the conversion process through our most advanced telescopes. In summary, we convert vast amount of previously unknown universe into some sensible miniature and then perceive it with our rather inferior sense organs. The part of universe we know directly through our senses is very limited, the rest that we know via those apparatuses is distorted and dramatically reduced in resolution. In comparison, the beautiful pictures of galaxies from Hubble telescope are like the shadows on a cave wall in Plato's allegory of the cave, yet with much worse resolution.

Wait, did we just endorse Plato's allegory of the cave? In a sense, yes. However, we are more like a prisoner sitting in a dark room, peeking through tiny holes. If we want to see more, we must put fisheye lenses on those tiny holes. Though the lenses can give us a much wider view of the outside world, they also bring huge distortion. In this analogy, the prisoner is our conscious mind and the tiny holes are our eyes, ears, nose and other senses. And our apparatuses work like the fisheye lenses, gathering in otherwise undetectable information and convert it into something accessible to us. Of course, we are paying the high price of distortion and loss of resolution.

6.2 Distortion in Our Sensation and Perception

One might say, "Okay, we have those issues because we use the sense-enhancing apparatuses. That is the tradeoff we pay. However, when we are observing the world directly with our sense organs, we see the world as it is. Right?" Unfortunately, the answer is still a "No." When we observe the world, distortion happens at two levels, namely the sensation level and perception level.

The first level of distortion occurs during sensation. Our sense organs themselves function in a similar way as those sense-enhancing apparatuses. For instance, when a ray of light enters our eyes, it first passes through cornea and is bent due to refraction. It then passes through pupil on iris, goes through lens and is further bent so that it will finally cast a focused image on retina in the back of our eyeballs. At this point, the light from a 3D object in the external world has been converted into a 2D image on retina. And retina further converts this 2D image into a series of electrical pulses, sends it to optical nerve, and finally reaches our brain, generating electrical pulses at the different parts of our brains, such as visual cortex, inferior temporal cortex, posterior parietal cortex, frontal lobe etc. At the end, a mystical process unknown to modern science happens - our subjective experience of seeing a 3D object in the external world emerges in accordance with those electrical pulses in our brains.

The same signal conversion process happens in our ears, nose, tongue and other sense organs. All the external stimuli, no matter whether they are sound waves or molecules bumping into our taste buds, will have to be converted into electrical pulses and sent to different regions of our brain. Finally, through the mystical process that gives rise to sensation, we have a subjective experience of external stimuli. During the processes of

conversion and transmission in the sensory organs and nerve system, information is inevitably distorted and reduced in resolution.

The second level of distortion occurs during perception. Our mind automatically engages in pattern recognition and information processing before we consciously realize it. Those processes greatly increase our efficiency of recognizing patterns of external stimuli. However, they also introduce distortion. Optical illusions are good examples to illustrate such distortion. As we will soon see, our mental representation of reality can often be quite off.

Please look at a picture of café wall illusion (Figure 1). These horizontal lines are parallel and straight. However, they appear sloped and wavy to us. Even though our eyes do not sense those lines to be tilted, our mind interprets them as sloped. If we use a T square to measure the lines, we will find out that they are indeed parallel and straight. However, they still look sloped and wavy to us no matter how hard we try to correct our misperception.

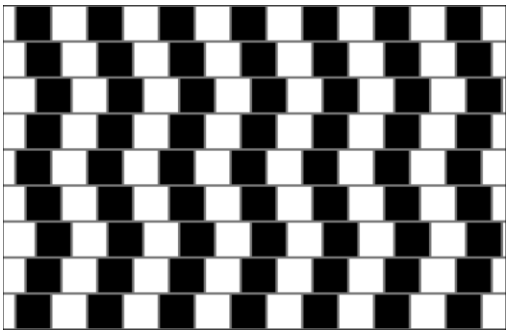


Figure 1. Café wall illusion from Wikipedia
https://en.wikipedia.org/wiki/Caf%C3%A9_wall_illusion

Another example is the checker shadow illusion (Figure 2). Two squares A and B have the same shade even though A looks much darker than B on the left picture. To see how the shade of A and B truly are, you can cover the picture with a piece of paper and poke two holes at the position of A and B, and look at only square A and B through those two holes without all the surroundings. You will find that they are indeed identical. Or we can add a band of same shade on the picture to break the illusion, see the right picture on Figure 2.

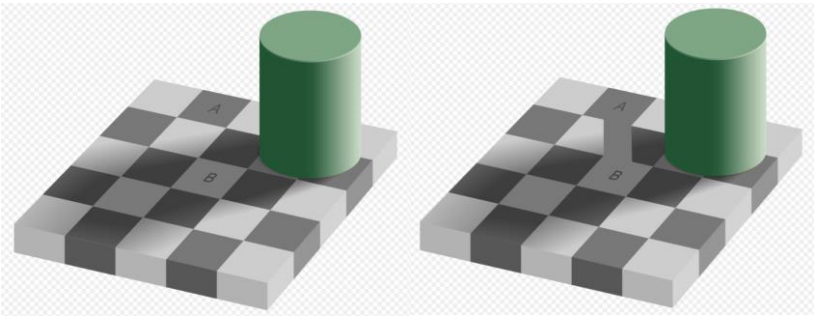


Figure 2. Checker shadow illusion from Wikipedia
https://en.wikipedia.org/wiki/Checker_shadow_illusion

Another example is Hermann grid illusion (Figure 3). When we look at the intersections of the white grid, we see grey blobs popping out here and there at the intersections. However, when we stare directly at one intersection, the grey blob disappears at that intersection.

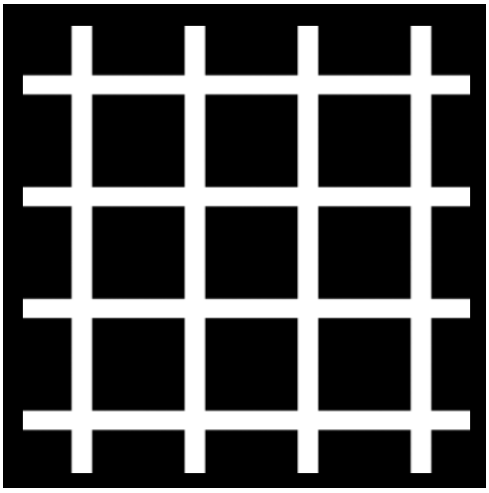


Figure 3. Hermann grid illusion from Wikipedia
https://en.wikipedia.org/wiki/Grid_illusion#Hermann_grid_illusion

A classic example of optical illusion is Müller-Lyer illusion (Figure 4). Those lines are of the same length. However, they do not look so. The line with two tails appears much longer than the line with two arrow heads. Interestingly, studies found that the natives of Australian Murray Island, Inuit, and Temne people were less susceptible to Müller-Lyer illusion. A study done in Zambia shows that city dwellers seem to be more susceptible to Müller-Lyer illusion than people living in rural area. It seems that culture, genetics, environment could all play a role in how people perceive the length of the lines in Müller-Lyer illusion.

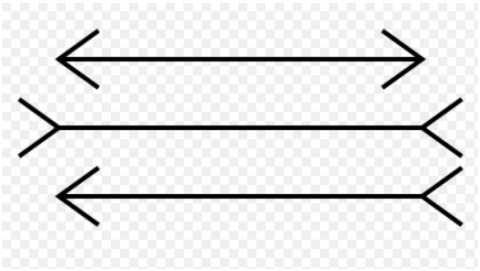


Figure 4. Müller-Lyer illusion from Wikipedia
https://en.wikipedia.org/wiki/M%C3%BCller-Lyer_illusion

Illusions are not limited to vision. There are auditory illusions and illusions on other sense organs. Some illusions involve more than one sense. For instance, the rubber hand illusion is created through synchronized vision and tactile inputs. can lead a human subject to believe a rubber hand is his or her own hand. The setup of this illusion is following. Researchers erect a board to block the human subject's vision of his own hand and put a rubble hand in his visual field. Then researchers use two brushes to gently brush his real hand and the rubber hand simultaneously. The human subject sees the rubble hand being brushed and feels a synchronized tactile sensation through his real

hand. The synchronization of tactile sensation with the visual input of rubble hand being brushed creates a strong illusion, and causes the human subject to consider the rubble hand as their real hand. When another researcher suddenly stabs the rubble hand, the human subject immediately withdraws his hand because he subconsciously thinks his hand is under attack. (readers interested in it can search “rubber hand illusion” in www.youtube.com and watch how the experiment is implemented.)

The existence of illusion proves that our mental model sometimes greatly misrepresents the external world. It further confirms Plato’s idea that we are not perceiving what external objects really are. One might argue, “But at least we know that we are looking at an optical illusion in the above examples. It is not the case that we can see only shadows as Plato claimed. Instead, we perceive an illusion at first, but then we can correct our misrepresentation of external world through more careful examination. Therefore, we can get to the truth behind the ‘shadows’ after all.”

That is a good argument. The reason that we can know those illusions are illusions is because we have other means to find truth about them. Otherwise, we would not even know that they are illusions in the first place. In the case of café wall illusion, we can rely on a T square to check if the lines are parallel. And for checker shadow illusion, we can block the surroundings to see what the shades of square A and B really are. The distortions of our perception shown in those cases can be easily detected. However, is there any deeper or more fundamental distortion in our sensation and perception that we are unable to detect at all? If so, how would we even know whether such distortions indeed exist, i.e., how could we detect the undetectable?

Chapter 7 Kant's Spectacles – How Our Perceptions and Cognition Are Distorted

It takes a genius philosopher to answer the difficult questions we raised at the end of last chapter. According to the famous German philosopher Immanuel Kant, we humans indeed have built-in distortions that we could never get rid of in both our perception and cognition. How could he draw such an outrageous conclusion?

Through his philosophical analysis, Immanuel Kant asserted that we humans look at the world through our built-in spectacles – the fundamental distortions in our perception and cognition. When we are looking, listening, smelling or getting into contact with the external world with other senses, we apply a set of built-in lenses in our perception, namely, the spectacles of space and time. And when we think, we apply another set of lenses to our cognition, which Kant listed as twelve categories. For our purpose of discussion, we will focus mainly on our inherent spectacles of space and time at perception level. Why? Cognition is a process of "garbage in, garbage out" or "illusion in, illusion out" and it takes perception or previously stored information in memory as input. If our perception were fundamentally distorted or flawed, the result of our cognition would also be seriously undermined. Therefore, the distortion in our perception is more fundamental and we need to address it first. Sadly, according to Kant, we will never be able to get rid of the spectacles which we wear when we are perceiving and thinking, thus we would never be able to know what the world really is. You might ask, how could this be possible? I can clearly see a world at any time and so can other people. How could every human being see the world in a distorted way without knowing it consciously?

To better understand Kant's theory, let's first investigate an interesting phenomenon called synesthesia. People who has it are known as synesthetes. Synesthesia is a neurological phenomenon in which one kind of sensory input will cause an automatic and involuntary stimulation in another kind. The most common type is grapheme-color synesthesia, in which an individual's perception of numbers and letters is associated with the experience of colors. For instance, a synesthete might see number 2 as blue, 3 red, 4 green, 5 yellow even though those numbers are all printed in black ink. At first glance, ordinary people might think that those synesthetes are making baseless claims or are simply crazy. How could a number printed in black look red to anyone? However, a cleverly designed experiment easily proved that these synesthetes were not lying. Scientists generate a picture with many number "5" randomly spreading everywhere. Those number "5" are of different size and orientation. Hidden among them are several number "2," forming a triangle pattern. Because all the numbers are laid out in such a chaotic way, it takes a while for an ordinary person to pick out all the number 2, which looks very similar to an upside down 5. In comparison, a synesthete should be able to instantly pick out the numbers 2 and see their triangle pattern because they see number 2 as a different color from number 5. When this experiment was carried out, synesthetes indeed saw the triangle pattern of number 2 immediately, thus scoring much higher than normal people.

When being asked by scientists, synesthetes say that they see the color of a number or letter without thinking about it. The experience is automatic and involuntary. Their perception functions in this strange way. It is not the case that they cannot see those numbers in black. They typically can, but at the same time, they can also perceive them in colors. There is no universal pattern in color coding of letters and numbers for grapheme-color synesthetes. Synesthetes tend to see different colors for the same letter or number. Carol Steen, a synesthete artist from New York, mentioned the following story in her interview at MIT. Below is a transcription of the excerpt. It shows clearly how synesthetes can disagree about the colors they experience.

> I came back from college on a semester break, and was sitting with my family around the dinner table, and – I don't know why I said it – but I said, "The number five is yellow." There was a pause, and my father said, "No, it's yellow-ochre." And my mother and my brother looked at us like, 'this is a new game, would you share the rules with us?'"
>
> And I was dumbfounded. So I thought, "Well." At that time in my life I was having trouble deciding whether the number two was green and the number six blue, or just the other way around. And I said to my father, "Is the number two green?" and he said, "Yes, definitely. It's green." And then he took a long look at my mother and my brother and became very quiet.
>
> Thirty years after that, he came to my loft in Manhattan and he said, "you know, the number four is red, and the number zero is white. And," he said, "the number nine is green." I said, "Well, I agree with you about the four and the zero, but nine is definitely not green!"

The famous American physicist, Nobel laureate, Richard Feynman is a grapheme-color synesthete. He mentioned it in his book *What Do You Care What Other People Think?* Here is what he said, "When I see equations, I see the letters in colors – I don't know why. As I'm talking, I see vague pictures of Bessel functions from Jahnke and Emde's book, with light-tan j's, slightly violet-bluish n's, and dark brown x's flying around. And I wonder what the hell it must look like to the students." Does Richard Feynman's synesthesia help him make his great discoveries in physics, such as his intuitive Feynman diagram? We do not really know. His synesthesia could have helped him better visualize the physics processes related to fundamental particles as shown in Feynman diagram.

Another type of synesthesia is chromesthesia, in which sounds are perceived as color. As you can imagine, people with chromesthesia will likely have perfect pitch, because they can see the associated color of music notes. Such association enables them to recognize the pitch precisely. Many famous musicians have chromesthesia. Franz Liszt is one of them. The following is a quote about his chromesthesia. "When Liszt first began as Kapellmeister in Weimar (1842), it astonished the orchestra that he said: 'O please, gentlemen, a little bluer, if you please! This tone type requires it!' Or: 'That is a deep violet, please, depend on it! Not so rose!' First the orchestra believed Liszt just joked;

more later they got accustomed to the fact that the great musician seemed to see colors there, where there were only tones." A younger Russian composer, Liszt's contemporary, Rimsky-Korsakov also has chromesthesia. To him, the key of C major was white, and the key of B major was a gloomy dark blue with a steel shine. It is said that Liszt and Rimsky-Korsakov famously disagreed on the colors of music keys. Even though they both have chromesthesia, apparently, they see different color mapping for music notes.

Ordinary people might consider those synesthetes abnormal. But most of them actually prefer to have their richer experience. The previous studies estimate that synesthesia only happens one in two thousand people. However, recent estimation is as high as 1 to 4% of the general population. The reason for this discrepancy is that many people do not realize that they have synesthesia. They do not know they perceive the world differently from ordinary people. That is the interesting feature of synesthesia. Because synesthetes' special perception is built-in, and it automatically frames how synesthetes see the world, there is no way for them to know that they see the world so differently from ordinary people unless they compare their perception with others.

This synesthetes' lack of self-knowledge of their synesthesia brings us back to our initial inquiry. If synesthetes' abnormal perceptions are intrinsic and undetectable without doing a comparison with ordinary people, could we ordinary people also have inherent distortions in our perception that are undetectable? If so, how can we know for certain? Since there is no reference point for comparison, we ordinary people may never be able to find out the built-in distortions in our perception. Of course, we can always compare us with those synesthetes and other people with "abnormal" perceptions. By studying their "distorted" perceptions, we can reflect upon our own perception and ponder how our perceptions could also be distorted in some way. But, doing so can merely establish a possibility, not a definite answer. Is there a way to find out the possible distortions in our perception without relying on comparison?

The answer given by Immanuel Kant is yes. He explained his theory by using the following analogy of spectacles. If a person wears blue-tinted spectacle, everything he sees will be bluish. Kant says that we human too wear certain spectacles in our mind. Namely, we perceive the external world with built-in framework of space and time. Therefore, we have no other choice but to experience external world in a spatial and temporal manner. The phenomena we observe everyday are not necessarily happening in space or time, it is our inherent framework which forces our perceived world to appear in that manner, much like the blue-tinted lenses forcing the perceived images to be bluish.

Synesthetes see the world with their built-in lenses of synesthesia. Similarly, we humans synthesize our human experience through build-in spectacles of space and time. Therefore, according to Kant, we will never be able to see what the world really is, which Kant give the name of "the thing in itself" or "noumenon." Instead, our human experience is limited only within the phenomenon level. In another word, we can only know through our distorted perception, we will never know what the reality truly is. Wait a minute, doesn't this sound very much like Plato's allegory of the cave? Yes, indeed! In addition to the analogy of spectacles, Kant gave a detailed analysis on why he thought

that we have built-in spectacles of space and time. Here are his arguments about space.

> Space is not an empirical concept which has been derived from outer experiences. For in order that certain sensations be referred to something outside me (that is, to something in another region of space from that in which I find myself), and similarly in order that I may be able to represent them as outside and alongside one another, and accordingly as not only different but as in different places, the representation of space must already underlie them. Therefore, the representation of space cannot be obtained through experience from the relations of outer appearance; this outer experience is itself possible at all only through that representation.

Kant basically is saying that we must already have a frame of space in place before we can experience the world in a spatial way, such as relating things as "here" and "there," "inside" and "outside" etc. The very notion of "here" and "there" implies the existence of space in the first place. Therefore, space is a pre-existing lens through which we look at the world. It is a structure our own mind imposes onto our mental representations of the external world. It is not something we learned through our experience dealing with space. In order to have any spatial experience, we must already have a frame of space in the first place. Thus, that frame of space is built-in.

Kant also points out that we can never imagine the absence of the space. We can imagine the space as absence of objects, i.e., empty space, but we can never imagine what any object would be like without space. We cannot mentally represent an external world without putting it into the frame of space. Therefore, our perception of space must be built-in.

Kant further argued that space is not a concept, but an intuition. Therefore, no amount of thinking can change the perception of space. We see things in a spatial way automatically and involuntarily, much like synesthetes perceive the world in their synesthesia. That is to say that the frame of space is there even before we generate the concepts of space. Here is Kant's argument:

> Space is not a discursive, or as one says, general concept of relations of things in general, but a pure intuition. For, firstly, one can represent only one space, and if one speaks of many spaces, one thereby understands only parts of one and the same unique space. These parts cannot precede the one all-embracing space as being, as it were, constituents out of which it can be composed, but can only be thought as *in it*. It is essentially one; the manifold in it, and therefore also the general concept of spaces, depends solely on limitations. It follows from this that an *a priori* intuition (which is not empirical) underlies all concepts of space.

So why does Kant claim that space is not a concept, but an intuition? A concept can be put together by different parts of the original concept without referring back to itself. For example, we can say that "computer" is an electronic machine capable of storing and

processing large amounts of information and of performing calculations. If we know the concepts of "electronic machine," "information," and "calculation" etc., we can grasp the concept of "computer." We can talk about any individual part of "computer" without referring back to "computer." We do not have to use the concept "computer" to explain "computer" itself. Therefore, we say that "computer" is a concept. In comparison, space is different. Whenever we talk about a part of space, it is a subsection of the entire space. We have to refer back to "space" when talking about a particular section of the space, i.e. any reference to a section of space presuppose the representation of space. This is similar to Kant's first argument about space. Any talk about "here" and "there" already presupposes the representation of space. Therefore, space is not a concept, but an a priori intuition, which means it is a built-in intuition which is not gained through our experiences. In another word, we have always been wearing the spectacles of space when we perceive the world. It does not matter if we have a concept of space or not. Concept is at the thinking level, but intuition or perception happens before we generate any concepts about the world. Children who have not yet learned the word or concept of "space" still maneuver through the world in a spatial way, even though they cannot articulate it verbally. Therefore, we humans always perceive the external world through a built-in frame of space.

However, are we perceiving the world as it truly is? Is everything in the world really existing in a spatial way? According to Kant, we have no way to know that. We can only know things through our perception – seeing them at the phenomenon level. We can never know the things-in-themselves – the noumenon. The world could indeed be a spatial existence just as we perceived. Or it could be non-spatial at all. For instance, it could be like a dream, the spatial feature is a mental construct of the dreamer's mind. Or it could be like a Matrix generated world, the space is just something displayed by a computer program. Or it could be a 2D holograph casting a 3D world as some physicists nowadays speculate based on their research in cosmology.

Kant's argument on time is similar to that on space. There is no need to go into the detail here. Basically, he argues that time is also an a priori intuition. Any discussion about past, present, future, or the order of events all presupposes a representation of time. We can imagine time without anything happening, but we cannot imagine events happening without time. Time, like space, is also a whole that cannot be defined as a collection of individual concepts. Any reference to a moment or a fraction of time already presuppose the representation of time. In conclusion, space and time are inherent in our perception of the world. Only by placing objects and events under the frame of space and time, could we observe and understand them. What do they really look like at noumenon level? We could never know because we can never take off our spectacles of space and time.

In addition to the spectacles in perception, Kant says that we also have built-in spectacles in our ways of thinking. After perceiving external world, a process which is confined by our intuition of space and time, we further synthesize the perceived information through our built-in spectacles of thinking to generate our knowledge of the world. Kant listed 12 categories of them in 4 groups. They are the following:

- Quantity
    - Unity
    - Plurality
    - Totality
- Quality
    - Reality
    - Negation
    - Limitation
- Relation
    - Inherence and Subsistence (substance and accident)
    - Causality and Dependence (cause and effect)
    - Community (reciprocity)
- Modality
    - Possibility
    - Existence
    - Necessity

There is no need to go into details about each of those categories, and people might not agree whether those categories are complete or accurate either. However, I think the key point of Kant's argument is that we humans think in some fixed ways. Much like we see the world through our built-in framework of space and time, we think about events through those inherent modes of cognition. For instance, we always try to establish a causal relationship between two correlated phenomena. In other word, we tend to link dots into a line even though in reality there may be only dots. Whenever we observe one event following another repeatedly, we tend to build a causal connection between the two events.

There was a scene in the sitcom *Friends*, in which Monica was trying to find what a switch in her apartment controls. She was flipping the switch on and off, however, nothing happened in her apartment. In Joey's apartment across the hallway, Joey and Phoebe were watching TV. Every time when Phoebe blinked, the TV would lose power and came back on at next moment. Apparently, Monica's switch is connected to Joey's power outlet for TV. Without knowing that, Phoebe thought that she was the one causing that. She and Joey saw two phenomena happened one after another in a consistent way. Therefore, they linked two together to form a causal relationship, thinking that Phoebe's eye-blinking was interrupting the TV. As ridiculous as it may seem to be, we humans often do that. How many of us sometimes think that our lucky number brings good fortune to us? One may argue that there might indeed be some force behind our lucky number. No matter what one's belief of lucky number is, it further proves that we all think in a causal way. Either we attribute the good fortune to the lucky number or we don't, we are still viewing the lucky number and possible outcome through our lenses of causality. We are thinking about them as either causally related or causally unrelated. If they are not causally related, we will be wondering what the real cause is. We have not gone beyond the concept of causality in either way of thinking about it. That is what Kant pointed out, we have our causal mode of thinking built-in in our mind.

In summary, Kant contends that we not only perceive the world through our built-in spectacles of space and time, but also make sense of it through our built-in spectacles of cognition, such as causality. Due to those two levels of spectacles, our knowledge of the world certainly does not truthfully reflect the thing-in-itself. We will never be able to see the thing-in-itself due to our way of seeing and understanding the world.

It is sad to realize that. Is it really the case that we can never know the truth as asserted by Kant? It would probably be so if all we could do is to perceive the world through our senses and use our cognition to synthesize the sensory information. We would be bound to wear those spectacles. However, there is a way to go beyond our sensation and our cognition process, thus avoiding those build-in spectacles all together. That is the method I am going to introduce to you in the second part of this book. Before doing that, let's stay in the realm of sensory observation and conceptualized thinking a little longer and find out how modern physics can help us peek more deeply behind the vail of those build-in spectacles of space and time.

Chapter 8 Einstein's Spacetime –Revealing the Unification of Space and Time

In previous chapters, we have been mainly using one method in our investigation, that is through philosophical reasoning. We briefly introduced the profound ideas of Descartes, Plato, and Kant. Their insights shatter our common view of the world and ourselves. However, those ideas, as powerful as they are, probably affect only those people who bother to read their books. Majority of humans do not care whether the world is a dream or if we are looking at it through spectacles because those theories do not impact their daily life much if at all. The next method we are going to discuss has such a huge impact on everyone's life that no one can neglect it.

In the recent four hundred years, a new way of investigating the world came onto the stage and became the most influential methodology in modern history. That is science. It has greatly changed our view of the world and the world itself ever since its birth. Scientists not only utilize logic thinking and mathematics to establish theories, but also implement experiments to test their theories. Theories are produced by human beings' subjective minds, and experiment results are observations of the objective world. When the subjective and the objective are bridged in this way, a positive feedback loop is formed. New data from the objective world will trigger human minds to develop new theories to explain the data. New theories will lead to deeper understanding of the objective world, and enable advancement in new technologies with which in turn better sensing devices can be made. Better sensing devices will expand the horizon of what human can observe, thus providing even more data for human minds to think deeper and broader. In that way, a circle of positive feedback is established. The achievement of science is astonishing. As we all have witnessed, humans can now soar high into the sky, even to the outer space, and dive deep into the ocean. We can detect objects as small as electrons. We can observe stars billions of light years away. What a great achievement!

One key factor that fuels the progress of science is the invention of numerous measurement devices which enable us to access vast amount of information previously beyond our senses. Without those devices, we wouldn't even know the existence of infrared, ultraviolet, X ray and other electromagnetic waves outside of the visible light, nor would we be able to discover bacteria, molecules, or subatomic particles in the microscopic world. Those devices convert signals or information beyond our senses into something we can perceive. As mentioned in previous chapters, after such a conversion, the signals are not the same as the original. Instead, they are compressed and distorted. However, they still enable scientists to develop new theories and carry out verifications of their theories through experiments.

One of the earliest sensing device is the telescope, which was first invented around early 1600s in Holland and was later greatly improved by Galileo Galilei in 1609. Because the lenses sold on the market were not strong enough, Galileo had to grind the lenses by himself to improve the magnification of his telescope. He was able to improve it to 9X and then later up to 30X. Armed with his newest invention, Galileo could see the Moon in

great detail and discovered the craters and mountains on the Moon. He was even able to calculate the height of the mountains on the Moon based on his observations. His findings shattered the previous misconception about the Moon and other heavenly objects. People used to believe that all heavenly objects are perfect spheres with smooth surface. That idea was proven wrong by Galileo. People back then also believed that everything revolves around the Earth. However, Galileo discovered that there are three moons circling around Jupiter, thus debunking that misconception too. Galileo's other astronomical observations, such as the phase of Venus, provided strong support for Copernicus' heliocentric model. Due to his great contribution, Galileo is known as the father of modern science. And his method reflects the positive feedback loop in science mentioned above. Enabled by telescope, a new sensing device, Galileo collected new data that were not accessible to human before. And new data triggered deeper thinking about the model of our solar system, and finally led to Copernicus' heliocentric model.

Nowadays, anyone can buy a 250X magnification telescope on www.amazon.com for around $150. Even with such a basic amateur telescope, one can see the craters on the Moon with great clarity, much better than the fuzzy image Galileo saw 400 years ago. With our most advanced telescopes, such as Hubble Space Telescope, we can detect the faintest light emitted from galaxies billions of light years away. It is amazing to see how much progress human beings have made in four hundred years – a short period in the entire human history. It all happened because human beings started using science, the new method, to investigate the world.

With science, this powerful tool, in human being's toolbox, will we be able to go beyond the intrinsic limitations of our perceptions, namely Kant's spectacles of space and time? The most famous physicist in the modern time – Albert Einstein did find a way to peek deeper into the mystery of space and time. His answer is the theory of Special Relativity published in 1905 and theory of General Relativity in 1915. His insight forever changed our view on space and time. Let's take a brief look at the historical background leading to Einstein's theory of relativity before discussing the theory itself, so that we can better understand how Einstein came up with such a great discovery.

In 19^{th} century, experimental physicists could measure the speed of light rather accurately. French physicist Hippolyte Fizeau measured the speed of light as 315000 km/s in 1849. Another French physicist Léon Foucault improved Fizeau's method and got a more accurate result of 298000 km/s in 1862. It is very close to our current value of 299792.458 km/s. The value of speed of light intrigued Scottish physicist James Clerk Maxwell. In 1860s, James Clerk Maxwell was working on his theory of electromagnetism and published his famous Maxwell equations for electromagnetism. Based on his equations, he calculated the propagation speed of an electromagnetic wave and realized that it is the same as the speed of light. Therefore, he proposed that light is an electromagnetic wave. His unification of electricity, magnetism, and light is dubbed as the second great unification in physics after the first one discovered by Isaac Newton. Maxwell's unification also led to the prediction of the existence of radio waves, which was verified by German physicist Heinrich Hertz at his lab in 1887. Many important inventions in modern life, such as radio, TV, and cell phone are all based on our

knowledge of electromagnetic waves.

However, Maxwell's equations dictate one universal speed of electromagnetic wave, a constant that never changes. That is very counterintuitive. From our daily experience, we know that there cannot be one universal speed for any moving object. The speed of an object is relative to the frame of reference. For instance, when a person drives his car at 60 mph, his speed is 60 mph relative to the ground, but is zero relative to another person sitting in his car. So, how can electromagnetic wave or light have only one constant speed? Naturally, people assumed that the constant speed of light is the value measured in a specific frame of reference – a universal stationary frame of reference. This assumption seemed to be very reasonable at that time.

Back then, physicists were also puzzled about how light and other types of electromagnetic waves propagate through empty space. A water wave needs water as the medium to propagate, and a sound wave needs air or other mediums to spread. What is the medium that light propagates in? Physicists thought that the medium must exist even though they had no idea of what it was. So, they give this mysterious medium a beautiful name "luminiferous aether" or simply "aether," which is named after the Greek god of light. To put things together, they also assumed that the universal speed of light in Maxwell equation must be the value measured in the reference frame of the aether. Now it all made sense in theory, the only thing left was to design an experiment to detect this invisible aether.

Two American physicists Albert A. Michelson and Edward W. Morley decided to undertake this task. Little did they know that their experiment, Michelson–Morley experiment, would become the most famous "failed" experiment. They intended to verify the existence of aether, yet their experiment proved that aether does not exist. The principle of their experiment design is straightforward. They were trying to detect possible effect of "aether wind" on the speed of light when light travels in different directions relative to the aether wind. If a ray of light travels against aether wind, its speed should be lower than another ray of light traveling perpendicular to the aether wind. If a ray of light is travelling with a tailwind of aether, it should travel faster than light traveling in other directions.

One might ask, "If physicists assume that aether is stationary, then how could there be an aether wind?" Let me give you an example to illustrate this. Assume that it is a sunny and windless day. When you stand outside your home, you feel that everything is so serene. Then you get on your bike and head toward your favorite trail. When you peddle your bike through the calm air, you feel a gentle breeze blowing on your faces even though the air is stationary. The faster you bike, the stronger the wind blows. When you reach your top speed, you can hear wind whistling through your helmet. Why do you feel wind on a windless day? That is because you move relative to the stationary air. In the same way, light should feel the effect of aether wind if the light source moves relative to the stationary aether. The Earth is constantly moving. It orbits around the Sun and rotates on its own axis. Prof. Michelson and Morley's lab, which stands still on the surface of Earth, moves along with the Earth. Therefore, the light generated in their lab moves relative to

the aether, and thus should feel the aether wind.

Based on the above reasonings, Prof. Michelson and Morley designed an interferometer to detect the aether wind. An interferometer has two perpendicular arms with mirrors at the ends. Please refer to a simplified diagram of the interferometer from Wikipedia (Figure 5).

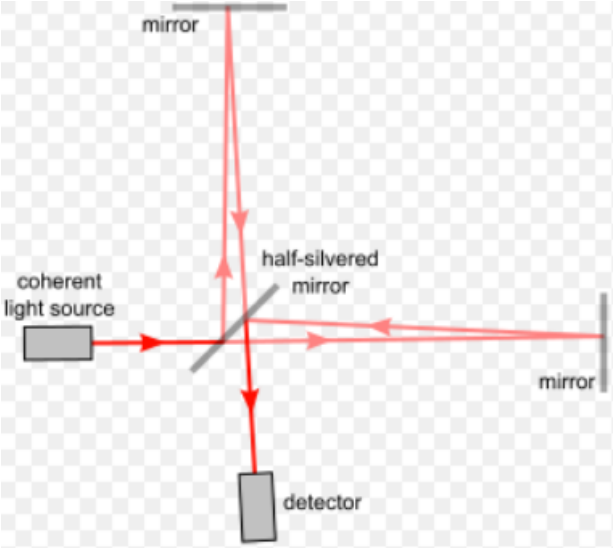


Figure 5. Simplified diagram of the interferometer from Wikipedia https://en.wikipedia.org/wiki/Interferometry

In this experiment setup, a half-silvered mirror (middle) splits the light from the coherent light source from left into two rays of light. The two mirrors (top and right) reflect each ray of light so that the reflected light will continue traveling toward half-silvered mirror and finally reach the detector. The path of each ray of light is marked with arrowheads so that their trajectory is clearly visible on the diagram. With this experiment set-up, half of the light from the light source will be reflected by the semi-silvered mirror and travel along the vertical arm to the mirror on the top. It will be reflected by that mirror on the top and travel downwards, pass the half-silvered mirror, and finally reach the detector. The other half of the light will penetrate the semi-silvered mirror and travel along the horizontal arm to the mirror to the right. It will then be reflected by the mirror on the right, travel toward half-silvered mirror, be reflected by it and reach the detector at the bottom. Over there, those two rays of light will meet and form a fringe pattern, which is also called the interference pattern.

The interference pattern of light works in the same way as the interference pattern of water wave. When you throw two rocks in a pond, you will see two circles of water wave propagating on the surface of the pond. When those two waves meet, they interfere, i.e., they will add on top of each other. The peaks of two waves will add up to an even higher peak, and the valleys of the two waves will also add up to a deeper valley. The peak from one wave and the valley of the other wave will cancel each other out. The interference pattern of light is made of bright and dark strips. Bright strips are where the two light rays add up, and dark strips are where they cancel each other out (Figure 6).

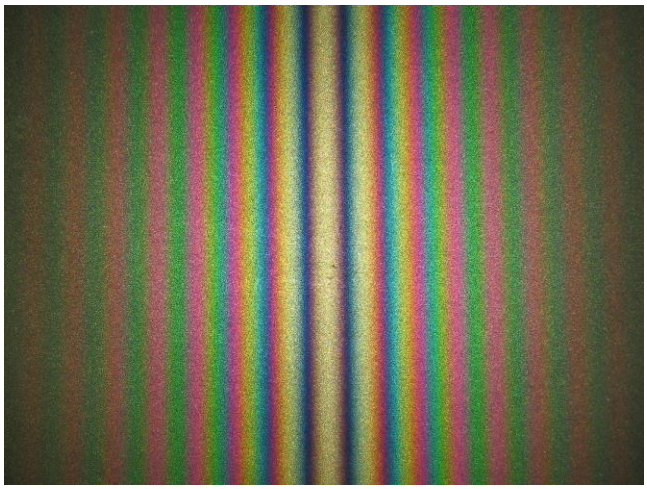


Figure 6. Interference pattern produced with a Michelson interferometer from Wikipedia https://en.wikipedia.org/wiki/Michelson%E2%80%93Morley_experiment

In the Michelson–Morley interferometer, two rays of light travel on the vertical and horizontal path will meet at the detector and create an interference pattern on a screen. If there were indeed aether wind blowing, it would affect light on two paths differently. Let's name vertical path as path A and the horizontal one as path B. When light on path A is travelling against aether wind, light on path B is perpendicular to the aether wind. If the interferometer were rotated by 90 degrees, then light on path A would be perpendicular to the aether wind and light on path B would be aligned with it. Therefore, a change in the interference pattern will appear at the detector when the orientation of the interferometer changes. Michelson and Morley put their interferometer on a large block of sandstone which floats in a trough of mercury. With a gentle push, the sandstone can rotate slowly and thus causing the interferometer to face all possible angles relative to the direction of the aether wind. Based on the theoretical assumption, the detector would register a shift in the interference pattern when aether wind blows from different directions. In addition, the movement of the Earth will also cause the interferometer facing different directions during different time of the day and different seasons. It should also result changes in the interference pattern at the detector. However, despite their best effort in three months between April and July in 1887, Michelson and Morley did not detect any noticeable change in the interference pattern, thus failed to find the highly expected "aether wind." No wonder this experiment is called the most famous "failed" experiment. The negative result of Michelson–Morley experiment provided convincing evidence that aether does not exist and the speed of light is a universal constant to all observers.

In 1905, probably intrigued by the experiment mentioned above, Albert Einstein invented his theory of Special Relativity, which is based on two simple postulates. Here are them in his own words:

1. The Principle of Relativity – The laws by which the states of physical systems undergo change are not affected, whether these changes of state be referred to the one or the other of two systems in uniform translatory motion relative to each other.
2. The Principle of Invariant Light Speed – Light is always propagated in empty space

with a definite velocity [speed] c which is independent of the state of motion of the emitting body.

The 1st postulate says that if physical laws are written in such equations in one reference frame, they should be the same equations in any other reference frame if it is moving in a constant speed relative to the first reference frame. In other words, the physical laws are the same to all inertial frames of reference. Inertial frames of reference refer to those reference frames moving relatively to each other with a constant speed, i.e., without any acceleration. That postulate is very natural to our common sense. Of course, the law of physics should not change no matter if we are walking at a speed of two miles per hour, three miles per hour, or standing still.

The 2nd postulate says that the speed of light in vacuum is constant regardless movement of the source of the light. Both Michelson–Morley experiment and Maxwell equation pointed to this direction, so Einstein assumed that is the case. It is quite counterintuitive. Imagine that you are riding on a fast-moving train and throw a baseball toward the direction that train is moving, assume the speed of the baseball is 10m/s from your perspective, and train is moving at a speed of 50m/s. A person on the ground will see your baseball flying at 60m/s. That is because in exact one second, you see the baseball travels 10 meters in the carriage, yet the person on the ground sees it traveled 10 meters in the carriage, plus the train itself traveled 50 meters, so the total distance is 60 meters. Therefore, the speed that the ground observer sees is 60m/s. However, if you shine a beam of light from your flashlight on the train, the speed is 299792458 m/s from your perspective, and the ground observer will still see the same speed of light as 299792458 m/s. There is no add-on value due to the speed of the train. That is very counterintuitive, isn't it? Interestingly, nature works in this mysterious way.

You may ask, what happened to the extra 50 meters that the train travels in that one second? Isn't the case that speed still equals to the distance divided by time? Doesn't light travel that extra 50 meters for the observer on the ground? Yes, speed by definition is distance divided by time. To keep the speed of light constant to all inertial reference frames, distance and time must be different for each reference frame. A clock in a moving reference frame will register less time than a clock at still for the same event. And the length of an object will decrease to the observer who is in relative motion to it. Those two phenomena are called time dilation and length contraction. We cannot just simply add up the distances to transfer from one inertia reference frame to another, neither can we assume that the time is the same for different reference frames. The exact mathematics formulas to calculate the change are described by Lorentz transformation, which we do not need to discuss in detail for our purpose here.

The effect of Special Relativity is very small when low speeds are concerned. It only gets noticeable when the speed difference between two reference frames is comparable to the speed of light. Physicists flew atomic clocks on commercial airplane to test the time difference caused by relativity, the difference between the clocks on the airplane and the clocks on the ground is only in nanoseconds after flying around the Earth. No wonder we have never noticed any time dilation on our wrist watch in a flight.

However, the indication of Special Relativity is revolutionary. It means that we can no longer treat space and time as two independent variables, they become one single unity – the spacetime. How we travel in the space will affect how we travel in time. Isn't it astonishing and at the same time extremely hard to believe? It still amazes me till today ever since I heard the theory of relativity in my teenager years. Let's use a standard textbook analogy to illustrate how the unified spacetime works.

Assume you are driving at the speed limit of 60 miles per hour on highway. At a section where the highway is exactly heading north, you will travel 60 miles northward in one hour, and travel zero mile toward east or west. That is because all your speed is used on northward direction. Later the highway makes a turn and runs slightly toward northeast direction. Even though you still drive at 60 miles per hour, you do not make as much progress northward as in the last section. Why? That is because part of your speed is used to travel eastward. When your eastward travel and northward travel are combined, you still have a total travel distance of 60 miles within that hour of drive.

It is similar for space and time. Traveling in time is like heading north in the analogy, and traveling in space is like heading east. And we constantly travel through spacetime at the speed of light. When we are standing still, i.e., we are not travelling in space, we are traveling through time at the full speed. That scenario corresponds to heading north on the highway at the full speed in the analogy. When we are moving in space, we will travel a little slower in time. That is like heading northeast on the highway, in which case, part of our speed is used to travel east, thus we travel less on northward direction. Similarly, because we are using part of our speed for traveling in space, our motion in time is slowed down a little bit. Therefore, we experience time dilation.

Even though Special Relativity seems straightforward to understand with the help of that textbook analogy, its implication is profound and revolutionary. Does it indicate that Kant's theory about spectacles of space and time is incorrect? In a sense, yes, because space and time turns out to be one pair of spectacles instead of two independent pairs as Kant has suggested. On the other hand, however, we are still experiencing our life through our ordinary sense of space and time despite the theoretical understanding provided by Einstein. I do not think anyone has a direct sensation or perception of the four-dimension spacetime. Instead, we all experience a three-dimension space and a one-dimension time as two separate domains which have nothing to do with each other. It further proves that our perceptions are not truthfully reflecting thing-in-itself. Even being helped by Einstein's insight, we still cannot go beyond the spectacles of space and time, we only gained a deeper theoretical understanding about them. This is comparable to the café wall illusion mentioned before. Even though we can use the T square to measure the lines and know they are indeed straight and parallel, we still perceive them as sloped and curved. Similarly, we can use modern physics as a tool to correct our knowledge of space and time, but we still perceive space and time as two completely different and unrelated frames.

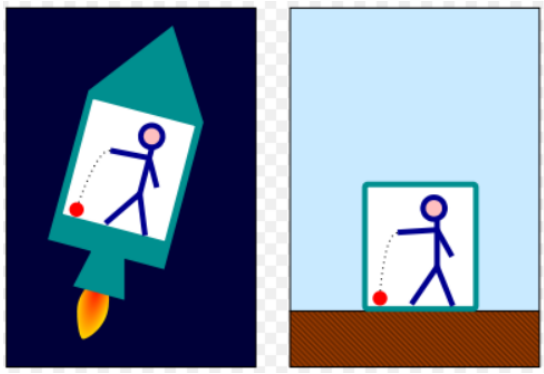
You may wonder, "Does the theory of Special Relativity have the final answer to the

mystery of space and time?" Einstein apparently did not think so, because it does not include gravity. In Newton's theory of gravity, gravity is a force that acts instantly on an object no matter how far away it is. This annoyed Newton. But his equation explains the observed movements of a wide range of objects so well – from apple falling off the tree to planets orbiting around the Sun – that he and physicists of later generations have to accept it as is. It is Einstein who finally solved the problem of the speed of gravity with his theory of General Relativity. General Relativity claims that gravity is not a force, instead, it is the effect of spacetime curvature. And the spacetime curvature is caused by mass and energy.

Einstein started from theory of Special Relativity, which dictates that the speed limit of our universe is the speed of light. Nothing can travel faster than it, including gravity. There cannot be any force instantly acting from a distance as gravity described by Newton. How gravity works must be resolved in order to reconcile with Special Relativity. It took Einstein another decade of hard work until he discovered the theory of General Relativity in 1915. It is based on one simple assumption – the equivalence principle.

Einstein used a thought experiment to demonstrate the equivalence principle. Imagine that you are riding an elevator and suddenly the cable breaks, both the elevator and you are in free fall. At that moment, you will no longer feel the gravity because the elevator and you are both falling at the same speed with the same acceleration. If you pull out your cell phone and release it in the air, it will just float in front of you as if in outer space. Just like you, it also does not feel any gravity. So, the force of gravity can be eliminated just by switching to a free falling reference frame. Isn't it intriguing? This thought experiment has been carried out by NASA to train astronauts. An airplane carries them to a high elevation and then takes a free fall. Astronauts will then experience zero gravity as if in space.

On the other hand, imagine you are in a spaceship floating in the outer space and the engine suddenly fires up and accelerates at the exact acceleration of g – the gravity acceleration you would feel on the surface of the earth. As that time, you will feel your exact weight just as you would feel standing on the ground. As shown in Figure 7, a ball will fall in the same manner, no matter it is in the Earth's gravitational field or in a rocket accelerating at $9.8 m/s^2$.



According to General Relativity, objects in a gravitational field behave similarly to objects within an accelerating enclosure. For example, an observer will see a ball fall the same way in a rocket (left) as it does on Earth (right), provided that the acceleration of the rocket is equal to 9.8 m/s^2 (the acceleration due to gravity at the surface of the Earth).

Figure 7. Equivalence principle from Wikipedia
https://en.wikipedia.org/wiki/General_relativity

Einstein's thought experiment shows that gravity can be turned off by adopting a reference frame of free-fall on earth. It can also be reestablished by adopting an acceleration reference frame in outer space, where the Earth's gravitational pull barely exists if at all. Based on this thought experiment, Einstein, with his great insight, realized that gravity may be just an illusory force and it is associated with acceleration motion in spacetime. Here is Einstein's own words of equivalence principle:

> we [...] assume the complete physical equivalence of a gravitational field and a corresponding acceleration of the reference system.

Armed by his equivalence principle, Einstein was able to peel off yet another cover off the mystery of spacetime. The math is extremely complex for the theory of General Relativity. Einstein used the Riemannian geometry to define the curvature of spacetime on one side of the Einstein field equations. And spacetime curvature is caused by the presence of mass and energy, which is mathematically expressed by stress–energy tensor on the other side of Einstein field equations. Despite the complicated math, the basic concepts of General Relativity are easy enough for layman to understand. It basically says the following.

1. Spacetime is curved.
2. Spacetime tells matter how to move, and matter tells spacetime how to curve.

Matter here also includes energy. As we know from Einstein's famous mass–energy equivalence equation $E = mc^2$, mass and energy are interchangeable. "E" represents energy, "m" is mass, and "c" is the speed of light in the equation. Mass and energy are different names of the same underlying physical quantity. The theory of General Relativity says that the presence of mass and energy causes spacetime to curve. The effect is illustrated by this drawing as shown in Figure 8. A drawing can only show the

curvature on a two-dimension grid, but spacetime actually has four dimensions – three dimensions of space plus one dimension of time. It is impossible for us to imagine the curvature of the 4D spacetime intuitively since we are always wearing the spectacles of 3D space and 1D time. But the drawing still helps us better understand the curvature of spacetime.

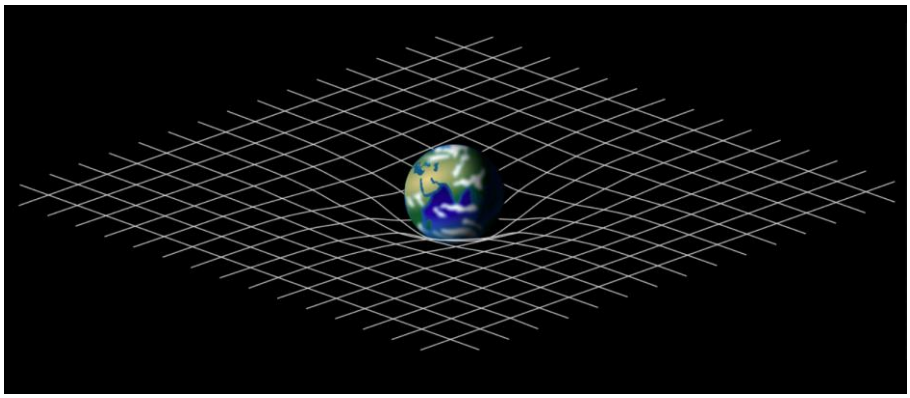


Figure 8. Spacetime curvature from Wikipedia
https://en.wikipedia.org/wiki/General_relativity

According to Einstein's General Relativity, the reason that the Moon is orbiting the Earth is not because Earth exerts an instantaneous and mystic force called gravity on the Moon. Instead, it is because the Earth's mass causes the spacetime to curve, and the Moon is moving through this curved spacetime, thus appearing circling around the Earth. In the same way, Earth and other planets in the solar system orbits around the Sun due to the spacetime curvature created by the massive Sun.

The spacetime curvature affects everything passing through it, including light. Light travels through the curved spacetime in the shortest distance, along the geodesic, which is the "straight line" in a curved spacetime. A massive object such as the Sun will curve the spacetime around it, thus Einstein predicts that light from remote stars will seem to be bent when it passes near the Sun. His prediction was verified by Sir Arthur Stanley Eddington in his experiment during the solar eclipse on May 29th, 1919. Photos of stars were taken during the total eclipse, and then compared with their positions taken at night. Since light from stars does not pass near the Sun at night, they are not bent by the Sun. By studying the positions of those stars, Eddington found that they do appear shifted by the Sun at the exact amount predicted by General Relativity. The photos had to be taken during a total solar eclipse because the Sun is too bright and will outshine all the stars during any ordinary day. Only during a total solar eclipse, the stars are visible during daytime.

Eddington's result brought instant fame to Einstein even though very few people understood his theory of General Relativity. Physicist Ludwik Silberstein told the following story. During one of Eddington's lectures he asked, "Professor Eddington, you must be one of three persons in the world who understands General Relativity." Eddington paused, unable to answer. Silberstein continued "Don't be modest, Eddington!" Finally, Eddington replied "On the contrary, I'm trying to think who the third person is." Even till today, General Relativity is still a very hard topic to study due

to its difficult math.

Through his theories of Special Relativity and General Relativity, Einstein profoundly changed our view of space and time or spacetime, twice. First, he united the space and time into one single entity – spacetime. Then he told us that it is not flat, but curved, and its curvature depends on the mass and energy in it. In that sense, spacetime is deeply connected with mass and energy.

In summary, things get more and more interesting, both more "complicated" and more "simplified" at the same time. More "complicated" is in the sense that the difficult mathematics is needed to thoroughly understand the theories, whereas more "simplified" refers to the fact that space, time, mass, and energy are all coming together into one interconnected entity. Kant used his philosophical reasoning to point out that we are always wearing the spectacles of space and time. And Einstein used his mathematical equations to reveal a united spacetime curved by mass and energy. Even though we all directly experience space and time, it seems that we have never got them right. Our perception of space, time, and objects – which are mass and energy – has been proven incorrect as we gain deeper and deeper understanding of them through modern physics.

Space, time, mass, and energy are interconnected as illustrated by Einstein's theory of relativity. This revelation strongly indicates that the entire physical world is one unity. Even though everything in it appears to be so different and often seemingly unrelated, they are one at the fundamental level. But, there is still one piece of puzzle missing in this grand unity. That is our own subjective mind. Each of us experiences our world subjectively. We feel that we are perceiving and thinking about this world in a subjective vs. objective manner. We have our own internal world, the subjective side, which is completely different from the external world, the objective side. We are the observer and knower, and the external world are stuff being observed and known. However, does this dichotomy of subjective and objective truly exist, or is it just a pair of deeper spectacles we human wear without being aware of it? Should Kant add this fundamental pair of spectacles of subjective-objective-division, in addition to his two levels of spectacles of perception and cognition? If the duality of the subjective and the objective did not really exist, if it were there only due to our inherent spectacles, what would happen if we could take off those spectacles? It would mean that the subjective observer and objective physical world are one. So far, we only know one scenario in which the subjective and the objective are one. That is a dream. Our avatar in a dream and the dream world are both created by our dreaming mind, and they are ultimately one. So, could it be the case that our life is indeed like a dream, in which the subjective and the objective are one unity? Can science give us any hint to answer this question?

Chapter 9 Quantum Mechanics – Unifying the Subjective and the Objective?

In previous chapter, we discussed how Einstein's theory of Special Relativity unifies space and time into spacetime and how his General Relativity indicates spacetime is interconnected with mass and energy. Everything in the external world are becoming one unity. But it still takes an observer to see space, time, mass, and energy. Is there any deeper connection between the observer and the external world? Could they also be one unity? Fortunately, Quantum Mechanics gives us some hints on this question. In this chapter, we are going to investigate many weird phenomena in Quantum Mechanics and investigate why they might indicate the unification of subjective and objective.

Quantum Mechanics was discovered in the early 20th century. However, after 100 years, physicists still cannot agree on what it means. Yet it has been repeatedly verified by numerous experiments and widely used in many practical applications, such as microchip, laser, and fMRI etc. As famous physicist Richard Feynman once said, "I think I can safely say that nobody understands Quantum Mechanics." Why? I personally think the reason is because Quantum Mechanics is against our built-in spectacles, especially our inherent tendency of separating the subjective and the objective, i.e., our tendency of considering that the objective physical world exists independent of a subjective observer. Therefore, we feel that the world described by Quantum Mechanics is very weird and even incomprehensible.

Now let's have a taste of the weirdness of quantum phenomenon. Let's start with the famous double-slit experiment. It was originally performed by physicist Thomas Young in 1803. At that time, there was a great debate among physicists about the nature of light. Isaac Newton believes that light is made of particles. Yet Thomas Young and others think that light is a wave. The double-slit experiment was designed to show that light does indeed behave like a wave. It interferes in the same way as water waves do. Here is a diagram of the setup of Young's double-slit experiment (Figure 9).

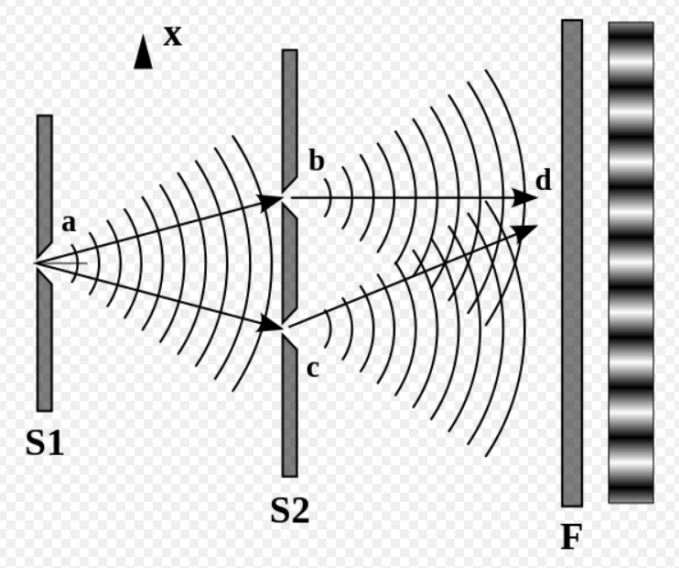


Figure 9. Thomas Young's double-slit experiment from Wikipedia
https://en.wikipedia.org/wiki/Young%27s_interference_experiment

Because Young did not have modern technology to generate a ray of laser, he had to let sunlight pass through slit "a" to form a homogeneous light source. Then this ray of light goes through two parallel slits, slit "b" and "c," and finally hits a screen. The result might surprise you. Instead of showing two bright strips on the screen, it shows an interference pattern with many bright and dark strips, shown on the right side of Figure 9.

This experiment proves the wave nature of light. As the light wave passes through the two slits in the middle, it becomes two waves which then interfere with each other, thus generating the interference pattern on the screen. Those bright and dark strips on the screen are interference pattern, which is the signature of two waves interfering with each other. Bright strips indicate that two waves reinforce each other. And dark strips mean that two waves cancel each other out at those locations, thus less light, or even no light arriving there.

The double-slit experiment clearly illustrates that light is a wave. Combined with other experiments which prove the wave nature of light, the particle theory of light finally died off. However, human beings' knowledge about light made an interesting turn years later. That was triggered by the discovery of photoelectric effect by German physicist Heinrich Rudolf Hertz in 1887.

Photoelectric effect refers to the phenomenon that metals emit electrons when being shined upon by light. Based on classical view of physics, if the light is ample or shines on the metal for a long time, there should be enough energy transferred from light to the electrons in the metal so that they will be able to escape from the metal. However, the experiments show that there will not be any electron emission unless the frequency of the light exceeds a certain threshold. If the frequency of the light exceeds the threshold, even at a very low intensity, a beam of light can still eject electrons. If below the frequency threshold, no matter how high the intensity of the light is or how long the light shines on

metal surface, there will not be any electron emission. It is like shooting a tank with different kinds of ammunition. On the one hand, ordinary bullets cannot penetrate the armor of the tank no matter how many of them being fired at it. On the other hand, just one armor piercing shell can piece through the tank.

To explain this phenomenon, Einstein had to assume that light is made of discrete packets, which were later called photons. Each photon has energy proportional to its frequency. When a ray of light shines on the surface of a metal, it is like to bombard the metal with many photons. If the energy of each photon is too low, it will just bounce back like ordinary bullets. To bump an electron out, the impacting photon's energy must be greater than the electron binding energy which binds the electron to the metal. Since each photon's energy is proportional to its frequency, there is a threshold on frequency for photoelectric effect to occur. Therefore, photoelectric effect forces us to consider light as particles.

In the classical view of physics and in our common sense, wave and particle are two completely different things. How can light be both? However, the experiments mentioned above dictate that light should have the characteristics of both wave and particle because it can demonstrate either feature in accordance with different experimental setups. This characteristic of light is called wave-particle duality. Interestingly, light can never show both particle-like and wave-like behavior simultaneously. It can show only one feature at a time. In that way, light is like a coin on the table, you can see either its head or tail, but never both at the same time. Not only does light have wave-particle duality, but also electrons, atoms, and molecules all have been experimentally verified to possess wave-particle duality. The wave feature of macroscopic objects usually cannot be detected due of their extremely short wavelengths.

However, there is a crucial difference between two sides of a coin and wave-particle duality of a particle. Even without being looked at, a coin still has its head or tail facing up, or at least we assume so. Without conducting a measurement on a photon or electron, we do not really know whether it is a wave or a particle at any given moment. The following experiment illustrates the subtlety of wave-particle duality. When physicists perform the double-slit experiment by sending out one particle at a time, they find something very puzzling. Please look at the pictures of interference of individual particle shown in Figure 10 (the photos in Figure 10 shows the result of double-sit experiment of individual electron. Electrons are shot one by one, and the photos of "a" to "e" show what the screen looks like when more and more electrons land on the screen subsequently as time goes by. To maintain the flow of the text, I still use the word "photon" to describe the experiment.)

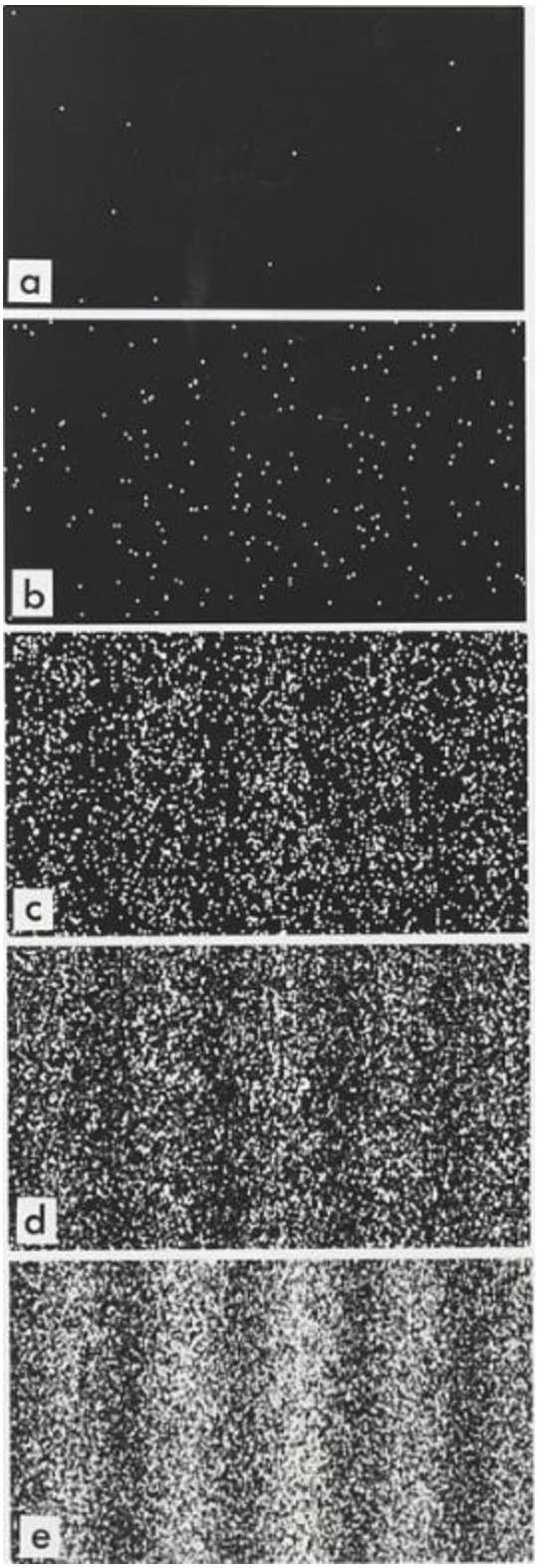


Figure10. Single particle interference pattern from Wikipedia
https://en.wikipedia.org/wiki/Double-slit_experiment

Each individual photon hits screen randomly as shown in picture “a” and “b.” However,

when many photons hit screen, the interference pattern gradually emerges and becomes clearer, as shown in pictures “c,” “d,” and “e.” Each individual photon shows the characteristics of a particle, hitting the screen at a definite point. Yet with many of them, collectively they show the characteristics of a wave, an interference pattern.

Here a paradox arises. It takes two waves to generate an interfere pattern. However, when the photons are being fired one by one, each photon has nothing to interfere with! So how can they gradually build an interference pattern on the screen? To do that, each photon must pass the two slits at the same time and interfere with itself. Based on our common sense, a photon cannot pass the two different slits simultaneously. Or can it?

According to physicists, the answer is yes, because each photon is in a so-called superposition. While in a superposition, a photon can pass through both slits simultaneously. Let me first explain the term of superposition in layman’s language. Superposition means that a photon is in a state which is a combination of multiple possible states. In the double-slit experiment, one possible state of a photon is to pass through slit A and the other possible state is to pass through slit B. The superposition refers to a combination of both states, i.e., passing through both slit A and B at the same time. Welcome to the bizarre quantum world.

In the double-slit experiment, we can no longer consider photon merely as a particle that goes through only one slit. Instead, photon exists in its quantum state of superposition. Each photon can travel through both slits at the same time as a wave and then interfere with itself. However, when it hits the screen, it is reduced to a dot on the screen, i.e., becomes a particle again. Just nanosecond before hitting the screen, the photon is still in superposition. It still has the potential to land on many possible locations on the screen. It still has the potential of realizing each and every possible outcome of the measurement. The probability of obtaining each outcome is given by equations in Quantum Mechanics. And the interference pattern is the manifestation of such probability. The bright strips correspond to high probability of being hit by photons, and dark strips indicate that lower possibility for photons to reach that area. As you can see, right before photons hit the screen, they are still in its quantum state and can potentially land on many different locations on the screen. However, once the photon hits the screen, only one possible outcome is realized. In this case, the photon is said to have been reduced to its classical state. Classical state refers to the state which an object can only be in one state and that state only. Every object we see in our daily life can only be at one place at any single time. We have never seen any object in superposition. For instance, we have never seen a soccer ball landing both inside and outside of a gate. We have never seen a coin with both head up and tail up. Similarly, when a photon hits the screen, it becomes classical. It loses its quantum state which enables them to go through two slits a moment ago. Now it occupies only one location on the screen.

One might wonder “does quantum state really exist?” Whenever we look at a photon, i.e., measure it in one way or another, it is already reduced to its classical state. How do we ever know that photon does indeed pass the two slits simultaneously? Why can’t physicists add sensors at each slit to see if the photons really pass through both slits? In

fact, physicists did try that. What they found is even more puzzling. When physicists add an apparatus to retrieve the information about "which-path" each photon goes through, the interference pattern disappears. Photons will act as particles, leaving two bright strips on the screen, which correspond to the two slots. The measurement of "which-path" information makes photons' superposition disappears, and they act like particles.

One more twist is added to this experiment to see what will happen if the "which-path" information is made inaccessible after each photon passes the double-slit. Physicists add another apparatus in front of the screen to wipe clean or obscure the "which-path" information so that there is no way to tell which slot each photon goes through. To their surprise, the interference pattern reappears. The experiment setup is as following. The photons pass the double slit, which has a device to put a mark on each photon. If the photon passes through slit A, it will get a slit A mark. It will get a slit B mark if it passes through slit B. The photons then travel toward the screen. An obscuring device is placed right in front of the screen. It will make change to both slit A mark and slit B mark so that they are no longer distinguishable. Therefore, even though the photons are marked with "which-path" tags early, a new obscure mark will cover the previous marks of "which-path," so that there is no way for an observer to know which-path each photon took when it finally hit the screen. The result is surprising, the interference pattern reappears on the screen. This experiment is called quantum eraser experiment because the setup erases the "which-path" information.

Now, think about it, in the first scenario where there is only a "which-path" tagging device, it seems that the photons "see" it and "decide" to act as particles. After going through either slit, they continue traveling until they hit the screen and generate two bright strips. That is exactly what we would expect particles to behave. However, in the second scenario with both a "which-path" tagging device and an obscuring device, after going through either slit as particles, carrying the "which-path" tag, the photons travel further. Just before hitting the screen, they "see" another device which erases the "which-path" information, the particles would suddenly change their behavior at the last moment before hitting the screen, and decide to manifest the interference pattern as a wave. Isn't it mindboggling? It is as if the photons are playing hide-and-seek with observers. How we, the observers, set up the experiment to look at those photons has a direct effect on which feature they show us, either as a particle or a wave.

As counter-intuitive as double-slit experiment seems to us, the result is precisely predicted by the equations of Quantum Mechanics. Under the mathematical formalism of Quantum Mechanics, the quantum state of a system is expressed by a wave function. And Schrödinger Equation describes how the wave function evolves over time. In order to calculate the result of a certain measurement, such as position of a photon, an operator (also called observable operator or simply observable[5]) corresponding to that specific measurement is applied to the wave function of the system. The result of such calculation will generate possibilities for each possible outcome of the measurement. That is the nutshell of the mathematics formalism of Quantum Mechanics. The details are too

[5] In mathematics, the observable is a self-adjoint operator mapping a Hilbert space (namely, the state space, which consists of all possible quantum states) into itself.

complicated to be mentioned here.

As you can see, there is a major difference between the math of Quantum Mechanics and that of classical physics on measurement. In classical physics, any measurable, such as the position or speed of an object, is explicitly expressed in the equations. There is no extra step to calculate measurement result. Therefore, we can calculate the trajectory of a cannon ball if we know its initial state and external forces acting on it, such as gravity and air resistance etc. At any given moment, we can read its position and speed directly from the equations, easy and simple. However, in Quantum Mechanics, measurement is subtle and tricky. It requires one extra step of calculation, which is mathematically described by applying an operator on the wave function of the system. The wave function, which contains every aspect of the system, does not give us a clear answer to its position, speed, or any other measurables. We, the observers, have to take the action of measurement to "force" the wave function to spit out the position, speed, or other measurables. When it does so, it still does not give us a definite answer. Instead, it gives us only possibilities.

For instance, in the double slit experiment, a photon's state is mathematically expressed by its wave function. In order to know where it is at any given moment, the operator of position is applied onto its wave function. The result of calculation is the probabilities of finding the photon at different places. That is exactly what we have observed on the screen (please refer to figure 10). Each photon lands on the screen in a seemingly random way. We cannot be sure where the next photon will land. However, when many photons hit the screen, gradually an interference pattern emerges. It reflects the probabilities of finding photons at different locations. Photons have a higher chance of hitting the area of bright stripe and lower chances on dark stripe.

The math of Quantum Mechanics matches the experimental result perfectly. However, why is the math of measurement process so complicated and cumbersome in Quantum Mechanics? It reflects the fundamental difference between the quantum world and classical world. Quantum world is fuzzy and uncertain, while the classical world is certain. As the bridge connecting the two worlds, measurement is mathematically explained in such a counterintuitive way so to describe a transition from quantum world to classical world. Taking measurement of a quantum system affects the system in an irreversible way. Measurement mysteriously breaks the superposition of the quantum system, and turns it into a classical system. Before measurement, a quantum system is in its state of superposition, which has the potential to manifest many possible outcomes. However, after a quantum system is measured, it is reduced to its classical state, which is a single outcome out of all those possible outcomes. How a system switches from quantum superposition to classical state due to measurement remains a mystery to physicists. That is so-called "measurement problem," a crucial yet unsolved issue in Quantum Mechanics.

The statistical nature of measurement in Quantum Mechanics made many scientists uncomfortable in the early 20^{th} century. One of them is Einstein, who famously said "God does not play dice with the universe." Einstein tried to challenge Quantum Mechanics for

many times. However, every time his challenge was defeated. Finally, Einstein and his colleagues came up with a thought experiment to prove Quantum Mechanics is incomplete. That is to say Quantum Mechanics may be correct in certain scope, but it is not the final words of the ultimate reality of the universe. The thought experiment was later called EPR paradox. EPR refers to the last names of the research team: Albert Einstein and his colleagues Boris Podolsky and Nathan Rosen. Their attack was aimed at Heisenberg's Uncertainty Principle in Quantum Mechanics. However, the attack was yet another failed trial for Einstein. Not only did it fail to prove Quantum Mechanics was wrong, but also ushered in another weird phenomenon in Quantum Mechanics – quantum entanglement.

To understand EPR paradox, we need to first discuss Heisenberg's Uncertainty Principle, so that we can see how Einstein et al. attacked it, and subsequently led to the discovery of quantum entanglement. Like everything in Quantum Mechanics, Heisenberg's Uncertainty Principle is also very counterintuitive. It says that a pair of complementary variables cannot simultaneously be known precisely. Let me explain what a pair of complementary variables is with an example. For instance, a particle's position and momentum is a pair of such complementary variables. The more accurately the position is known, the less accurately the momentum can be known, vice versa. To put it into a formula, it is: $\sigma_x\sigma_p>=\hbar/2$. The product of the standard deviation of position "σ_x" and the standard deviation of momentum "σ_p" is always greater than the half of ħ, the reduced Planck constant. Let's assume that we could measure the position of an electron with great accuracy, that would mean σ_x is extremely small. In order to still satisfy $\sigma_x\sigma_p>=\hbar/2$, σ_p needs to be huge, which in turn indicates that we cannot get an accurate measurement on momentum of the electron. There is always this inherent uncertainty when measuring those complementary variables. Because ħ is extremely small, this phenomenon is not noticeable in our everyday life in the macro-world. However, for small particles in micro-world, the amount of the uncertainty is significant.

The lack of precise knowledge about complementary variables is not caused by any measurement error. Instead, it is a theoretical limit dictated by Quantum Mechanics. Heisenberg's Uncertainty Principle describes a fundamental limit of how much we can know about a quantum system. In equations of classical mechanics, it is possible to calculate the position and momentum at the same time. Therefore, there is no theoretical reason why accurate measurements of both position and momentum cannot be done simultaneously in classical mechanics. In comparison, measurement in Quantum Mechanics is completely different as we mentioned early. Any measurable is attained through applying an operator on the wave function of the system. The operator for position and the operator for momentum happens to be at odds to each other (the technical term is non-commutativity of the operators). The incompatibility of those two operators results that the position and momentum cannot be measured to an arbitrary precision simultaneously. In other word, the mathematics of Quantum Mechanics dictates the Uncertainty Principle. The detail of the math is too complicated and beyond the scope of this book. If you are interested, you can investigate more about the non-commutativity of operators in Quantum Mechanics.

Now we have a clear idea about Uncertainty Principle, let's see how Einstein et al. tried to disprove it with their thought experiment – EPR paradox. Here is a brief description of EPR thought experiment. Imagine a stationary particle breaks into two smaller particles, which travel toward the opposite directions. Let's call them particle A and B. Since those two particles originate from a single particle, they are deeply interconnected. The total energy of them as a system is conserved. Therefore, we can measure one particle and infer the state of the other particle without directly measuring it. For example, we can measure the momentum of particle A, and calculate the momentum of particle B based on the information we retrieve from particle A. Using this clever design, Einstein et al. proposed a smart method which is supposed to measure both position and momentum of a particle accurately, thus raise a serious challenge to the Uncertainty Principle. Their experimental design is the following: measure the position of particle A directly. And at the same time measure the momentum of particle B. Then infer particle A's momentum from particle B's momentum. By doing measurement in such a way, theoretically they can know particle A's position to an arbitrary accuracy through direct measurement, and know its momentum to an arbitrary accuracy by inferring from particle B's momentum. Therefore, both the position and momentum of particle A can be known accurately. This conclusion contradicts with the Uncertainty Principle, which says that the position and momentum cannot be known accurately simultaneously. Therefore, Einstein and his colleagues drew the conclusion that Quantum Mechanics is incomplete.

However, nature gives Einstein a big surprise. When this thought experiment was later carried out in labs, it turns out that particle A and B cannot be considered separately. They are in fact connected as one quantum system. Any measurement done on particle A will instantly cause a change in the state of particle B, vice versa. One cannot treat them as separate entities as Einstein and his colleagues did. That bizarre relationship of particle A and B is later called quantum entanglement, while at that time Einstein named it the "spooky action at a distance." The pair of particles can be arbitrarily far apart, even across an entire galaxy. And one particle still seems to be able to "know" instantly that the other one is being measured and the result of the measurement. Einstein thought that such a long-distance instantaneous knowledge of each other was "spooky."

One may think that there may be some kind of instantaneous communication between the two particles so that particle A will act accordingly when particle B is measured. However, since Einstein's theory of Special Relativity dictates that nothing can travel faster than the speed of light, any transmission of information must be slower than or equal to the speed of light between particle A and particle B. Then how could particle B instantly "know" that particle A has been measured and thus yanked out of superposition at the same time? The answer is that we must consider particle A and B as one system. They are just like the head and tail on a coin. When we flip the coin in the air, the head and tail are like in a superposition with a 50% probability of landing on either head or tail. When we take a measurement on this system of two particles, their superposition dwindles down to a definite state. It is as if we catch the coin with our hands, either head or tail will be facing up. When the state of one side is decided, the other side is automatically determined. If the upper side is head, the bottom side must be tail, vice versa. There is no communication needed between the upper side and bottom side of the

coin to generate such a result. The system of an entangled pair is like a giant coin with two sides separated, and their separation can be light-years apart. As you can see, quantum entanglement breaks the perspective of locality. That is to say that an entangled system is no longer local as we would normally believe. Instead, it is both here and there at the same time.

The non-local characteristic of quantum entanglement does feel very weird to us. It is weird because it goes against our perception of space and the spatial relationship among objects. It strongly indicates that our concept of space is an illusion. As Kant pointed out, thing-in-itself may not be spatial at all. Now the phenomenon of quantum entanglement forces us to discard the concept of locality. Therefore, in addition to the philosophical argument from Kant, we now have physical evidence of quantum entanglement pointing to the same direction. They both strongly indicate that space is an illusion. Therefore, it is about time for us to seriously consider the possibility that we are wearing the spectacles of space, and strive to find a way to take off them so that we can see the undistorted truth hidden behind them.

Kant pointed out that we also wear the spectacles of time in addition to those of space. Einstein proved to us that time and space are one unity – spacetime. Do we have any empirical evidence to show the illusory nature of time? The delayed choice quantum eraser experiment may have provided just that. It uses quantum entangled pairs of photons to add yet one more mind-boggling twist to the quantum eraser experiment mentioned earlier. Figure 11 is the diagram of its setup.

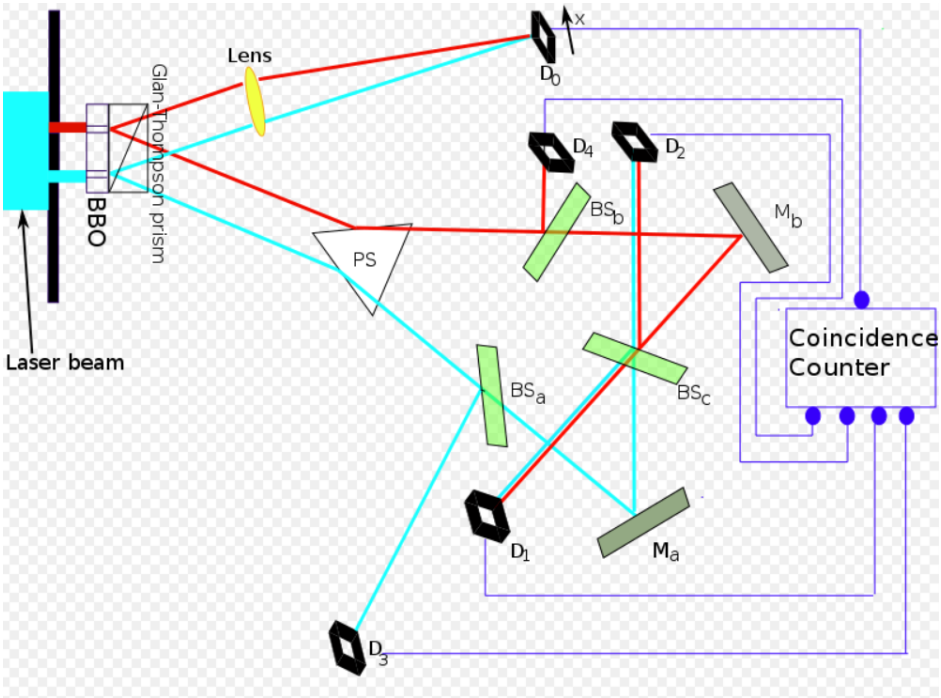


Figure 11. Delayed choice quantum eraser experiment from Wikipedia https://en.wikipedia.org/wiki/Delayed_choice_quantum_eraser

The photons pass through two slits shown on the top left of the picture. The two paths are

marked by red and cyan respectively. Red corresponds to slit A and cyan corresponds to slit B. This part is the same as typical double-slit experiment. Then an optical crystal BBO (beta barium borate) is added to split each photon into two entangled photons. The two photons that travel along two red lines are one entangled pair, so are the other pair on the cyan path. Of each entangled pair, the one travels upwards toward detector D_0 is called "signal," which will hit detector D_0. And the one travels downwards toward path splitter (marked as "PS" on the diagram) is called "idler." The idler photons will encounter three beam splitters marked as BS_a, BS_b, and BS_c. Those three beam splitters will cause the idler photons to have 50% chance of passing through and 50% chance of being reflected. Two mirrors M_a and M_b are placed in positions shown on the diagram. This complicated experimental setup is to ensure the following:

1. If an idler photon is recorded at detector D_3, it can only have come from slit B. That means the "which-path" information is clearly known. As shown on the diagram, only a cyan line reaches D_3.
2. If an idler photon is recorded at detector D_4, it can only have come from slit A. The "which-path" information is also available. Only a red line goes to it.
3. If an idler photon is detected at detectors D_1 or D_2, it might have come from slit A or slit B. Both red lines and cyan lines go here, so there is no way to retrieve the "which-path" information.

Please note that idler photons travel longer distance than the signal photons. The signal photons travel to detector D_0 and end their journey right there. On the other hand, the idler photons need to go through an array of beam splitters and mirrors before finally hit D_1 to D_4. Therefore, when a signal photon hits the screen, it has no way to know which detector will register its corresponding idler photon since the idler has not hit any detector yet. Only a short time later, the corresponding idler photon hits the detectors, then there will be information available on which detector it hits. If the idler photon hits D_1 or D_2, it means the "which-path" information is erased. That is because both red line and cyan line go to D_1 or D_2, there is no way to tell which-path it has taken. If the idler photon hits D_3 or D_4, we will have definite information on "which-path" it went through. Since idler and signal pair all pass through the same slit, if we knew the "which-path" information about the idler, we would immediately know the "which-path" information for the signal photon too.

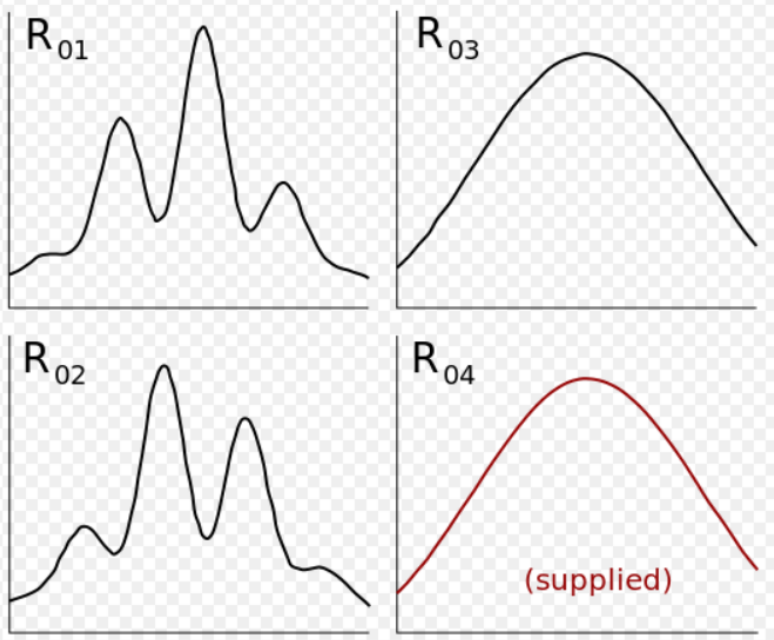


Figure 12. Results of delayed choice quantum eraser experiment from Wikipedia https://en.wikipedia.org/wiki/Delayed_choice_quantum_eraser

Now, let's look at the result of this experiment. When all signal photons that hit detector D_0 are looked together, the result does not look particularly interesting. However, when physicists examine the subset of D_0 combined with the information from Detector D_1 to D_4, findings become very interesting. Please refer to Figure 12. R_{01} means the jointed detection of D_0 or D_1, i.e., the signal photon hits D_0 and its entangled pair, the corresponding idler photon hits D_1. Since the "which-path" information for idler photons hitting D_1 is erased, this subset of signal photons has an interference pattern shown on R_{01}. It is the same case for R_{02}. On the other hand, since the "which-path" information for idler photons hitting D_3 is not erased, we know that it travels along cyan line and is from slit B, there is no interference pattern in this subset of the data as shown on R_{03}. The same is for R_{04}, which experimenters did not even bother to report when they published their paper. The graph was supplied later.

This is not all that surprise since we already know that interference pattern will appear when the "which-path" information is erased, and it will disappear when the "which-path" information is available. The surprising part is that when the signal photon hits the screen, its corresponding idler - its entangled pair - has not yet reached any detector yet. Whether the "which-path" information will be erased or not has not been decided yet, so how would the signal photons know if they should show the interference patter or not? Do they have knowledge of their entangled pair beforehand? It is extremely mindboggling, isn't it? Because the erasure part is carried out after the signal photons have already hit the detector, this experiment is called the delayed choice quantum eraser experiment.

In the recent version of this experiment carried out by Prof. Anton Zeilinger's team, the erasure part is moved out to 144 kilometers away. Such experimental setup rules out any

possible communication between idler photons and signals photons, so that scientists can be absolutely certain that "choice is indeed delayed." And the result is still consistent with previous findings. Thus, we know that we cannot consider any individual part of an entangled system separately through either space or time. The entire system must be taken as a whole. And the entanglement effect seems to defy the limitation of both space and time. In Prof. Zeilinger's own word, "In a certain sense, quantum events are independent from space and time."

What do you think? How do we make sense of those weird quantum phenomena mentioned above? What are they telling us? There is a consensus among majority of physicists on non-locality of quantum entangled system. The non-locality is a strong evidence that we humans are wearing spectacles of space as Kant claimed. And delayed choice quantum eraser experiment indicates that time may be our inherent spectacles too. In addition, the thorny issue of measurement problem seems to point to an even more fundamental layer of spectacles, namely the division of the subjective and the objective. What is measurement? How does measurement cause the quantum system to become a classical system? Those questions are fiercely debated among physicist and philosophers. We are going to explore their ideas in the next chapter.

Chapter 10 Prevailing Interpretations of Quantum Mechanics

What does Quantum Mechanics tell us? Why does photon act as a particle when "which-path" information is available, and appear as a wave when "which-path" information is erased or obscured at the very last moment? How can two entangled photons have such weird correlation that they seem to have an instant effect on each other no matter how far away they are separated through space and time, or spacetime? And what is measurement? Does the observer play an important role in measurement? Those questions are not answered by the mathematical equations of Quantum Mechanics. The same set of equations can be explained in many different ways regarding its underlying physical meaning. Those explanations are called interpretations of Quantum Mechanics. Even though the mathematics of Quantum Mechanics has been discovered and largely agreed for about one hundred years and its validity has been confirmed by numerous experiments, there is still no consensus of its interpretation among physicists and philosophers. In this chapter, I am going to introduce several relatively more popular interpretations of Quantum Mechanics, so that you will have a sense of the diversity of those ideas and understand why it is so difficult to make sense of Quantum Mechanics.

The most prevailing interpretation nowadays is still the traditional Copenhagen interpretation, offered by founders of Quantum Mechanics, Niels Bohr and Werner Heisenberg, and their followers. According to the Copenhagen interpretation, a quantum system does not have any definite property before measurement. It is in superposition described by its wave function. When measurement is carried out, the wave function "collapses." Collapse here means the system is no longer in the superposition - a state of many possibilities. Instead, it collapses into one possible outcome out of all the potential outcomes.

In the double-slit experiment, according to the Copenhagen interpretation, each photon passes through two slits in its superposition and keeps traveling forward in its superposition until it hits the screen. Right before reaching the screen, it could hit all the possible spots on the screen. However, once it is registered on the screen, i.e., being measured, its wave function collapses and it appears at only one specific location. How and why does measurement have this effect and exactly what happened during a measurement is not explained in Copenhagen interpretation. Here is how Heisenberg himself explained the necessity of measurement process:

> Of course the introduction of the observer must not be misunderstood to imply that some kind of subjective features are to be brought into the description of nature. The observer has, rather, only the function of registering decisions, i.e., processes in space and time, and it does not matter whether the observer is an apparatus or a human being; but the registration, i.e., the transition from the "possible" to the "actual," is absolutely necessary here and cannot be omitted from the interpretation of quantum theory.

As you can see, Heisenberg claimed that it is absolutely necessary to introduce an observer, either a human or an apparatus, as the agent that can cause the collapse of the wave function, in which the system transforms from all potential possibilities to one actual measurement result. However, he did not explain why and how this happens.

If we have no idea what happens during measurement, do we know anything before it? What is the quantum system like before a measurement is taken? The answer from Copenhagen interpretation is that it is meaningless to talk about any property of a system before making a measurement of it. For example, in the double-slit experiment, before hitting the screen, a photon can be anywhere in the universe. The probability of any position that we might find it is described by its wave function. Therefore, philosophically, it means that there is not a preexisting fixed reality of the photon. Rather, the result of measurement will only be decided at the exact moment when the measurement is carried out. Therefore, measurement becomes the prerequisite for knowing the external world as we know of. As it is said, "Reality is in the observations, not in the electron."

That perspective makes many people uncomfortable, including Einstein, even though he is one of the pioneers of Quantum Mechanics. Einstein once challenged the believers of Quantum Mechanics, "Do you really believe that the moon is not there unless we are looking at it?" The reply is that there is no way for us to know whether the moon is there or not if no one is looking at it, so it is pointless to discuss it. "Wait a minute!" One might protest, "we were talking about particles like photons and electrons previously. It is not too astonishing when we heard that they are in superposition before being measured. Now we are talking about the Moon, a huge object even in our macroscopic world. And we cannot know its existence for certain before looking at it. How could that be!"

We tend to think that quantum effects occur only at microscopic level. The objects visible in our daily life are macroscopic and obey the law of classical mechanics. However, if we really think about it, where is the exact boundary between the microscopic world and macroscopic world? One atom is certainly microscopic. How about ten atoms? One hundred atoms? A huge protein molecule? A DNA molecule? Where should we draw the line in the sand? In addition, all macro objects are made of fundamental particles. Shouldn't they inherent some quantum features from their microscopic components?

In recent years, larger and larger systems have been proven to be able to show the quantum effect. In 2010, Andrew Cleland and his team at UC Santa Barbara were able to put a 30-micrometer paddle into a superposition of both moving and standing still. If physicists can take bigger and bigger objects into a quantum state, one day we might just be able to really put a cat in a superposition of both live and dead as Schrödinger had imagined in his famous thought experiment of "Schrödinger's cat." Schrödinger designed his thought experiment in such a way that the superposition of a particle induces the superposition of a macro object. Please refer to Figure 13.

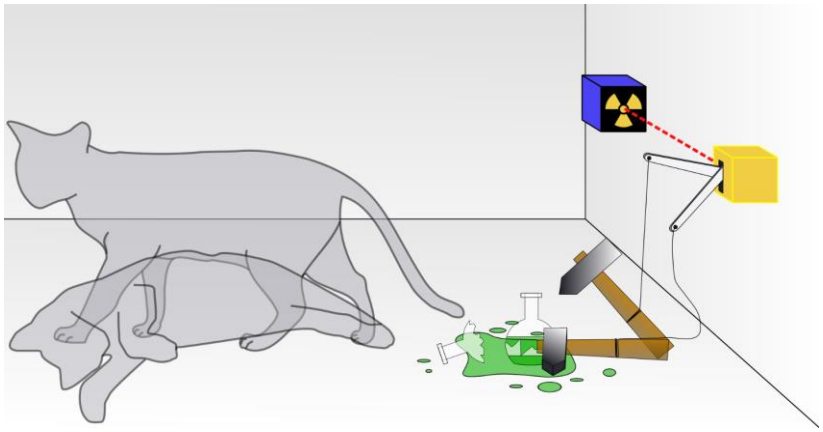


Figure 13. Schrödinger's cat from Wikipedia
https://en.wikipedia.org/wiki/Schr%C3%B6dinger%27s_cat

Schrödinger described his thought experiment setup as such:

> One can even set up quite ridiculous cases. A cat is penned up in a steel chamber, along with the following device (which must be secured against direct interference by the cat): in a Geiger counter, there is a tiny bit of radioactive substance, so small, that perhaps in the course of the hour one of the atoms decays, but also, with equal probability, perhaps none; if it happens, the counter tube discharges and through a relay releases a hammer that shatters a small flask of hydrocyanic acid. If one has left this entire system to itself for an hour, one would say that the cat still lives if meanwhile no atom has decayed. The psi-function of the entire system would express this by having in it the living and dead cat (pardon the expression) mixed or smeared out in equal parts.

The psi-function mentioned by Schrödinger is another name for the wave function because it is often written down as Greek letter psi. In his thought experiment, Schrödinger linked a macroscopic object, the cat, with a microscopic object through a causal chain. When the microscopic object is in the superposition of both decay and not decay before a measurement is taken, the cat is in the superposition of both live and dead. A cat both dead and alive at the same time is, to say the least, counter-intuitive. We have never seen a cat like that in our daily life. We see either a dead cat or a live one. How do we explain the paradox here? Well, when we see a cat, we have already made a measurement. That measurement collapses the wave function, yank the cat out of the superposition of half live and half dead, results it in either one of those two possible outcomes. If we repeat the same experiment with numerous cats, we will see half of them are dead and the other half are alive. Such a result reflects the cat's superposition of being half dead and half alive before measurement.

Since any person or apparatus can be the measurement device in Copenhagen interpretation, we do not know which of those possible measurement devices causes the collapse of wave function. It could be the case that the cat is both dead and alive until a person opens the box and the quantum state of the cat immediately collapses into either

dead or alive. In that scenario, that person is the one that carried out the measurement process. Or it could be the case that the Geiger counter causes the superposition to collapse. In such a case, the Geiger counter does the measurement. When the person looks inside of the box, the measurement is already finished. He or she only sees the result of that measurement taken by the Geiger counter. However, how big a device qualifies as the measurement device that can collapse the superposition? What if we insert a series of measurement devices in between, assuming they have different sizes ranging from several atoms to hundreds, thousands, millions, and billions of atoms? Where should we make the cut in this chain of devices and pin down where the measurement occurs and superposition collapse? Apparently, Copenhagen interpretation would have trouble to draw the line in the sand in this chain of measurement devices.

As you can see, Copenhagen interpretation uses the measurement process as a bridge to connect the quantum world and the classical world, i.e., microworld with many possible outcomes and macroworld with only one measurement result. However, the measurement process is not clearly defined. As mentioned before, the boundary between the two worlds is not clear either. Even a big 30 micrometer paddle can be put into a quantum state although most of time it is probably in its classical state. Maybe an object of any size can be in either quantum state or classical state depending on the conditions. Under what conditions does an object maintain and lose its quantum state? There is a theory attempting to answer that question. It is the so-called decoherence theory developed by David Bohm in 1958.

Quantum decoherence means the loss of coherence when a quantum system interacts with its surroundings. To better understand decoherence, let me first explain what coherence is. Coherence refers to the extent of how well waves maintain their phase difference. If two waves have different phases and maintain the same frequency, they are in perfect coherence. That means, at any time, their phase difference will be constant. Thus, they will generate a perfect interference pattern. In the double-slit experiment, photons pass double-slit and generate an interference pattern because the two wave fronts from two slits are in a perfect coherence. Therefore, we see a clear interference pattern. When a quantum system meets its surroundings, its coherence decays as time goes by due to its interaction with surrounding objects. In another word, it goes through decoherence process, which will finally cause it to lose its quantum state. This is the so-called quantum decoherence process, which inevitably transfers the system from a quantum state to a classical state. For a macro object, this process happens extremely fast due to its numerous interactions with surroundings, such as being bombarded by billions of molecules and photons at any given moment. That is the reason why we have never seen any macro object showing any quantum weirdness in our daily life according to decoherence theory.

Quantum decoherence theory provides an explanation on why we only see macro objects in their classical state. However, it does not really solve the measurement problem. It basically says that we do not see our car in superposition because its quantum feature “leaks” into its surroundings quickly. It does not mean the wave feature of the car disappears, it just means it got mingled with everything around it so badly that we cannot

see a clear interference pattern. However, if we could theoretically keep the system isolated from its surroundings, as in the case of Schrödinger's cat, the system would still maintain its quantum state. In addition, we have experimental evidence mentioned early – the 30-micrometer paddle was put into a superposition of both moving and standing still. Thus, the reason we do not see our daily macro objects such as our car and chair in quantum state is because we typically cannot completely isolate them from surroundings. If we could, we would still be facing the paradox of Schrödinger's cat under quantum decoherence theory. Because the quantum decoherence theory does not explain how a completely isolated macro object can turn into a classical system, how to make sense of that "living and dead cat" still needs some version of interpretation of Quantum Mechanics in addition to quantum decoherence theory.

It is very difficult to isolate any system from the rest of the world. However, if we consider the entire universe as one huge quantum system, there is nothing outside to disturb it. Therefore, its quantum state is perfectly preserved, forever, i.e., the entire universe has been and always will be in superposition. If that is the case, there should exist many possible versions of universe. Why haven't we observed any other possible versions besides the universe we currently observe, which looks very much classical. Apparently, quantum decoherence theory cannot provide an answer to this question either. Thus, an interpretation of Quantum Mechanics is still needed to resolve the measurement problem.

In summary, Copenhagen interpretation puts the mystery of the transition from quantum state to classical state into "collapse" of wave function without providing a good explanation for it. Even though quantum decoherence theory provides an explanation of the decoherence process, it does not really solve the measurement problem, especially for a quantum system without any disturbance such as Schrödinger's cat or entire universe. Unsatisfied with Copenhagen interpretation and quantum decoherence theory, physicists and philosophers tried hard to come up with alternative interpretations of Quantum Mechanics.

One alternative is the many-worlds interpretation. To avoid the thorny issues of measurement and wave function collapse, many-worlds interpretation took a different approach. It asserts that there is no wave function collapse at all. Instead, the universe just splits into many universes in which each and every possible outcome is realized. Please refer to Figure 14, which illustrates many-worlds interpretation with Schrödinger's cat.

In the case of Schrödinger's cat, a measurement does not cause the cat's superposition to collapse into either classical state of being dead or alive. Instead, the universe just splits into two universes when such a measurement takes place. In one universe, the cat is alive. In the other universe, the cat is dead. Since the wave function never collapses in many-worlds interpretation, it successfully avoids the thorny issue faced by Copenhagen interpretation, which is to explain the cause and mechanism of wave function collapse in measurement process. However, the downside of many-worlds interpretation is that it will lead to countless parallel universes which cannot communicate with each other. Some physicists consider such a scenario as unfalsifiable and hence unscientific because

we can never know if those parallel universes really exist or not.

Figure 14. Schrödinger's cat in many-worlds interpretation from Wikipedia https://en.wikipedia.org/wiki/Schr%C3%B6dinger%27s_cat

If proliferation of inaccessible parallel universes bothers you, there are many other interpretations of Quantum Mechanics available to choose from. If you are leaning toward idealism or any other form of anti-materialism, you may like the von Neumann-Wigner interpretation, which asserts that consciousness causes the collapse of wave function. Mathematician John von Neumann argued that the mathematics of Quantum Mechanics allows for the collapse of the wave function to be placed at any position in the causal chain from the measurement device to the "subjective perception" of the human observer. Therefore, it is arbitrary to draw the line in the sand to separate the quantum side and classical side. Everything before this line on the causal chain is still in their quantum states. They are in their quantum superposition. Everything after this line has already lost their quantum state due to the collapse of wave function, and thus becoming classical.

Let me use an example to further illustrate Prof. Neumann's point. Assume that we are trying to measure the spin of an electron, which is in a superposition of spin-up and spin-down. The electron's spin is first detected by a sensor, then the sensor sends its signal to a wire, which goes into a computer. And finally, we look at the screen of the computer, and we will see the display showing either the electron is spin-up or spin-down. In this simplified picture of the experiment setup, the causal chain runs from electron to the sensor, then the wire, then computer and finally reaches us, the human observer. According to John von Neumann, the collapse of wave function can happen anywhere in this chain. It can happen at the sensor, the wire, the computer, or at human observer. If it happened at the sensor, it would mean that the electron was in its quantum state of superposition, but the sensor made electron's wave function to collapse and everything from sensor down the chain is in their classical states. Or if the collapse of wave function happened at computer, it would mean that the electron, sensor, and wire are all in their quantum state of superposition, entangled together. It was the computer which caused collapse of wave function, and everything after computer is classical. Of course, the collapse could happen at the very last stop of the causal chain, namely human observers.

That would mean everything in the material world are in their quantum state whereas it is the human mind that causes the collapse of wave function.

Since math of Quantum Mechanics does not dictate where to set the collapse of wave function, it is arbitrary for us to decide where to draw the line in sand. Later physicist, Nobel laureate, Eugune Wigner proposed that it is the consciousness of an observer which collapses the wave function. The non-physical mind is the only true measurement device. Everything in the physical world is in superposition until a conscious mind makes it collapse into one single reality that he or she perceives. It makes sense because everything before the conscious mind are all physical objects that are made of fundamental particles. Why should we treat them differently? On the other hand, our conscious mind does seem to be completely different from any physical object. It is natural to draw the line at the boundary of physical world and mental world. As you can see, the von Neumann-Wigner interpretation put human consciousness at the center of measurement problem.

However, Eugune Wigner later shifted away from his interpretation partially because that it might lead to solipsism, which claims that only one's own mind is sure to exist, the world and other people's minds do not exist. This interpretation will also raise difficult questions about what consciousness is and what kind of beings have consciousness? Do dog, pig, or other mammals have consciousness? Or do insects possess consciousness? In short, we will have to face the "hard problem of consciousness" if we claim consciousness as the reason of wave function collapse. In addition, the von Neumann-Wigner interpretation still does not explain how consciousness makes the wave function collapse.

To avoid problems associated with the mechanism of wave function collapse, we can borrow the branching method in many-worlds interpretation. Combining it with consciousness, we will get many-minds interpretation. This interpretation was proposed by German physicist H. Dieter Zeh in 1970. It is very similar to many-worlds interpretation except that it claims that branching of worlds occurs at the level of observer's mind, not at the level of physical world. Whenever a person makes an observation, his mind proliferates into many different minds, each of which corresponds to one possible outcome defined by the wave function. Each mind will only experience one outcome because all other possible outcomes are branched off in other minds inaccessible to this mind. In this sense, each of those other minds is experiencing whatever scenario realized in their individual branches. For instance, if you take a look at the Schrödinger's cat, you will see an alive cat in one version of your mind, and a dead cat in the other version of your mind. That is to say, your mind splits into two minds, each of which sees a corresponding result of the measurement of the Schrödinger's cat.

However, many-minds interpretation, like many-worlds interpretation, also has the problem of proliferation of too many branches. The only difference is that the branches are now in minds instead of in physical worlds. In addition, branching in mind creates a new problem. When a measurement is conducted, the physical universe stays the same, and our brain is still the same brain. Yet our mind splits into many, each of which sees a

different outcome of the measurement. Therefore, the many-minds interpretation implies that a single physical brain state could correspond to numerous mind states. However, we know that there is a strong correlation between brain and mind from modern brain research. For instance, damage in a certain area of brain matches a corresponding mental illness. When performing a task, the corresponding brain areas will light up under the fMRI scan. The correlation between brain and mind seems strong that the two might have a one to one match. How could a single brain state match numerous mind states as implied in many-minds interpretation?

Another way to avoid measurement problem was proposed in Ghirardi–Rimini–Weber theory (GRW), which hypothesizes that fundamental particles undergo spontaneous wave function collapses randomly. The theory assumes that the rate of this spontaneous wave function collapses is extremely low. How rare is it? Physicists have not detected any spontaneous wave function collapse in the lab so far. Therefore, it is either extremely rare or never happens. According to GRW theory, the rarity of spontaneous wave function collapse explains why a single particle can maintain its superposition until it hits a measurement apparatus. When a single particle is by itself, it will stay in its quantum state because it is very rare for it to go through spontaneous wave function collapse. On the other hand, once the particle is measured, it becomes entangled with the measuring device. Since there are billions of particles in a macroscopic measuring device, there exists an extremely high chance for at least one of those particles to undergo spontaneous wave function collapse, thus causing the entire device to yank out of superposition. Therefore, macroscopic objects behave classically. GRW theory gets away with measurement problem with spontaneous wave function collapse, yet still manages to explain the transition from quantum state at microscopic level to classical state at macroscopic level. However, it needs to have experimental evidence to prove spontaneous wave function collapse does exist no matter how rare it is. In addition, it has difficulty to explain why a macroscopic object like a 30-micrometer paddle can be put in quantum state. The paddle has trillions of particles in it and should leave its quantum state in no time.

If you do not like the randomness in Quantum Mechanics, De Broglie–Bohm theory might be your choice. De Broglie first developed the theory in 1920s, which claims that a particle moves under the guidance of a pilot wave. We observe both the wave and particle nature of a particle because both the particle and the pilot wave exist. According to this theory, in the double-slit experiment, the particle goes through only one slit. However, the pilot wave goes through both slits, become two wave fronts. Then they interfere with each other and form an interference pattern, much like water wave does. Therefore, large number of particles under the influence of this interfered pilot wave will generate an interference pattern on the screen, as shown in screen shot “e” on Figure 10. On the other hand, under the guidance of the pilot wave, the particle, being a particle, has a fixed trajectory and hits a definite spot on the screen. The reason that individual particle appears to hit at random place on the screen is because we do not know some hidden variables at work. If we knew all the hidden variables, we would be able to calculate the exact location of every particle, and their motions are not random as described by other interpretations of Quantum Mechanics. As you can see, De Broglie–Bohm theory is

deterministic. It claims the randomness we see in Quantum Mechanics is due to our ignorance of hidden variables.

It is funny that De Broglie later became a firm believer of Copenhagen interpretation after being persuaded by Niels Bohr and others to abandon his pilot wave theory. Only decades later, David Bohm rediscovered de Broglie's pilot-wave theory in 1952. Even though De Broglie–Bohm theory gets rid of randomness and provides a more classical thus easier to understand interpretation, it conflicts with Einstein's theory of Special Relativity because it requests the entangled particles to send signals faster than the speed of light. Therefore, it does not gain too much popularity among physicists.

There are many other interpretations of Quantum Mechanics. Those mentioned above are just a few to give readers a sense of diversity in those ideas. Each of them has their merits and their own thorny issues to resolve, therefore physicists have not yet been able to reach a consensus after a century's debate. Most of those interpretations share the same mathematical formalism of Quantum Mechanics, their differences lie in their philosophical stances. A few interpretations do differ mathematically. However, the difference is so small that it is not verifiable with our current technology. So, basically there are many different ideas that cannot be distinguished or validated with our current experimental capability. Out of so many interpretations, which one or ones are your favorite? Or maybe none of them explains the quantum phenomena well enough to convince you. I personally believe that the heart of all problems in Quantum Mechanics lies in the division of the subjective and the objective. This division is our inherent spectacles which run even deeper than the spectacles of space and time pointed out by Kant.

You might still remember how we get here. Our discussion started from the possibility that we could be living in a dream or an AI simulated world as shown in the movie *The Matrix*. After establishing such a possibility, I proposed two approaches in Chapter 4. The first one is to assume that we do live a dream-like life and jump directly to Part Two of this book for a solution. The second one is to assume that our sensory information reflects an objective world, which exists by itself, independent to any observer. In the following chapters, we discussed how our perception through senses is limited, distorted, and imposed with our built-in spectacles of space and time. We then talked about how Einstein's theory of Special Relativity reveals the unity of space and time, and how his theory of General Relativity reveals that spacetime is deeply interconnected with mass and energy. Based on those findings, we have realized everything in the external physical world, from objects and energy to spacetime itself, is fundamentally one. However, despite the grand unity of physical world, there is still a division between our subjective mind and the objective physical world. This division is further challenged by discoveries in Quantum Mechanics. Even though no consensus has yet reached on the interpretation of Quantum Mechanics, people start questioning the assumption that the existence of an objective world is independent of subjective perception.

Think about it. Is light a particle or a wave before we observe it? It is hard to say. If we set up the experiment to measure its characteristic of wave, light will appear as a wave. If we try to measure its particle characteristic, light will appear as particles. Light shows us

whichever side we intend to see. And in quantum eraser experiment, light seems to switch back and forth from appearing either as particle or wave in accordance with whether the "which-path" information is erased or not. In delayed quantum eraser experiment, such switching of the signal photons can happen way before their entangled pairs know whether their "which-path" information will be erased or not. All those phenomena seem to indicate that we make the world appear in the way we observe it. Observer seems to play an important role and the objective world is no longer objective any more. I personally believe the appearance of objective world is closely related to the subjective mind. But this stance will immediately face a challenge – why doesn't our mind seem to play an important role when interacting with macro objects in our daily life? Why is the observer's role only significant in experiments of microscopic world?

To answer those questions, we first need to realize that physicists have found quantum effect on larger and larger objects. People use to think Quantum Mechanics only applies to the fundamental particles. However, as mentioned before, a 30-micrometer paddle was put into a superposition of both moving and standing still. In comparison, the diameter of a human hair can go from 17 to 180 micrometers. So, the 30-micrometer paddle is actually visible in our macro world, and it can behave in a weird way of both moving and standing still – superposition described by Quantum Mechanics. Therefore, I think we should dare to assume that Quantum Mechanics also governs objects in the macro world. The reason we do not see any quantum effect in our daily life is not because Quantum Mechanics is not working at macro scale. Instead, it is due to the way how we perceive the world. In next chapter, I will give my layman's interpretation of Quantum Mechanics to elaborate my point in detail.

Chapter 11 My Interpretation of Quantum Mechanics – Dream-like-world Theory

As mentioned in the previous chapter, it is logical to assume that Quantum Mechanics applies to not only microscopic particles, but also macroscopic objects. Macro objects are made of fundamental particles. If fundamental particles have certain characteristics described by Quantum Mechanics, macro objects, as the sum of fundamental particles, should also have those characteristics. As a conglomerate of numerous particles, a macro object's quantum characteristics might not be as apparent as a single photon or electron. But basic principles should be the same on both micro and macro scale. Experimentally, physicists already have had some success with creating superposition for macro objects, such as the 30-micrometer paddle mentioned before. The cutoff line between micro and macro in terms of quantum effect has been gradually pushed up over the years and now has reached the macro level. Therefore, it is very reasonable to assume there is not a cutoff line between micro and macro world at all. That is to say, all objects, despite their sizes, obey the law of Quantum Mechanics.

Based on both theoretical reasoning and empirical evidence, it is reasonable to make the following assumptions.

1. Macro objects also have superposition – a mixture of multiple states before being measured.
2. Macro objects also have quantum entanglement. Multiple entangled macro objects should be considered as one system instead of individual objects. And their entanglement is beyond separation of space and time, same as that in microscopic systems.

However, the entanglement of macro objects is much more complicated. The two entanglement electrons have their spin correlated in an obvious way. When being measured, the system of two electrons yanks out of superposition. If one electron shows positive spin, the other will be negative, vice versa. That level of entanglement is simple and easy to verify. In comparison, a macro object has trillions of fundamental particles, such as electrons, quarks, and gluons etc. The possible configurations of those fundamental particles are incalculable. How such an object would entangle with another macro object also made from trillions of fundamental particles is beyond our limited mathematical capability. Nonetheless, it does not mean we cannot carry out theoretical reasoning about it. In fact, if we consider the entire universe as one giant system, everything is indeed entangled from the very beginning.

To understand the origin of entanglement among everything in the universe, we need to trace back an important event that happened 13.8 billion years ago – the origin of our universe. According to our current understanding in cosmology – the big bang theory, the universe started from an extremely small and dense state. In less than one trillionth of a second, it went through an exponential expansion stage called "inflation." Then it cooled down enough so that subatomic particles could be formed. When the universe cooled

further down, simple atoms, such as hydrogen and helium appeared. Clouds of those simple atoms later amalgamated to form galaxies which we see today. Above is a brief description of life of our universe according to the big bang theory.

The big bang theory was first proposed by Belgian astronomer and priest Georges Lemaître. He published his theory of expanding universe based on his calculation of universe using Einstein's theory of relativity in 1927. At that time, Einstein, who believed that the universe is static, rejected Lemaître's new idea, saying "Your calculations are correct, but your physics is atrocious." However, in 1929, American astronomer Edwin Hubble discovered observational evidence for an expanding universe. Through his observation on redshift of galaxies, Hubble found that the further a galaxy is from the Earth, the faster it is moving away from the Earth. Its speed of moving is proportional to its distance from the Earth. That is called Hubble's law nowadays. If all galaxies are rushing away from us, we can easily imagine that all the galaxies would move toward us if time runs backwards. It means that the earlier the universe was, the smaller and denser it should be. When we backtrack all the way to the very beginning of the universe, it contracts to a single point. That scenario is what Georges Lemaître proposed in his 1931 paper on Nature. He believed that the universe expanded from an initial point, which he called the "primeval atom." Lemaître also described it as "the cosmic egg exploding at the moment of the creation." His theory of "primeval atom" or "cosmic egg" is now widely known as the Big Bang theory.

Later in 1964, two American radio astronomers Arno Penzias and Robert Wilson accidentally discovered a background noise in their radiometer. They tried hard to get rid of it without any success. It turns out that the noise is the cosmic microwave background (CMB), an afterglow from the early universe. The CMB exists in every corner of universe. No wonder Arno Penzias and Robert Wilson could not get rid of it. The CMB radiation is the oldest light in our universe, appeared about 380,000 years after the big bang. It came into being when the universe cooled down enough so that photons can roam freely. In addition to the observational evidences mentioned above, there are also many other evidences supporting the big bang theory, such as the abundance of primordial elements – hydrogen and helium etc. Till now, the big bang theory is the best model which physicists have developed to explain the origin of our universe.

Now armed with the insight provided by the big bang theory, let's consider everything in the universe since the very beginning. If universe indeed started from the singularity, an extremely small and dense point, everything in the universe would be locked in the quantum entanglement from the very beginning due to their initial microscopic scale. And they should still be entangled till today even though the universe has expanded into such a huge space with trillions of galaxies because quantum entanglement defies space and time. Thus, the vast separation in space and time or spacetime does not affect this universal entanglement at all.

Someone might argue that entanglement of fundamental particles is a very delicate state and can be easily disturbed by its surroundings. The larger the system is, the faster it will turn into classical due to quantum decoherence. Therefore, for a huge system like the

entire universe, its quantum state will turn into classical state in no time. This argument sounds plausible on the surface. However, it fails to take into consideration that there is nothing outside of the universe to disturb it. It is true that a tiny system of two entangled particles is relatively easy to stay entanglement for a while. And a bigger system is indeed easily disturbed by the surroundings and will be yanked out of its superposition quickly. However, since nothing exists outside of the universe, when we consider the entire universe as one single system, it has no surroundings. Since there exists nothing to disturb the universe or break its quantum state, it has been in superposition from start and will stay that way forever.

One may ask, "if the universe is really one unity, one huge entangled system staying in its quantum superposition ever since its origin, how come the everyday world we see is classical? We have never seen a half-alive and half-dead cat as Schrödinger described." To answer this question, we need to look at the universe at two different levels, the noumenon level and phenomenon level. I am borrowing Kant's terminology here. The noumenon refers to things-as-they-are. And phenomenon refers to things-as-we-see. What really is everything at their noumenon level? They are one unity, one huge entangled quantum system as mentioned above. The noumenon of the universe is without any form or appearance, without space or time, and without dichotomy of the subjective and objective. It is oneness which cannot be observed through our sense organs. And why do we experience a classical world in our everyday life? That is because we are experiencing the universe at the phenomenon level. We human beings constantly observe the universe through our senses. In this process of observation, we establish ourselves as the subjective, and the rest of the universe as the objective. We "break" the oneness of the universe through our observation. We turn this oneness at the noumenon level into the dichotomy of the subjective side and objective side at the phenomenon level. The universe, eternally in its superposition, theoretically can manifest any version of outcomes. We, as the observers, make it appear as our own individual version, the world that each one of us senses. It is us, the observers, who turn universe's quantum state of numerous possibilities into one specific outcome – the classical world we see.

Does this transformation from quantum state to classical state sounds familiar to you? It is exactly the "measurement problem." In the previous chapter, we discussed the thorny "measurement problem." All interpretations of Quantum Mechanics try to resolve the "measurement problem" one way or another. Here we are taking the "measurement problem" to the grandest scale – the entire universe. And I believe that we create this "measurement problem" by ourselves through our observation. When we observe the universe through our senses, we turn the quantum universe into our individual classical universe. Using the terminology in Quantum Mechanics, I designate this process "pseudo-collapse" of wave function of the universe. Since the collapse never really happens and the universe is forever in the superposition at the noumenon level, the word "pseudo" is used to describe the illusory nature of the "collapse." On the other hand, since we human beings only sees one possible outcome of the wave function of the universe due to the way that we observe, the universe does appear as the classical world we sense. So, at the phenomenon level, it does "collapse" into a classical state, the state each of us sees individually. For those two reasons mentioned above, I named this

process “pseudo-collapse.”

In Quantum Mechanics, measurement is mathematically expressed by applying an operator onto the wave function to get the result of a measurement. Similarly, we can consider the peculiar way that each of us observes as an operator that is applied to the wave function of the universe. And our individual operator causes the pseudo-collapse of the wave function of the universe, and results in the corresponding classical world that each of us sees. You see your world through your operator, and I see my world through mine. The world that each being sees reflects the characteristics of their own operator.

The following three points are a summary of my interpretation of Quantum Mechanics:

1. At the noumenon level, the entire universe is a giant entangled quantum system that stays in superposition timelessly. It cannot be known through senses. It is without any form or appearance, without space or time, and without dichotomy of the subjective and objective. Yet it has the potential to manifest numerous possible versions of universe at the phenomenon level.
2. At the phenomenon level, we experience our individual version of universe through our senses. Due to our built-in spectacles of subjective-objective-division, we break the oneness at the noumenon level and give rise to the duality of the subjective and the objective at the phenomenon level whenever we observe the world through our senses.
3. The process of transferring from noumenon to phenomenon is named “pseudo-collapse” of the wave function of the universe. The result of “pseudo-collapse” is our own version of phenomenon world, the appearance of which depends on our operators.

My interpretation of Quantum Mechanics may seem unbelievable at the first glance. I will address some immediate doubts you might have at this point, and then use an analogy of dream to further illustrate my theory. Then, in the next two chapters I will provide supporting evidence for it.

The first question you might have is, “if we are seeing our own version of universe which is created by our individual operator through pseudo-collapse process, how come we all see the same world?” The answer is that we are seeing very similar versions of world, but they are not exactly the same. The similarity indicates that humans’ operators are very similar to each other. Sometimes different versions of worlds cross over among different kinds of beings, that is an indication that there are certain degrees of similarities between their operators. For instance, our world overlaps with animals’ world quite a lot. Yet only a few people reported seeing ghost’s world. When they did report such an event, majority of us will think that they were hallucinating. However, I think it could be an indication that the operators of those people have some similarities with the ghosts’ operators. That is the reason why they can see ghost. And we ordinary people’s operators do not have any overlap with ghosts’ operators, so that we do not see ghost. We should not jump to a conclusion that those people are seeing hallucinations, especially if more than one person had the same vision of a ghost at the same place and/or at the same time. Everything in

the world appears because our own operators lead to pseudo-collapse of the wave function of the universe, therefore we are all seeing illusions in that sense because we do not see the noumenon. Some versions of illusions happen widely across human race, so we take them as reality. While other versions of illusions happen rarely among human beings, thus we think they are hallucinations. Fundamentally those two categories do not differ significantly besides their relative rarity. They are both phenomenon, the result of pseudo-collapse of the wave function of the universe.

The second question you might have is what kinds of beings can cause pseudo-collapse. Not only human beings cause pseudo-collapse, any being who can sense the world in one way or another will create the dichotomy of the subjective and the objective, thereby creating their own version of the phenomenon world. For instance, when a bat senses the world through its sonar system, the wave function of the universe will also pseudo-collapse by its operator. The bat will experience its version of phenomenon world, which is very different from our experience of our versions of world. When a dolphin senses an electric field around it, its phenomenon world will appear accordingly based on its operator. The dolphin's experience of its world is certainly very different from ours. Those animals have various versions of operators that make the wave function of the universe pseudo-collapse into the world they each experience. In short, the wave function of the universe will be pseudo-collapsed by any "sentient being," i.e., any being that can sense. And each sentient being experiences their own version of world in accordance with their operators.

Please note that I chose the word "sentient beings" instead of "conscious beings" here. The reason is because there is a critical difference between the two. The concept of conscious often refers to a wide range of mental processes, especially the thinking process which takes place at the level of abstract concepts, language, and symbols. There are two major difference between thinking and sensing. Firstly, thinking happens solely on the subjective side, while sensing happens in the middle of the subjective and the objective. Sensing is a gateway between the subject and objective while thinking is inside of the realm of the subjective. Secondly, sensing and thinking happen at different time. Sensing happens at the exact moment when the duality of subjective and objective arises. While, thinking about any external object happens only after we have already sensed the object. Therefore, thinking cannot be the cause for the pseudo-collapse of the wave function because it happens in the realm of subjective and it happens after the rise of the duality of the subjective and the objective. Instead, it is sensing which leads to pseudo-collapse and gives rise to the division of the subjective and the objective.

Having clarified that sentient beings create their own versions of phenomenon world through sensing, now please allow me to use the analogy of a dream to further illustrate my interpretation of Quantum Mechanics. Before entering a dream, the dreamer's mind is at a state of nothingness, yet full of all the possibilities for different dream contents. Once a dream starts, the dreamer's mind gives rise to the division of the subjective and the objective in the dream. The subjective side is a miniature version of self in the dream, for the sake of discussion, let's call it "mini-self." By "miniature version of self," I do not mean that the mini-self is a smaller replicate of the dreamer because the dreamer can take

any form in a dream. A man could dream himself as a woman in a dream, or a god or a dog, or a butterfly in Zhuang Zhou's case. Instead, the name "mini-self" is used here to indicate that mini-self can sense the dream world in a similar way as the dreamer senses his awake world. The mini-self can see, hear, smell, touch in a dream. And everything in the dream world is on the objective side which is sensed by mini-self. Even though the two sides of subjective and objective in a dream have completely different characteristics, they are both created by the dreamer's mind and the dreamer's mind is still one unity. The difference between subjective and objective is merely a superficial dichotomy in the dream. Once the dream ends, the mind will return to its original state of oneness, and the dreamer will realize that it was just a dream. Even during the dream, the dreamer's mind is still one unity fundamentally. It appears to have dichotomy of subjective and objective only from mini-self's perspective, which is ultimately illusory.

Now let's relate my interpretation of Quantum Mechanics with this dream analogy. The universe's superposition described by its wave function is like the dreamer's mind. It has the potential to manifest numerous possible versions of worlds, yet it does not have any particular appearance. It is formless, soundless, odorless, timeless, space-less, and cannot be sensed. It is at the noumenon level. In comparison, the world we know does have form, sound, odor, time, space, and can be sensed. That is because we live in the phenomenon world, which appears after pseudo-collapse. Our phenomenon world is like a dream, which has form, sound, odor, time, space etc., and can be sensed by our senses. And pseudo-collapse is like entering dream in the analogy. Once the dream starts, the oneness of the dreamer's mind is illusorily divided into the two sides of the subjective and the objective in the dream. The subjective side is the mini-self, while the objective side is the dream world. Similarly, once pseudo-collapse occurs, the superposition of the noumenon universe manifests two sides. The subjective side is us, the sentient beings. And the objective side is the world we sense. Even though we feel that we are completely different from the objective world, fundamentally we and the phenomenon world are one unity, as in the case of mini-self and his world in the dream. Once dream ends, the dreamer will realize it was just a dream. Similarly, once we wake up from this dream-like life, we will also realize it was just like a dream. Much like the mini-self's perspective of division of subjective and objective is illusory, our perspective of such a division between subjective self and objective world is also ultimately illusory.

To recap, at the noumenon level, the entire universe is forever in superposition, and it has countless possible versions that it can take form of. And at the phenomenon level, it is us, sentient beings, who cause the superposition to pseudo-collapse to the individual version of universe through our operators. Since it is pseudo-collapse, the universe has never really turned into any particular version of the physical world that each sentient being senses. That is to say the universe is forever in its superposition, without division of subjective and objective, without space and time, without appearance, sound, odor, taste etc. However, because each sentient being observes the world with their senses, their world does manifest to each of them in accordance with their operators. The pseudo-collapse is like entering a dream. Even though dream is illusory, it does feel substantial to the mini-self who is locked inside of the dream. Similarly, we also feel that our phenomenon world exists. Thus, I name this interpretation of Quantum Mechanics as

“dream-like-world” interpretation.

The immediate implication of “dream-like-world” interpretation is that sentient beings could potentially experience different versions of world by modifying their operators. Because the world we sense is the result from our operators, which cause the wave function of the universe to pseudo-collapse to our version of world, theoretically, we can adjust our operators to see different results of pseudo-collapse. If we want to see a butterfly’s world, we can adopt a butterfly’s operator and see the universe as it sees. If we want to see a ghost’s world, we can apply a ghost’s version of operator and see what it sees. We have the potential to access countless possible versions of the universe since they are merely different displays of the underlying wave function of the universe.

Let me use the dream analogy again to illustrate the possibility of seeing a different version of the universe. Assume I am in a dream. In the dream, I experience the dream world as my avatar - the mini-self. The mini-self, a projection of my own mind, does not really have any idea about who he is or where his world comes from, not does he have any idea of the existence of me, the dreamer. He is deeply engaged with the dream world and feels that his world is real and substantial. However, he suddenly gives rise to this weird thought, “Could I be in a dream? Is my life dream-like? Is my world dream-like? If so, how could I know it for sure?” He continues his train of thought, “If my world and my life were really dream-like, both were created from the dreaming mind, then I, as a projection from the dreaming mind, as an avatar of the real and deeper me, should be able to change the manifestation of the dream world with my mind.” The mini-self then concentrates intensively, “… May the world change according to my will! … May I look at it through the eyes of a butterfly! ...May I see what a butterfly sees!” If mini-self had enough skill, the dream world could change according to his will. When that happens, mini-self, can be certain that he is in a dream. Such a change of mini-self’s world is completely feasible. After all, his world is an illusory world in a dream constructed by my mind. Theoretically, I, the dreamer, could dream up any kinds of world.

Zhuang Zhou did dream himself as a butterfly and looked at the world through the eyes of a butterfly, but he did not do it purposefully. Instead, such an interesting dream just happened to him. Is it possible to exert any control in one’s dream? The answer is yes if one has mastered the skill of lucid dreaming. When a person realizes that he is dreaming and thus can change the dream world he lives in, he is having a lucid dream. By definition, a lucid dream is a dream that one is aware of the fact that he is dreaming. Once one realizes that the entire dream world is his own mental construct, he can exert various levels of control over the dream world. For instance, the lucid dreamers can use their mind to turn on and off switches without touching them, or move the arms of a watch by staring at it, or walk into a mirror to see what is on the other side, or even fly in their dreams.

Theoretically, anyone can have a lucid dream and it is a skill that can be learned through training. Like any other skill, some people can master it effortlessly, while others might need more practice. The key is to realize that one is dreaming while still in a dream. So how do they do that? The basic technique is to run a reality test, such as to check if things

change abnormally when you stare at them, or to check if the text in a book remains unchanged when you read them twice, or to check if a clock or watch is normal, etc. Typically, those things tend to change abnormally in a dream. Once you notice the abnormality, you will become aware that you are currently dreaming. Bingo! You are now in a lucid dream. You can then try to see if you can use your mind to cast some level of control over the dream world, doing the supernatural, or should I say super-dream deeds mentioned above.

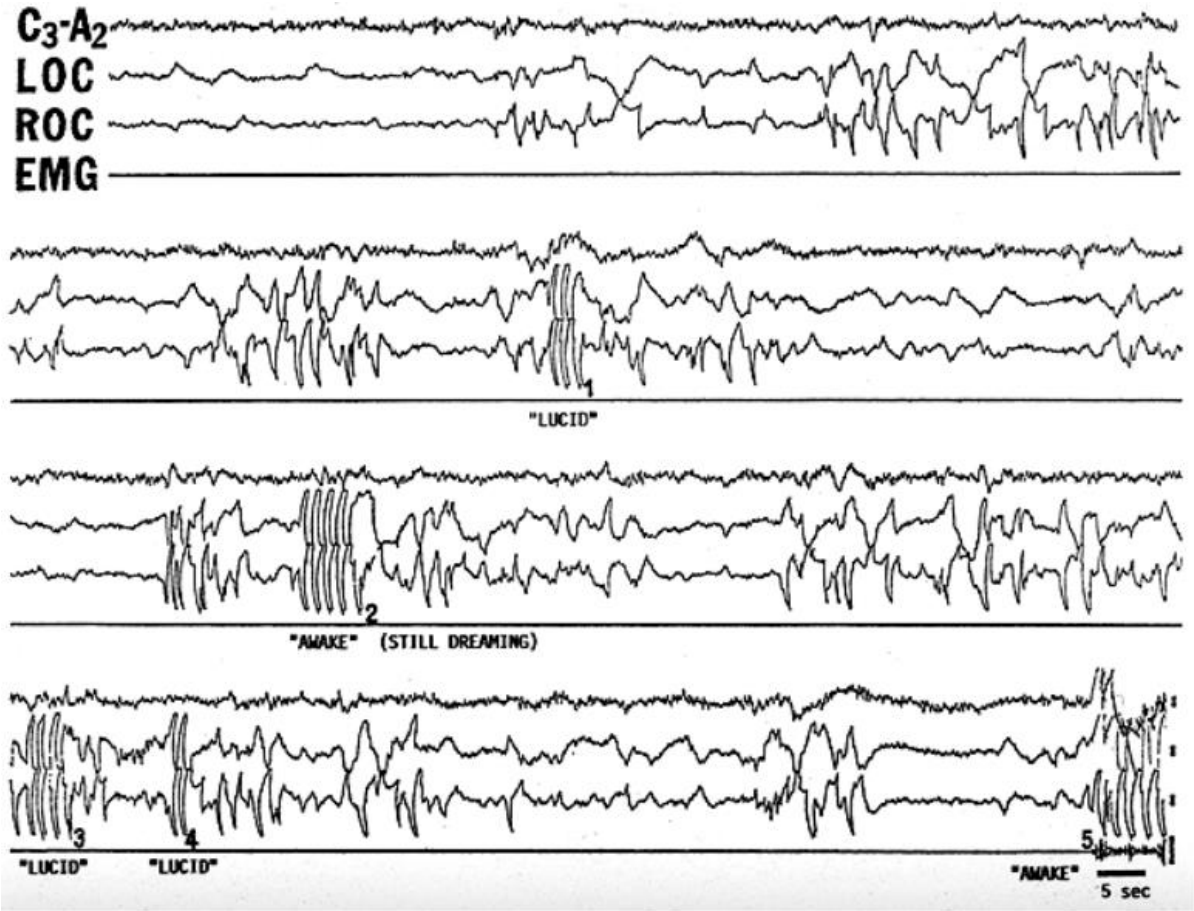
One may ask how the dreamers know when to run a reality test? Isn't it the case that they have already suspected it was a dream, and therefore they carry out a reality test? Actually, they need to build up a habit to do a reality test every once a while during wake time, so that they will remember to do such a reality test when they are dreaming. Of course, the real world will pass the test and the dream world won't. If the reality test fails, they know that they are in a dream. They can then try some super-dream tricks, such as transforming a big object into a small object, or walking through a wall etc. It feels like Alice in Wonderland. Interestingly, lucid dreamers do not immediately have infinite power in a lucid dream, even though they clearly know that the world in the dream is created by their own minds. Some super-dream tasks are easier than other tasks. For example, turning on switch with mind is much easier than fly. Why are there different levels of difficulties associated with those super-dream tasks? I think the reasons lie in the mindset of lucid dreamers. There is nothing to limit them. But their mindsets probably put a burden or limit on those super-dream deeds. Lucid dreamers need to overcome the thresholds of their mindsets to perform those deeds. Some tasks, such as flying, seems more impossible than other tasks in the real world. Thus, they will have high thresholds, and are consequently more difficult to overcome than other tasks.

The research on lucid dream had been considered as pseudoscience due to its lack of physical evidence. Because there is no instrument to measure the content of dreams, so there is no way to know whether the lucid dreamers really know they were dreaming. It could be the case that they are dreaming of themselves to be lucid dreaming. However, a well-designed experiment finally changed that status quo and gave the legitimacy to lucid dream research.

The ingenious design of this experiment relies on the fact that a dreamer can still control his eye movement during a dream. When we are dreaming, our muscles are paralyzed so that we don't act out our dreams, except for the muscles which control our eye movement. Therefore, if your avatar moves his eyes in your dream, a person standing next to your bed will see your eye movement. In fact, a dream typically happens during a period called Rapid Eye Movement (REM). We are moving our eyes rapidly because we are busy looking around in our dreams. Based on this fact, researchers and lucid dreamers can establish a protocol of communication through a pattern of eye movement in advance. For instance, the protocol can request lucid dreamers to move their eyeballs from left to right three times when they believe that they are in a lucid dream. When a dreamer falls into sleep and realizes that he is dreaming, he will send out a signal with previously agreed pattern of eye movement to indicate his awareness of having a dream. Once he moves his eyeballs from left to right three times, researchers would know that

the dreamer is indeed in a lucid dream.

Please refer to Figure 15. It is a graph from a paper written by Dr. Stephen LaBerge at Lucidity Institute. The eye movement of a lucid dreamer is shown on the graph.



A typical signal-verified lucid dream. Four channels of physiological data (central EEG [C3-A2], left and right eye-movements [LOC and ROC], and chin muscle tone [EMG]) from the last 8 min of a 30 min REM period are shown. Upon awakening the subject reported having made five eye movement signals (labeled 1-5 in figure). The first signal (1, LRLR) marked the onset of lucidity. Skin potential artifacts can be observed in the EEG at this point. During the following 90 s the subject "flew about" exploring his dream world until he believed he had awakened, at which point he made the signal for awakening (2, LRLRLRLR). This signal, made in non-lucid REM, shows that the precise correspondence between eye movements and gaze is not an artifact of lucidity. After another 90 s, the subject realized he was still dreaming and signaled (3) with three pairs of eye movements. Realizing that this was too many, he correctly signaled with two pairs (4). Finally, upon awakening 100 s later he signaled appropriately (5, LRLRLRLR). [Calibrations are 50 microV and 5 s.]

Figure 15. Eye movement record of a lucid dreamer from Lucidity Institute www.lucidity.com/slbbs

The dreamer's left and right eye movement are labeled as LOC and ROC on the graph. As you can see from the data, the pattern of eye movements for the protocol is dramatically different from the typical REM. The dreamer was sending out the pre-agreed signals at places marked by number 1 to 5. Compare with regular REM, the eye movement of those signals is much more compacted, indicating fast and big distance movement of both eyes. The data proves that the dreamer indeed knew that he was dreaming and communicated with researchers successfully through the designed protocol. Thus, it proved that lucid dream is a real phenomenon.

As mentioned before, once a person has mastered the skill of lucid dreaming, he or she can gain super-dream abilities, such as fly, teleport, go through walls, weather control, shapeshift etc. Those abilities come from the realization that the dream world and mini-self in the dream are both products of the dreaming mind. Even though only a few people have mastered the skill of lucid dream, everyone does have the potential to learn and acquire it.

Let's apply the dream analogy to illustrate the possibility of experiencing different versions of world through adjusting our operators. We know that lucid dreamers can change their dream world at will, or at least to certain degree depending on their skill levels. In a lucid dream, the mini-self realizes that it is a dream and thus gains super-dream abilities. Similarly, based on the dream-like-world theory, our worlds are products of pseudo-collapse caused by our operators. Therefore, our physical worlds and ourselves are just like the dream world and the mini-self in the dream. So, if the mini-self in the dream can change the dream world as those lucid dreamers prove to us, by the dream analogy, we would also be able to change our worlds if we could realize that our life is dream-like. Some lucid dreamers reported shrinking themselves to the size of an insect so that they can see the world as an insect would see. By analogy, if we were skillful enough, we should theoretically be able to switch our operator to see a butterfly's world.

Very few people can have a lucid dream and gain super-dream ability without training. Similarly, very few people have supernatural abilities without being trained first. In fact, it is much harder to gain supernatural abilities in "real" life than to gain super-dream abilities in dreams. A dream is a much more fragile mental construct compared with our waking life. So, it is much easier to break the limits in a dream. Our life and our world have been repeatedly reinforced day after day ever since we were born. Years of experience of living as a human make it almost unshakable. Therefore, it will take a lot of practice to overcome the obstacles. Despite of its difficulty, it is nonetheless feasible. In the latter chapters, I will provide detailed examples of supernatural abilities.

The most important benefit of mastering lucid dreaming is not to gain those super-dream abilities. Instead, it is the awareness of the fact that it is just a dream. Therefore, one can transcend the dream and not being psychologically burdened by the content of the dream. The state of being lucid in a dream is unmatchable. In a sense, lucid dreamers are omniscient and omnipresent in their dreams. Even though they might not know what will happen next in their dreams, they can still be considered as omniscient because they do know that everything in their dreams is from their dreaming minds. They are also

omnipresent because their dreaming minds are present in every corner in the dream even though their avatars in the dream exist only in a certain place and time. By the dream analogy, gaining supernatural abilities in our waking life is not as crucial as the awareness of the fact that our life is dream-like. Once we truly realize life is dream-like, we would transcend our physical worlds and not being psychologically burdened by the content of our life. Instead, we would realize that we can reach omniscience and omnipresence much like lucid dreamers in their dreams.

With the help of dream analogy, I hope that you now thoroughly understand the dream-like-world theory of Quantum Mechanics and see the great benefit of awakening. In our daily life, we are often burdened by the content of our life, ranging from minor imperfections, to stressful or even dreadful situations. Those events would not bother us if we could truly realize that we are living a dream-like life. Just as the lucid dreamers are not frightened by a nightmare and could even turn it into a pleasant dream or a self-improvement experience, we, when awakened, will no longer be dragged down by anything in this dream-like-life. Instead, we could transform a dreadful situation into a pleasant version or even greatly transcend ourselves to reach omniscience and omnipresent. We would be “omni-living.”

Chapter 12 Ancient Chinese Masters Were Omni-living?

Omni-living is both appealing and inspiring. But its feasibility relies on the validity of the dream-like-world theory. How can we validate the dream-like-world theory? In the next two chapters, I will lay out supporting evidences for it. I will quote two pieces of classic Chinese texts written thousands of years ago in this chapter. It will surprise you when you find out how well those Chinese classics match the dream-like-world theory. These texts strongly indicate that those wise ancients have realized the dream-like nature of human life and were omni-living.

12.1 Dao De Jing

Let's take a look at *Dao De Jing* (*Tao Te Ching*), an essay of 5000 Chinese characters and the only script left behind by Lao Zi (Lao-Tzu), the founder of Daoism (Taoism). The legend goes that Lao Zi foresaw the decline of moral value and his nation. So, he traveled west, leaving the country to become a hermit at the age of eighty. On his way out, at the last garrison of the nation on the west boarder, the Han Gu Garrison, he was recognized by the officer Yin Xi. Yin Xi asked him to leave a manuscript before leaving the nation. Upon the request, Lao Zi wrote down this 5000-word essay – *Dao De Jing*.

In the first chapter, it states:

道可道非常道。名可名非常名。無名天地之始。有名萬物之母。故常無欲以觀其妙。常有欲以觀其徼。此兩者同出而異名同謂之玄。玄之又玄眾妙之門。

Do not worry if you cannot read Chinese. Most people in China nowadays have trouble understanding classical Chinese, not to mention *Dao De Jing*, which was written in a very dense and poetic format more than 2000 years ago. I quoted the original Chinese text above because there are literally hundreds of drastically different English translations of this short paragraph. When it is translated into English, translator's interpretation will inevitably shape the outcome one way or another. If you are interested, you can read those hundreds of different translations on the internet. You will be surprised by the dramatic variance among them. Down below is my rough translation.

> The Dao that can be expressed is not the eternal Dao.
> The name that can be named is not the eternal name.
> The nameless is the origin of heaven and earth
> and the named is the mother of myriad things.
> Therefore, constantly (focus on) nothingness to see the subtlety (of the Dao),
> and constantly (focus on) existence to see the boundary.
> Those two (nothingness and existence) are the same.
> Yet named differently when they are expressed.
> The sameness (of nothingness and existence) is the mystery.
> Mystery within mystery;
> Lies the door to all subtlety.

The first chapter of *Dao De Jing* summarizes the entire book as it talks about what the Dao is and how to realize the Dao. Classical texts such as this inspired my dream-like-world theory, even though their wordings are completely different from mine on the surface. Now let me explain this chapter of *Dao De Jing* in the language of dream-like-world theory so that you can see the similarity between the two.

In Daoism, the Dao is the source of everything. It corresponds to the wave function of the entire universe in dream-like-world theory. Both the wave function of the universe and the Dao are nameless, timeless, space-less, formless, soundless, and tasteless. They cannot be known through our sense organs or our thinking mind. For that reason, Lao Zi says that anything that *can be expressed is not the eternal Dao*, anything that *can be named is not the eternal name*. This nameless wave function of the entire universe is the origin of everything, i.e., the noumenon. Once we start to sense the Dao and name it, myriad things manifest. Thus, it is said, "*The nameless is the origin of heaven and earth and the named is the mother of myriad things.*" In dream-like-world theory, that is the process of pseudo-collapse. We apply our operators on the wave function of the universe, thus lead it to pseudo-collapse and generate the myriad things that we each experience, i.e., the phenomenal world manifests.

How can we reach the truth disguised by the veil of phenomenal appearances? *Dao De Jing* gives us two methods in next couple sentences. The first one is to *constantly (focus on) nothingness to see the subtlety (of the Dao)*. We can focus on nothingness, then we can see the Dao's subtlety. In dream-like-world theory, this means not applying our operator so that the wave function of the universe does not pseudo-collapse, thus phenomenon world will not manifest. Another method is to *constantly (focus on) existence to see the boundary*. That is to focus on the phenomenal existence, then we can see boundary of Dao's manifestation or materialization. Similarly, in the dream-like-world theory, we can apply our operator and sense myriad of things as the result of our operators. Lao Zi concludes, *those two (nothingness and existence) are the same. Yet named differently when they are expressed.* Nothingness and existence are fundamentally the same. "Nothingness" is the Dao or the wave function of the universe before it pseudo-collapse, "existence" is the result of the pseudo-collapse or the manifestation of the Dao. So, they are like the two opposite sides of the same coin. Thus, it is said *the sameness (of nothingness and existence) is the mystery*. The noumenon and phenomenon of the universe are the same, that is very difficult to understand, thus it is a mystery. *Mystery within mystery; Lies the door to all subtlety.* Once you understand the mysterious principle, apply the method so that you can go deeper and deeper with your focused attention. Then you can finally enter *the door to all subtlety* – knowing the Dao.

As you can see, the description in *Dao De Jing* is very similar to the dream-like-world theory even though they are worded completely differently. They both describe the universe at two levels. One is the noumenon level, which cannot be expressed or named. The other is the phenomenon level with myriad of things. In addition, they both emphasize that the noumenon and phenomenon are one and the same. Realizing that is the key to unlock the ultimate truth. *Dao De Jing* gives a brief description on how to

reach the Dao. The method to verify the dream-like-world theory will be provided in Part Two of this book in detail. This method shares similarities with the one in *Dao De Jing*. Based on those similarities mentioned above, we can assume that Lao Zi had indeed realized the Dao and been omni-living.

12.2 The Ten Mysterious Doors

Another classic Chinese text I am going to quote is the "ten mysterious doors" mentioned by National Master Qing Liang (also translated as Ching-Liang, 738~839AD) in his book *Commentary of the Avatamsaka Sutra*. He lived a long life and his great wisdom was so well recognized that he became the master for seven emperors in a row during Tang Dynasty. That is why he is honored as the National Master. He is also the fourth Patriarch of the Huayan school of Chinese Buddhism. To explain the unimaginable wonder of the universe, National Master Qing Liang laid out ten mysterious doors. They are the following:

1. All things produce one another at the same time.

   According to National Master Qing Liang, the law of cause and effect is not only simultaneous, but also boundless and all-encompassing. That is why he says, "All things produce one another at the same time." Anything in the universe is the cause of everything else. And at the same time, it is also the effect from everything else. All things are both causes and effects to each other, co-arising simultaneously. This is completely different from our understanding on causality. In our ordinary people's worldviews, we consider causality as a simple linear relationship of two events A and B in a formula of "A causes B," in which A happens before B in time and they typically are not too far separated through space. In comparison, physicists might have a more sophisticated view on causality. Since they have observed the phenomenon of quantum entanglement, physicists know that causality is not constrained by space and time. For example, in delayed quantum eraser experiment, a later measurement of idler photons happened faraway could affect the result of an earlier measurement of signal photons. Further, unlike the narrow view that only considers two individual events or objects for causality, physicists attend to all objects in a system as they are all connected and interact with each other. One such example is the butterfly effect which states that the flap of a butterfly's wings in Brazil can set off a tornado in Texas. In other words, the causality described in the butterfly effect is a complex, non-linear connection of everything in the entire weather system. Due to the interconnection, a small change of one object can have a catastrophic effect on many objects in the entire system. If physicists were to extend those two lines of reasonings to everything in the universe, they would arrive at a conclusion that agrees with National Master Qing Liang's description of the universe – anything in the universe is the cause of everything else; at the same time, it is also the effect from everything else. In other words, all things produce one another

simultaneously.

As you can see, National Master Qing Liang's first mysterious door completely shatters our view of space, time, and causality. You may still remember the Kant's spectacles which we have discussed in Chapter 7. Kant claims that all human beings wear the spectacles of space and time at the sensation level, and another set of 12 spectacles at the cognition level, causality being one of them. However, if one could see that all things co-arise simultaneously and are cause and effect to each other, it would indicate that he has already put down his spectacles of time, space, and causality etc. Kant thought it would be impossible for humans to take off those inherent spectacles. However, National Master Qing Liang was able to see that "all things produce one another at the same time." This would mean that he had already successfully got rid of those spectacles, and thereby directly witnessed the universe without any distortion.

Now let's compare this mysterious door with the dream-like-world theory. When our operators are applied to the wave function of the universe, they pseudo-collapse the wave function which manifests as the universe we sense. Therefore, all things in this universe are produced simultaneously at the pseudo-collapse. When we examine anything in this universe, it is interconnected with everything else in the following way. If one thing appears in such a form from the pseudo-collapse, then at the same time, everything else would also individually take their corresponding forms, because they are all from the same pseudo-collapse based on the same operator. In that sense, all things are causally connected through the operator. They interdependently co-arise, and their interdependency reflects the characteristics of the operator. Therefore, the dream-like-world theory also indicates simultaneous and interconnective co-arising of all phenomena, as National Master Qing Liang described in his first mysterious door.

2. The big and the small interfuse freely.

In this second mysterious door, National Master Qing Liang pointed out that size is not what ordinary people think. We can think about the smallest thing as a thing that has nothing inside of it, and the biggest thing as something which has nothing outside of it. Yet, according to National Master Qing Liang, the biggest thing can enter the smallest thing without becoming any smaller. And the smallest thing can encompass the biggest thing without being any bigger. That is why you often read the following verses in Buddhist canon, "countless mountains can be put on the tip of a hair. In order to know that the extreme big still has a characteristic of small, a Bodhisattva brings forth the initial resolve (to enlightenment)," and "In a single dust mote, there are countless worlds."

What we have experienced in our life seems dramatically different from the

description of National Master Qing Liang, in which small things can encompass big objects without shrinking the big or enlarging the small. It is so alien that it is beyond our wildest imagination. Our imagination about size probably does not go beyond what is written in the book Alice in Wonderland, in which Alice's size shrinks or grows after eating magic mushroom. Alice still needs to shrink her size to be able to hide in the teapot. In comparison, objects do not change in size yet the small can contain the big, and the big can get inside the small in this second mysterious door. How could that be? As we know, size is closely related to space in our sensation. We think an object is big because it occupies a large volume in space. In fact, the units to measure size are the same units to measure distance in space, such as inch, meter, kilometer, mile, light year etc. Kant has pointed out that space is one of the spectacles that human inherently wear. Therefore, if we could not take off the spectacles of space, we would always be bound to the limitation of size. On the other hand, if we could take off the spectacles of space as National Master Qing Liang did, we would see a world without the limitation of size, described as "the big and the small interfuse freely."

The dream-like-world theory does not say anything directly about the sizes of objects. However, because everything is from the pseudo-collapse of the wave function of the universe, they do not have a fixed size. The size in our world is like the size in our dreams. When we are dreaming, a dinosaur in a dream is not necessarily any bigger than a butterfly in a dream. The dinosaur could be taller than a skyscraper at one moment and then be eaten by a frog at another moment. Since nothing in a dream has any substantial existence, associating a fixed size to them is meaningless. The big is not necessarily big and the small is not necessarily small. Similarly, according to the dream-like-world theory, the size of any object in our world is merely a 3D image produced by the operator of the observer. If the observer had enough skill to adjust his operator at will, a dust mote certainly could encompass a galaxy without changing the size of either one of them. If the observer does not have such a skill, his experience will be limited to the scope of the ordinary world. Therefore, under the dream-like-world theory, the mysterious state of "the big and the small interfuse freely" described by National Master Qing Liang can be realized through mastering operators.

3. One and many merge with each other, without losing their own peculiarities.

   In this mysterious door, National Master Qing Liang explains that one thing can merge with countless things and countless things can merge with one thing. And both one thing and countless things still maintain their own characteristics after the merge. For instance, one world can fill up numerous worlds without altering the characteristics of itself and those worlds. Similarly, numerous worlds can "enter" one world while still maintaining their peculiarities. In that case, numerous worlds can be seen in this one

world while this particular world and all those numerous worlds still maintain their own characteristics. Another example is that all living beings can enter one living being's body and one living being can enter all living beings' bodies while both sides still do not lose their own peculiarities. After the merge or entering, all living beings can be seen inside of this one being's body, and this one being can be seen in the bodies of all other living beings. They merge, yet they keep their individualities.

How is it possible? This mysterious door is even harder to imagine or visualize than the previous one. The dream-like-world theory can provide an excellent explanation. Every object and every sentient being acquire their own characteristics from the pseudo-collapse of the wave function of the universe. Because the collapse is pseudo, they are fundamentally still the wave function which has no fixed characteristics, and their current appearances are ultimately insubstantial. We tend to think each object or living being is a solid object like a rock. Two rocks simply cannot merge with each other without compromising their appearance of a rock. However, all objects and living beings are insubstantial like light rays of different colors, which can shine in the same room yet still maintain their own colors. Someone may protest, "But we will see the colors mixed. Sunlight is a combination of lights with all colors in a rainbow, but we see it as only white." Yes, that is the limitation we have with our ordinary vision because we are still constrained by our built-in spectacles. Before we eliminate our spectacles, what we can see or imagine is not nearly as marvelous as what is described by National Master Qing Liang. Once we had made progress on the method described in Part Two, it is possible for us to see different colors simultaneously fill up space without mixing with each other. Once you could experience that, you would understand "One and many merge with each other, without losing their own peculiarities."

4. All things are mutually identical, so that one is all and all is one.

This mysterious door explains that one is all and all is one. Any object fundamentally is everything else. There are two aspects of being mutually identical. First, one thing can let go its peculiars and becomes the same with everything else. Second, this one thing can gather in everything else and make them become the same to itself. The second scenario can be considered as the reverse of the first one, i.e., all things let go of their peculiars and becomes the same with this one thing. Therefore, this one thing "gathers in" everything else and makes them to become the same as itself. Based on those two aspects, one thing and everything else are mutually identical. They can all mix together as one unity without any hindrance.

The dream-like-world theory indicates the same principle. Because everything appears from the pseudo-collapse of the wave function of the

universe, they are fundamentally one unity. And pseudo-collapse is not an irreversible collapse. Instead, it is an illusory collapse. Therefore, everything is fundamentally the wave function of the universe. Anything can manifest as everything else. And everything else can manifest as this one thing. Thus, all is one and one is all.

5. Explicitness and implicitness coexist.

   The fifth mysterious door follows naturally from the previous mysterious door. National Master Qing Liang explains this mysterious door as following: when one object gathers in everything else, this object is explicit and everything else is implicit. When everything else gathers in this one object, then this object is implicit and everything else is explicit. In either case, when one side is explicit, the other side is implicit, and vice versa. Both the explicit and implicit coexist.

   Doesn't the coexistence of implicit and explicit features sound familiar? Indeed! The wave and particle duality of light illustrates this mysterious door perfectly. When light appears as a wave, its particle characteristic is implicit and its wave nature explicit. When light behaves like a particle, its wave characteristic becomes implicit. However, the implicit part still exists and can become explicit when conditions change. At any given moment, both the particle and wave feature coexist in light, even though only one can manifest at any given time.

   The dream-like-world theory has the same implication. When one object takes its form under a certain operator, it is explicitly occupying a certain spot in the spacetime. The manifestations of all other possible objects at that exact spot are dormant and implicit. They are all implicit and gathered in by this one explicit object. However, they do have the potential to be realized. Under different conditions, other objects could appear, and this one object will not manifest. Therefore, those objects, which were implicit in the previous case, are explicit now. And that previously explicit object is implicit, dormant, and gathered in by other objects. Let's use an analogy to illustrate the point here. Assume that you open your favorite web browsers on your computer. There are multiple stories you would like to read. Therefore, you open each story on a separate tab in the browser. When are reading the first tab, it is explicit, and all other tabs are implicit. However, when you switch to the second tab, the first tab becomes implicit and second tab is explicitly shown on the computer screen now. At any given time, explicit tab and implicit tab coexist in this browser. In this analogy, your computer screen is like the wave function which can display anything on the screen. And different tabs on the screen are like different phenomena in our physical world. They can be explicit or implicit corresponding to our operators. From the analogy, it is easy to see that the explicit and implicit always coexist.

6. All things encompass one another in an orderly manner.

   National Master Qing Liang says that one dust mote contains ineffable numbers of worlds, which appear simultaneously in an orderly manner inside of the dust mote, neither clumping together nor scattering around. The dust mote does not become big, nor do the worlds become small. Yet all those worlds are encompassed by a dust mote. It is this way in one dust mote, and it is the same in all dust motes. In short, everything encompasses everything else in an orderly manner.

   In the dream-like-world theory, since everything is fundamentally the wave function of the universe, it can encompass everything else. Even though everything encompasses everything else, they still can keep their own appearances in an orderly way. We can visualize this mysterious door with the analogy of a hologram. An interesting feature of a hologram is if it is cut into small pieces, each piece still contains the entire holographic image. Now let's imagine there is a holographic image which shows the entire Milky Way Galaxy. We then cut this hologram into tiny pieces. On each tiny piece as small as a dust mote, there is still an image of the entire Milky Way Galaxy, with every star displayed in their proper positions. This is true for every tiny piece of the original hologram. Similarly, our world is like the hologram. Every dust mote is a manifestation of the wave function of the universe, which contains the information of entire universe. Therefore, one can see the entire universe inside of each dust mote. Of course, for us to view a hologram, a ray of laser needs to shine on the hologram to bring out the 3D image. Likewise, to view our physical world in such a marvelous way described by National Master Qing Liang, we need to realize the dream-like nature of the phenomenon world so that we can go beyond the limitation of our inherent spectacles.

7. All things manifest one another as the jewels of Indra's net reflect on one another infinitely.

   Indra is a deity in Indian religions. An Indra's net is a net in which the strands are joined together by jewels. Each jewel reflects images of all other jewels. And other jewels further reflect the image of this jewel reflecting other jewels. In such a way, all the jewels reflect images of each other infinitely. To make it easier to visualize this, you can put two mirrors, A and B, face to face, light a candle in between. You will see the image of the candle being reflected in Mirror A, and the candle image in Mirror A is further reflected by the Mirror B. That image in Mirror B is again reflected by Mirror A. This mutual reflecting process goes on endlessly. Therefore, you see the reflections of candles going deeper and deeper in both mirrors to infinite. Now imagine what you have are not just two mirrors, but countless mirrors which can all reflect each other. In any of those mirrors, you will see

the first reflections of other mirrors, and the second reflection, the third reflection, up to infinite reflections. That is what the Indra's net looks like.

National Master Qing Liang says that everything in the world is like the jewels on the Indra's net. In each of them, you can see everything else in it as the first reflection. Those first reflections will be further reflected, thus generating the second reflection. This process goes on to infinite. All things manifest one another in this infinite loop of reflections. Therefore, any object in the world is like the jewel on the Indra's net, containing the deepest information of each and everything in the entire universe. How marvelous that image is!

In the dream-like-world theory, everything is a 3D image generated from the wave function of the universe. Since everything is ultimately the wave function of the universe, it has the potential to manifest all other objects, which is again a 3D image generated from the same wave function of the universe, and in turn any object in it has the potential to manifest everything. This process goes on to infinity. Thus, it will generate an infinite loop of mutual manifestation, exactly like the jewels of Indra's net described by National Master Qing Liang.

8. Any given thing essentially illustrates of the truth of interdependence of all things.

   This mysterious door is relatively easy to understand. From previous mysterious doors, we know that anything is one unity with everything else, anything can reflect everything else, anything can gather in everything else, anything can encompass everything else, and everything mutually manifest each other. Therefore, any single thing can be an example to illustrate the interdependence of all things.

   In the dream-like-world theory, it is also very straightforward. Since everything arises from the pseudo-collapse of the wave function of the universe, they are all embodiments of the wave function of the universe. They manifest together interdependently at the pseudo-collapse. Therefore, if a person truly understood one thing, he or she would have understood everything, because they are ultimately one unity.

9. The past, present, and future interfuse one another without confounding.

   National Master Qing Liang explains that time does not have a separate existence from objects. Instead, the existence of time depends on objects in the world. Since everything can interfuse with, encompass, and gather in everything else, a time period can also merge with different time periods. Therefore, it is said in Buddhism canon, "Countless eons of the past can be set in present and future. Limitless eons in the future are put back in the past." "Measureless eons are just one single thought, and a single thought is

measureless eons." "Countless eons are a single moment, neither long or short." National Master Qing Liang says that the past, present, and future interfuse in various ways described by above quotations. Even though they interfuse, they do not lose their characteristics of being past, present, or future. Neither will the length of long period of time or short period be lost. They interfuse without confounding.

In the dream-like-world theory, time comes into existence with everything at the pseudo-collapse, therefore time is also interconnected with everything in the universe. An operator will make the wave function of the universe pseudo-collapse into certain past, present, and future. A different version of operator will cast a different version of time, along with differences in every object. It is like time in your dream, which is neither real nor fixed. In one dream, time can be thousands of years in the past. And in another dream, time could be in the future. Those two different versions of time can be combined yet in another dream at a different time and space. Yet, you can still state clearly whether time is about the past or the future in each dream, even though the time frame is not fixed in all those dreams. The pseudo-collapse of wave function makes time flexible in the same way as time in dreams. Since time is not fixed and can change with operators, the past, present, and future can interfuse with each other without any confounding.

10. Anything can be regarded as the center of its companions.

As described in previous mysterious doors, nothing can manifest by itself in isolation. Instead, all things co-arise interdependently, and they reflect, gather in, encompass, and merge with each other like reflections in the jewels on Indra's net. Such an image of everything manifesting in infinite loops and layers is beyond our comprehension. In this last mysterious door, National Master Qing Liang describes an easy way for us to understand it. Regarding any given thing, everything else are its companions. For instance, if one dust mote is the center, countless dust motes all over the universe are its companions. If one flower is the center, numerous flowers from everywhere else are its companions. When we look at another flower, then that flower is the center and all other flowers become its companions. When we look at one jewel on Indra's net, that jewel and its reflection is the center and all other jewels and their reflections are companions. It is always the case that one center is surrounded by many companions. There cannot be one center with another center, nor could there be companions without a center. Nothing can arise alone. Whenever anything manifests, everything else will co-arise as companions. Together, they form a complete set of a center and its companions.

In the dream-like-world theory, when we sense, we apply an operator on the wave function of the universe and causes it to pseudo-collapse into one version of physical world. There is always a center of the attention during

> our sensation process, while everything else arises in the background. Our attention often changes so that the center and the background stuff will shift accordingly. Any object can be the center in one moment and become a companion in the next moment. No matter how our attention of sensation roams around, there is always a center and everything else acts in a supporting role.

Above is a summary of the ten mysterious doors laid out by National Master Qing Liang. It is hard to imagine his interfusing universe in which everything interconnects, merges, gathers in, and reflects each other in an infinitely nested manner. Luckily, we now have our modern technology to help us visualize his world. Imagine a 3D fractal structure (please refer to Figure 16. Romanesco broccoli has a natural fractal structure, which resembles itself on all scales.) And then turn that 3D fractal structure into a hologram. This 3D fractal hologram will be close to the picture painted by National Master Qing Liang. Since it is a holograph, any small piece of this hologram contains the entire holographic fractal picture. And if you zoom in on a tiny region on this hologram, you will see the entire structure hidden in it due to its fractal nature. And if you further pick out a tiny region on this 3D structure hidden inside of the previous tiny region, you will see yet another layer of entire 3D fractal structure. This process can go on infinitely, just like the images on the jewels of Indra's net. Even though things on this fractal hologram cannot merge, reflect or encompass each other, this 3D fractal hologram still gives us a feel of the marvelous world described by National Master Qing Liang – the infinite-nesting and interdependent co-arising of everything as one unity. To view a hologram, a ray of laser is shined on the hologram to reveal the 3D image it stores. In the dream-like-world theory, our operators work like the ray of laser in a holographic display. We apply our operators on the wave function of the universe to make it pseudo-collapse into the worlds we sense. If we could enhance our operators to match that of National Master Qing Liang, we would also be able to see his marvelous world.

Figure 16. Romanesco broccoli
https://en.wikipedia.org/wiki/Romanesco_broccoli

In this chapter, we discussed the ancient texts from both Daoism and Buddhism. Even though those ancient texts speak a completely different language from that of our modern

physics, the similarity between their descriptions of the universe and the weird quantum world is apparent. The reason quantum world and National Master Qing Liang's world both feel weird to us is because we have not yet discarded our inherent spectacles of space, time, causality, and division of subjective and objective. If we are willing to throw away those spectacles, Quantum Mechanics can be interpreted in the same way as those wise words from Lao Zi and National Master Qing Liang, which paint a marvelous and profound picture of the universe.

Some people might say, "Okay, the dream-like-world theory seems to match those ancient texts. However, we need empirical evidence to test whether a theory is correct or wrong. I have never experienced the world anywhere close to what National Master Qing Liang described in his ten mysterious doors. How could I assume it is right?" To answer this question, I am going to provide empirical evidence to support the dream-like-world theory in the next chapter.

Chapter 13 Empirical Evidence to Support Dream-like-world Theory

My layman's interpretation of Quantum Mechanics may sound loose or even far-fetched to physicists. However, it can be empirically verified. One way is to follow the method that I will mention in Part Two of this book and realize it by yourself. Once you knew the unity of everything and saw different versions of worlds, you would no longer have any doubt about the dream-like-world theory. The other way is to seek supporting evidence through scientific research on paranormal phenomenon, especially psychokinesis. Psychokinesis is the ability of influencing a physical object without any physical interaction, commonly known as the "mind over matter." Apparently, if mind over matter phenomenon were real, it would strongly indicate the unity of the subjective mind and the objective matter, and support the idea that one can change his physical world through modifying his operator. However, whether mind over matter or paranormal phenomena exist is highly controversial. So is parapsychology, the field that studies paranormal phenomenon. Scientists who take firm materialism stance claim that parapsychology is pseudoscience, while parapsychology researchers believe that they are investigating the frontier of science. As history has proven, new developments in science and human knowledge in general often originate from controversies because they force human to investigate and confront data that are inexplicable by prevailing theories. Therefore, I encourage readers to be open-minded and do not discard any theory as soon as you see its association with paranormal or parapsychology. In the following chapters, you will find new data and ideas unknown to western readers. You can always draw your conclusion after reading and analyzing the evidence as well as even conducting some simple experiments on your own.

In this chapter, I will first explain why paranormal phenomenon, especially psychokinesis, is the best evidence to support the dream-like-world theory. Then I will quote empirical evidences from cases recorded in Chinese history. Finally, I will describe scientific experiments conducted in mainland China and Taiwan as supporting evidence. After carefully examining the evidences presented in this chapter, hopefully you will be convinced of the validity of dream-like-world theory and appreciate its explanatory power of both normal and paranormal phenomena.

13.1 How Paranormal Phenomenon Supports the Dream-like-world Theory

Why do I choose to focus on paranormal phenomena, especially psychokinesis, as the main supporting evidence for dream-like-world theory? The reasons are following. Firstly, paranormal phenomena strongly indicate the unity of mind and matter, i.e., the oneness of the subjective observer and the objective world. Psychokinesis, which shows that mind can directly affect matter without relying on any physical means, is a strong evidence to support the notion that one can experience different versions of world through changing one's operator. Secondly, ordinary phenomena can be explained by materialism worldview which is dominant in science community, yet paranormal phenomena require extraordinary explanations. Current mainstream materialism tends to

sweep paranormal phenomena under the rug or even label parapsychology as pseudoscience because it simply cannot explain them. In comparison, the dream-like-world theory provides a well-grounded explanation for various kinds of paranormal phenomena. Overall, the dream-like-world theory has more explanatory power than the prevailing paradigm of science based on materialism. Being able to explain the phenomena that cannot be explained by current scientific theories is a strong evidence that the dream-like-world theory is a better option.

Let me use a simple example to illustrate my points in the previous paragraph. Suppose I am peeling a banana with my hands. The scientific explanation is that my brain sends electrical signals down to my spinal cord and then to the nerves in my arms and hands. The nerves control the muscles of my hands to generate the movements of peeling the banana. However, there is an important yet unexplained link from my intention of peeling a banana to the electrical signals generated by my brain. That relationship between our subjective mental states and the physical brain states characterized by electrochemical interactions remains unknown to scientists. The explanation given by the materialism view claims that matter is the fundamental and mind is merely a byproduct of the brain. Under such an explanation, my intention to peel the banana, which I vividly feel as mine, is merely a result generated by the neurons in my brain. The banana-peeling process would be explained by materialism perspective as some parts of my brain decide to peel the banana and carry out the action on their own. Mysteriously, I subjectively feel that I am the commander who is issuing the order to peel the banana. But in fact, I am not. I am merely given that illusion of being in control by my brain. It is the neurons that made the decision before I even had the subjective feeling of wanting to peel the banana. My brain decides all my thoughts and actions. Thus, it is an illusion for my subjective self to feel that it is in control. As you can see, materialism basically reduces me or any other human being to a robot. I do not even have the freewill of peeling a banana. Instead, the chemical reactions in my brain dictate what I want to eat. As absurd as it sounds, it is the prevailing belief in scientific communities nowadays.

There is a joke about two scientists who had a fierce argument on the hard problem of consciousness during a conference. They were arguing whether consciousness is just an illusion created by the brain and human are merely automatons without any freewill. The scientist with materialism view listed all kind of supporting evidence from fMRI brain images, cases of brain damaged patients to support his claim. He also fiercely attacked the other side as being unscientific, making claims without solid empirical evidence. Later, one of the scientists from the non-materialism side stood up and publicly humiliated the materialism scientist and made him very mad. At the end of his speech, he said to him, “I am sorry. I did not mean to humiliate you. However, I had no control over myself since I am just an automaton. It is the neurons in my brain which dictate me to say such nasty things to you.”

Even though the materialism perspective seems ridiculous to general population, a good percentage of people with higher education believe in it because it goes along with prevailing materialism paradigm in science. However, imagine how the human society would be if people really acted out as automatons and were treated as an individual lack

of freewill. No one would ever be held accountable for anything they do because they do not have any freewill. Every action of theirs is merely a result of the chemical reactions in their brains, i.e., their minds do not have any control over their actions. In US legal system, mental patients are not guilty for crime because they could not control their actions. Their freewill is impaired therefore they are not held responsible for their crimes. Materialism basically takes away freewill from every person. Thus, no one should ever be punished for anything. The absurdity of materialism view is apparent if you think it through. However, it is not likely to be overthrown unless a better paradigm in science emerges. I believe that the dream-like-world theory is a perfect candidate for such a paradigm shift.

Now imagine if I could peel the banana using only my mind without physically touching it, that would completely defy materialism. Such a phenomenon couldn't possibly be explained by the materialism view which claims that the subjective mind is a byproduct of the brain. Why? If mind were merely a byproduct of the brain, it would mean that it is the brain, not the mind, which peels the banana without touching it. However, our brain does not have any physical strength to act on anything that touches it, not to mention to peel a banana which locates outside of the skull. Thus, such a mind over matter phenomenon would be impossible for materialism to explain. In comparison, the dream-like-world theory can easily explain it. The external physical world is not substantial; instead, it is illusory like a dream. Therefore, it can be changed directly by our mind, in the same manner as lucid dreamers can modify the "physical" world in their dreams. As you can see, the mind over matter phenomenon is the best supporting evidence for the dream-like-world theory.

In fact, every one of us has the mind over matter ability in a limited way. At any given time, we can move our hands, eyes, or other parts of our bodies volitionally. It could be the case, as a materialist claims, that our brains control those movements and our mind is just a bystander. However, it could also be the case that our mind over matter ability is working on our body. The limit is that we can only control our body, nothing else for now. That is like a dreamer who has not yet mastered lucid dreaming. All he can control is his own avatar in the dream. However, once he had mastered the skill of lucid dreaming, he would be able to do many super-dream deeds, such as peeling a banana without touching it in his dream. Similarly, we cannot do any mind over matter deed in our waking life because we have not yet mastered the skill of omni-living. If we could one day master the skill, we would experience the unity of our mind and the physical universe, also be able to directly shape the physical world through our mind.

13.2 Evidence Recorded in Ancient Chinese History

In the long history of China there are many cases of well-documented paranormal phenomena, which defy materialism and support the dream-like-world theory. To Chinese, such phenomena had been considered normal, until the recent shift of worldview to dialectical materialism, the official ideology of communism.

Many cases of paranormal phenomena were recorded in the *Twenty-Four Histories*, the

24 official history books of China. The first book was written in 91BC and the last one in 1739AD. Those 24 books have high credibility because they were compiled and reviewed by historiographers with best credentials in the ancient China. The huge volume of *Twenty-Four Histories* is intimidating to any casual reader. It is not an easy task to cherry pick texts on paranormal phenomena in those books, especially since they were written in classical Chinese, a language modern Chinese can barely read. Luckily, a dedicated contemporary writer from mainland China, Mr. Chen, TaoQiu spent several decades combing through the ancient records and compiled a book called *A Record of Exceptional People in Ancient Time*[6] *(1998)*. Based on more than a thousand records he found in the official history records, i.e. the *Twenty-Four Histories*, the local history records, and historical notes, he compiled 318 cases of paranormal phenomena ranging from exceptional intelligence, ESP, psychokinesis, telepathy, to precognition, etc. Those cases are amazing and fascinating. The psychic abilities of ancient Chinese seem to be much more advanced than psychics nowadays. One reason may be because the modern life style causes people to be constantly distracted, thus they could not have enough concentration necessary for developing high level skills as the ancients did. The other reason may be because many methods or practices used to develop such psychic skills were lost in the long history of China, especially during cultural revolution.

I will quote two examples of high level psychic power. They were both documented in the *Twenty-Four Histories* and selected by Mr. Chen, TaoQiu in his book. One case is related to a famous general Chen, XianDa (427~500AD) during Southern Qi Dynasty in China. It was documented in the *The History of the Southern Dynasty*, one of *The Twenty-Four Histories*. According to his biography, General Chen was once engaged in a battle with rebellions. His army arrived at a palace called Du Mu Zhai and they fought the rebellions at the gates of Xuan Yang and Jin Yang[7]. His army finally defeated the enemy. However, an arrow pieced through General Chen's left eye during that furious combat. In the process of pulling the arrow out, the arrow shaft was broken, thus leaving the arrowhead inside his left eye. Fortunately, there was an old lady from nearby village Di Huang, Mrs. Pan, who was an expert of an ancient skill called Qi Jin[8]. Mrs. Pan first punched a nail into a pillar. Then she walked around the pillar in a special gait while circulating Qi at the same time. She exerted Qi on the nail without touching it, and the nail jumped out of the pillar. After demonstrating her skill, she performed the same procedure on General Chen's left eye, and the arrowhead came out. Apparently, such a powerful psychic skill was considered common back then. It was briefly documented in the official Chinese history record only because the receiver, General Chen, was a high rank officer.

The second example is about Zhou, Dian, a crazy monk in the early Ming Dynasty. He had interesting interactions with Emperor Zhu, YuanZhang, the first emperor of Ming Dynasty in China. Many years after he united China and ascended to the throne, Emperor

[6] English translation of the title of the Chinese book 千古异人录 by 陈涛秋.
[7] The exact location of those two gates was not stated clearly in the history record. My guess is that they were the gates of that palace.
[8] Here Qi is the same Chinese character as in Qi Gong. Qi refers to an invisible energy that the martial art masters and Qi Gong masters cultivate in their practices.

Zhu himself wrote a biography for Zhou, Dian, in which many encounters between the two were described in detail. Emperor Zhu ordered the famous calligrapher Zhan, XiYu, an official in his court, to copy it down, and then had it carved on a stone tablet erected at Mountain Lu in 1394 AD. The tablet has been well preserved inside the Imperial Tablet Pavilion ever since then. Zhou, Dian, the crazy monk, also has a detailed record on the *History of the Ming Dynasty*, the last one of the *Twenty-Four Histories*. It is rather rare for a monk to occupy so much space in the official history record, not to mention a crazy one. What is so special about him? Let's take a brief look at his imperial biography.

Dian is not Zhou's first name. Dian in Chinese means crazy. So, Zhou, Dian literally means Crazy Zhou. According to his imperial biography, Crazy Zhou's hometown was Nan Chang. When he was 14 years old, his parents could not take care of him due to his mental illness. So, he was abandoned and became homeless. When he was in his 30s, he occasionally spoke irony words. Whenever a new mayor arrived in office, he would greet the new mayor and say to him, "proclaim peace." Those were irony words. Even though the nation was peaceful at that time, a civil war would soon break out. Within a couple of years, Yuan Dynasty[9] was out of control. Rebellions took place everywhere. One of the warlords Chen, YouLiang led his group invaded Nan Chang. Crazy Zhou did not talk to him. (This is a hint that Chen, YouLiang would not become the new ruler. So Crazy Zhou did not bother to "proclaim peace" in front of him.)

Emperor Zhu then described how he first met Crazy Zhou in the biography of Crazy Zhou. The event happened after he drove away Chen, YouLiang from Nan Chang. Here is Emperor Zhu's own words[10].

> Soon my fleet conquered Nan Chang under my command. After I settled down the locals, I headed back to the Capital. On my way out of Nan Chang, there was a person kneeling at the city gate. I asked, "Who is this person?" My retinues said, "A crazy person." I went back to the Capital in March, and Crazy Zhou arrived in June. One day I went out to supervise a project. Crazy Zhou came to greet me. I asked, "What do you want?" He answered, "Proclaim peace." Every time when I came out of the imperial court, he would appear either at my left or right, front or back, always shouting out "proclaim peace." Sometimes I saw him taking out something underneath his cloth and putting in his mouth. I asked him why he did that. He said, "Lice." I asked, "How many?" He answered, "Two or three buckets." He often sung the following song in public, "What can move people's mind? Only makeups can move ladies." When others asked him why he sung those words, he answered, "You just be so, just be so."
>
> I was bothered by Crazy Zhou every day, so I ordered to have him steamed.

[9] Yuan Dynasty was established by Genghis Khan. His offspring did not govern China well, so Yuan Dynasty fell apart rapidly. It lasted less than 100 years. Emperor Zhu, YuanZhang finally drove Mongolians away, united China, and established the Ming Dynasty in 1368AD.

[10] Please note, the text below is not a word to word translation since the original text has too much details for our purpose of discussion. I kept the main point and omitted some unrelated texts.

I had him covered by a giant urn, piled 5 feet of firewood around it and set the fire. After the fire burned off, the urn was lifted to check his status. He had not changed a bit. Soldiers doubled the amount of firewood and carried out the same procedure, he was still the same. Soldiers quadrupled the firewood and followed the same procedure. When urn was lifted, thick smoke condensed at the bottom of the urn like cotton. Crazy Zhou shook his head gently and broke out a little sweat. Other than that, everything was fine with him.

Later, I ordered Jiang Shan Temple to provide food for Crazy Zhou. The head monk took the order. A month later, he came to report that Crazy Zhou engaged in a fight over food with a novice monk. He got angry and refused to eat for half a month. I was surprised to hear that, so I paid a visit to him at the temple. He looked normal without a sign of starvation. I held a banquet for him at the Green Mountain Pavilion. After the meal, I secretly gave the head monk an order, “Let Crazy Zhou starve for a month, see if he can handle it.” The head monk then locked him up in a room. I asked about his status every other day. Twenty-three days later, he had not yet eaten anything. It was beyond ordinary people’s limit. So, I went there and released him in person. My generals and soldiers heard about the story, they rushed to offer food and drink to Crazy Zhou. Later we had a meal together like last time. On my way back, he drew a circle on the ground and said to me, “You break a barrel, you make a barrel again.”

Soon I was going to march to Jiu Jiang to fight. I asked Crazy Zhou, “Is this trip doable?’ He replied, “Yes.” I said, “The enemy has already declared himself an emperor. Won’t it be hard to fight him?” Crazy Zhou looked up toward sky for a long time. With a stern countenance, he said, “There is no his seat up there.” I asked, “Can you come with me?” “Yes,” he replied.

When my army reached Wan Cheng, there was no wind and the fleet could not sail forward. I sent a soldier to consult Crazy Zhou. He said, “March forward, there will be wind. If you dare not go forward, there won’t be wind.” So, soldiers got on the bank and pulled the boats against the stream. A mile later, a gentle wind started to blow. Within three miles upstream, strong tailwind suddenly arrived, and my fleet could finally reach Xiao Gu.

I gave an order to soldiers who were monitoring Crazy Zhou, “He is crazy and utters inappropriate words. If he said anything wrong, report to me.” When we were in the middle of the river, dolphins appeared and played in water. Crazy Zhou said, “The water monsters manifest, there will be a big loss.” Soldiers reported his words to me. I defied his words and ordered to throw this ignorant crazy person into the river. The soldier who was supposed to drawn Crazy Zhou came back after a long while, followed by Crazy Zhou. I asked the soldier, “How come you did not kill him and let him come back alive again?” The solider answered, “It is hard to kill him.”

> At that moment, Crazy Zhou suddenly rushed in front of me and begged for food. I gave him some food. After the meal, he packed his stuff as if he would be gone for a long journey. He came in front of me, stuck out his neck, and said to me, “You kill me.” I said, “I am bothered by you a lot, dare not to kill you now, I will let you leave.” He then left, and no one knew where he went.

Emperor Zhu, YuanZhang included a lot more detail about Crazy Zhou in his biography which I did not translate. From the translated text mentioned above, we can see that they had an interesting relationship. On the one hand, the emperor wanted to get help from Crazy Zhou, especially his precognition of the outcome of the war. On the other hand, he was concerned that Crazy Zhou might demoralize his troops during the crucial battles. Apparently, his soldiers had great faith in Crazy Zhou. Upon hearing prophecy of high casualty rate, Emperor Zhu ordered Crazy Zhou to be drowned even though his prophecy later tended out to be true. According to the biography of Crazy Zhou, Emperor Zhu tried to find him after uniting China, but the search was futile. Many years after he ascended to the throne, Emperor Zhu got seriously ill once. A bare foot monk came to offer a dose of Chinese medicine to the Emperor, saying that he was sent by Crazy Zhou from Mountain Lu. After taking the medicine, Emperor Zhu fully recovered overnight. However, when Emperor Zhu sent people to find Crazy Zhou in Mountain Lu, he was nowhere to be found. Emperor Zhu thus wrote this biography for Crazy Zhou and erected the stone tablet in Mountain Lu to commemorate Crazy Zhou.

From the two examples mentioned above, we can see that those ancient Chinese possess unbelievable psychic skills. There are numerous records of paranormal phenomena documented in the official Chinese history. We cannot simply claim that all those records are inaccurate or superstitious simply because they contradict with prevailing materialism worldview at our present time. Instead, we should reflect why we stubbornly reject those historical records, while our ancestors documented them as ordinary events. Could it be the case that we have become so closeminded and dare not venture outside of our materialism paradigm of science?

If we are willing to let go of materialism and embrace the dream-like-world theory, those paranormal phenomena can be understood. The first example is a case of powerful psychokinesis skill. Mrs. Pan applied her mind over matter ability to remove the arrowhead from General Chen’s left eye without touching it. Under the dream-like-world theory, Mrs. Pan, through her skill, made the wave function of universe to pseudo-collapse to such a version of physical appearance, in which the arrowhead in General Chen’s eye came out by itself. In the second example, Crazy Zhou demonstrated many incredible skills, such as immunity to fire and water, endurance of prolonged starvation, and precognition. Under the dream-like-world theory, Crazy Zhou had mastered the operator that he could cast his body as something indestructible. And because time is merely an illusion existing after pseudo-collapse, it is possible for him to see the future or even shape the outcome of future events through his mastery of operator. Apparently, our material science cannot explain those two examples mentioned above and the dream-like-world theory provides a reasonable explanation to them.

13.3 Evidence from Empirical Studies in Mainland China and Taiwan

I quoted two records of paranormal phenomena from *The Twenty-Four Histories* in last sector. People may doubt the accuracy of those historical records since the skills documented in them are simply unbelievable to many modern readers. It is very normal to give rise to such doubt since historical records can hardly be verifiable empirically. Therefore, I will quote recent studies conducted by contemporary researchers in mainland China and Taiwan as modern evidences for the dream-like-world theory in this section.

Parapsychology research is rather limited in US since it is not fashionable and often not fundable nowadays. There are only a few US universities with research programs on paranormal phenomena. One is the research on children's memory of previous life pioneered by Prof. Ian Stevenson and continued by his student Prof. Jim B. Tucker and others in the Division of Perceptual Studies (DOPS) at University of Virginia. The other is the research on mediums by Prof. Gary E. Schwartz in University of Arizona. Both programs are highly controversial since they challenge mainstream understanding of science. Surprisingly, parapsychology research in China seems to enjoy much wider public acceptance than its counterpart in US. The reason, as you have probably guessed, is because paranormal phenomena have been well known to public throughout Chinese history and they used to be considered rather normal. At present, people with psychic abilities do not seem to be as common as in ancient China. However, there are still quite a few people who gained various degrees of psychic abilities through their practices of Qi Gong, Taiji, or other kinds of traditional practices in China nowadays. Therefore, Chinese tend to accept the existence of psychic power even though it goes against dialectical materialism, the center piece of communism ideology. Psychic power is called Exceptional Human Function (EHF) in mainland China. Unlike psychics in the west who typically gain their ability at birth or accidentally, people with EHF in China sometimes attain such ability through their practice. That indeed indicates that EHF is a skill that can be acquired through training and practice of Qi Gong, Tai Ji, meditation, or other kinds of traditional practices.

The Exceptional Human Function (EHF) research in China enjoyed more than a decade of booming period from early 1980s to late 1990s, thanks to the endorsement of prominent scientists and high rank government officers. There was also a great public interest in Qi Gong as a practice to improve physical health. The Qi Gong boom overlaps with the EHF research boom in China since Qi Gong practitioners can often gain EHF. Unfortunately, FaLunGong[11], a form of Qi Gong with religious characteristics, went against Chinese government and triggered a surge in government control on Qi Gong practice during late 1990s. Gone with FaLunGong was the Qi Gong boom in China. Subsequently, EHF research which is closely related to Qi Gong, was also fiercely attacked and labeled as pseudoscience by those who firmly believe in materialism.

[11] FaLunGong was founded in 1992 and quickly draw about 70 million members nationwide. Due to a series of conflicts with medias run by local government, more than 10,000 FaLunGong members gathered in Beijing demanding legal recognition from the central government in April 1999. That event led to the government crackdown in July 1999.

Nowadays only researchers from a few universities in China still conduct research in EHF.

The scientific research and public interest in EHF in China were triggered by an article published on Sichuan Daily on March 22nd, 1979. It was about Tang, Yu, a boy from Da Zuo County in Sichuan Province. The article reported that Tang, Yu could read with his ears. He could recognize Chinese characters written on a small piece of paper by putting it into his ear. Sichuan Daily is a newspaper run by provincial government. Such a report from a government newspaper immediately caught public attention throughout China. Among them was Professor Chen, ShouLiang at Peking University. Despite his initial disbelief, Prof. Chen conducted a series of experiments on elementary students in Beijing. He started his tests with two sisters Wang, Qiang, 11 years old, and Wang, Bin, 8 years old at that time. They could read Chinese characters written on a folded piece of paper by touching it with different parts of their body, such as putting it in their ears or under their armpits. This skill was named skin-vision, a type of ESP (extrasensory perception). To prevent any possibility of peeking or cheating, Prof. Chen made small envelopes with the size of 3cm by 3cm. Samples were sandwiched in the middle of two pieces of blank paper and then put into those sealed envelopes. Such a sample cannot be looked through even under bright light. During the experiments, two sisters were under tight monitoring and the envelopes must be kept intact and sealed. They were tested with 109 samples under the double-blind setup from Aug.13th to Sep. 9th, 1979. Wang, Qiang was tested for 57 time, out of which 47 were correct, partially correct for 2 times and incorrect for 8 times. Wang, Bin was tested for 52 times, out of which 44 were correct, 3 times partially correct, incorrect for 4 times, and 1 unrecognized. To increase the difficulties of the test, Prof. Chen later sealed random samples in ampoules and let Wang sisters try. After they recognized the sample, ampoules will be cracked open to check the result. Wang sisters still had no problem in recognizing those ampoule-sealed samples.

Since the finding was completely incompatible with the mainstream understanding of human biology or human vision, Prof. Chen, ShouLiang sent the manuscript of his paper to Prof. Zhao, YiBing, a prominent biologist in China to ask for his opinion. Prof. Zhao commented that a researcher can publish his findings if he accurately reports what he observed in the experiments and he did not identify any flaws in the experiments. If he were to find any error in the future, he could publicly acknowledge his mistakes and correct them. Encouraged by Prof. Zhao, Prof. Chen published his paper on the 11th issue of *Shanghai Nature* in 1979. Prof. Chen's follow-up research further discovered that skin-vision is rather common amongst children. He tested 40 elementary students from the Affiliated Elementary School of Peking University. After training, 25 students had shown skin-vision, among which 13 were boy and 12 were girls. Their academic performance has no correlation with this ability. Those children who like sports seemed to be prone to gain skin-vision ability.

In another study, Prof. Chen investigated skin-vision with color blind students. His research team first performed a color-blind screening among the students in Affiliated Elementary School of Peking University. Out of 739 boys and 737 girls, 48 boys and 5 girls were color blind. After training, some of them gained skin-vision capability. Five of

them participated in the follow-up study, which was designed to compare their normal vision with skin-vision. The result was interesting. For the colors that these color-blind students did not have problem with their normal vision, their skin-vision performed well too. The error rate was only 8%. However, for those colors that they were color blind with normal vision (65% error rate), their skin-vision had an error rate of 66%. Apparently, the error rate of skin-vision corresponds to that of normal vision.

In 1980, inspired by Prof. Chen's research, Prof. Tian, WeiGu and others at Hang Zhou University conducted similar experiments and their study reported that approximately 20% of children can gain skin-vision after a short period of training. They tested 1222 students from four elementary and four secondary schools in Hang Zhou. The age of those students ranged from 7 to 18 years old, including 623 boys and 599 girls. They found that majority of students tested positive for skin-vision fall into the age group of 7 to 13. Students older than 14 did not have any positive result except one 17-year-old girl. The peak is at 9 years old. The same experiment was repeated at different cities by different researchers, and the results were similar. They all show that 20% or more children can gain skin-vision after a short period of training.

On the other side of the strait, Taiwan is more open to parapsychology research than mainland China since they do not have the burden of communism ideology. An eminent researcher, pioneer and promoter of EHF research in Taiwan, Prof. Lee, Si-Chen, was appointed as President of National Taiwan University even though his research on ESP is not free of controversy. Prof. Lee graduated from Stanford University with a doctoral degree in Electrical Engineering. He was a professor in EE department and specialized in semiconductor before he became interested in EHF. His EHF research focuses on finger-vision, a special case of skin-vision. His team found that as high as 40% of children between 6 and 13 years old can be trained to develop the ability of finger-vision. More than 20% of the children can gain high precision of finger-vision (statistically significant, $p < 0.05$) after being trained for two hours per day over a four-day training session. Such a result is quite astonishing for merely eight hours of training. His research confirms the early findings of Professor Chen, ShouLiang and others in mainland China.

Prof. Lee's training procedure is straightforward. On the first day of training, children are shown video clips of previous finger-vision experiments so that they know that such a skill can be learned. The training is two hours a day for four days. Each session consists of four simple steps as following:

1. Children are instructed to practice Qi Gong breathing for ten minutes. Qi Gong breathing is deep and relaxed abdominal breathing by expanding and contracting one's abdomen to breathe. This step is mainly to calm down children's mind to enable them to become more focused during the training session.
2. Children are asked to stare at an object, for instance an apple, in front of them for several seconds, and then close their eyes to visualize it. Once the object is in their mind eye, they are instructed to spin the apple around to look at the backside. This step takes five minutes.
3. Children are asked to concentrate on their fingertip for five minutes.

4. After previous steps of warming up, children are now ready to try finger-vision. They are given samples to practice finger-vision. They are instructed not to guess. Instead, simply focus on their fingertips when they touch the sample and try to visualize the sample as they have practiced in Step 2.

The samples are made of a piece of paper, 5 cm by 8 cm in size. A random two-digit number is printed on it with four different colors, red, green, blue and black. The samples are folded twice and randomly distributed to children. During the finger-vision trials, children are requested to put their hands in an opaque bag which is then tied tightly on their forearms, so that it is impossible for them to peek or cheat. After children report that they see the number, they will first verbally report what they saw, leave the sample in the bag, withdraw their arms and then write down what they saw on a piece of paper. The research assistants will unzip the bag from the other end and take out the sample and unfold it, then glue both sample and child's answer on the record sheet. Here are photos of children participating in the finger-vision experiment in Prof. Lee's lab (Figure 17) and a result sheet (Figure 18).

Figure 17. Setup of Prof. Lee's finger-vision experiment
http://sclee.ee.ntu.edu.tw/mind/20150427_2/SCLee-2-2%20(5-1).pdf

Figure 18. Result of Prof. Lee's finger-vision experiment
http://sclee.ee.ntu.edu.tw/mind/20150427_2/SCLee-2-2%20(5-1).pdf

The following is a self-reported description on the finger-vision process given by participating children. After they focus their minds on the sealed sample for a while, they see a part of the sample appearing and then disappearing in front of their eyes or forehead. A while later, another part of the sample flashes by in the same manner. After several rounds of those flashes of partial images, all or most parts of the sample have appeared and disappeared. When they feel confident that they have seen every part on the sample, they will write it down as the final answer. Figure 19 illustrates this process. As you can see, some complicate Chinese characters may take multiple rounds of finger-vision before being finally recognized. Each round of appearing and disappearing can happen very quickly or with long lags in between. Therefore, a child sometimes can read a character almost instantly with his or her finger-vision capability when they are in the "zone" or "mood." Yet sometimes it could take half an hour or more, and the result of their finger-vision could still be only partially correct. Being able to calm down their minds and focus intensively is the key to successful performance in finger-vision.

During the initial stage in the development of finger-vision ability, children see the images flashing through the field of their normal vision. Later, when they become more skilled at it, they will see a television-like screen in front of their eyes. When they try to see a sample with their fingertips, the screen will suddenly pop up and display part of the sample for a second or two and then it will disappear. A while later, the screen will reappear to display another part of the sample and then disappear. It will come and go for several rounds until all the parts have been shown. This screen effect is literally dubbed as opening one's "divine eye" or "heavenly eye" in Chinese. It is the initial step toward more advanced EHF skills, such as psychokinesis.

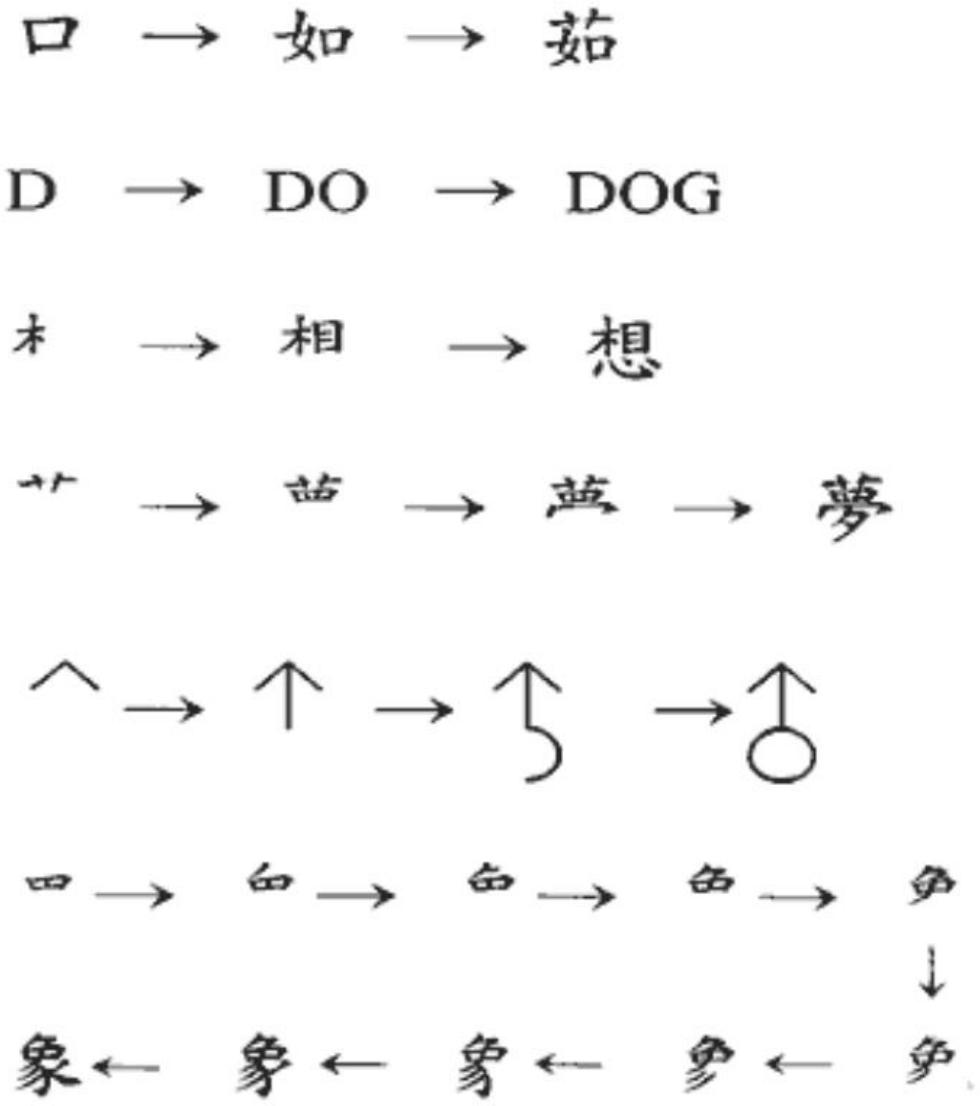


Figure 19. Process of finger-vision on their EHF screens reported by EHF subjects http://sclee.ee.ntu.edu.tw/mind/20150427_2/SCLee-2-2%20(5-1).pdf

Prof. Lee has conducted several thousands of experiments on finger-vision and his findings are consistent with previous findings from Prof. Chen, ShouLiang at Peking University and other pioneering researchers in this field in mainland China. Their conclusions are the same – a good percentage of children can develop finger-vision or skin-vision skill after taking a short training. Thus, it is reasonable to speculate that EHF is dormant in most if not all children. With proper training and enough practice, most of children could gain various degree of EHF abilities.

If children could develop EHF easily, how about teenagers or adults? The aforementioned study by Hang Zhou University shows that few teenagers were tested positive of the skin-vision skill. Do we humans lose EHF potential as we age? The answer to this question

was discovered by Shao et al., at Fudan University in Shanghai when they tried to establish a stable team of EHF human subjects for their EHF research projects.

EHF researchers had realized that the key to the success of EHF research was a good talent pool of human subjects with EHF skills. And this is one of the major challenges faced by all EHF groups in China. Young children are the easiest to induce EHF abilities. However, without regular practice, their skills tend to fade away when children grow older, especially after they enter puberty. Since Chinese parents typically put great emphasis on their children's academic performance, it is very difficult to convince parents to let their children spend time and effort on daily practice of skin-vision and other more advanced EHF skills. On the other hand, there has been few successes in training adults to develop EHF skills even though researchers and their graduate students wanted to develop some basic EHF skills themselves. The most successful EHF study with adult human subjects are many well-designed experiments conducted by researchers at Fudan University in Shanghai during 1980s. They pioneered EHF training for adults. The results of their studies were published on the journal *Exceptional Human Function Study*[12] and later compiled into the book *Experimental Studies on Exceptional Human Function and Its Training*[13], which is a collection of papers written by researchers of Human Information Science Group in Department of Electrical Engineering at Fudan University during 1980s and 1990s.

Researchers at Fudan University attempted to train three different groups of adults for EHF research purpose. The first group is the young migrant workers whose education levels ranged from elementary school to secondary school. Those workers came from rural areas to Shanghai to seek better paying jobs. The males were typically more mobile, therefore harder to retain than females. The female subjects sometimes stayed with the research program until they reached the age for marriage, then they would go back to their hometown to raise a family. The training results were satisfactory. Those migrant workers developed a variety of ESP and psychokinesis skills. However, due to their temporary residency in Shanghai and their lack of interest in research, those migrant workers are not as stable or committed as the research team would want them to be. Therefore, to establish a more permanent team of human subjects, the Fudan team tried to train the second group of adults - the undergraduate students, graduate students, and young faculty members. However, the training result was much worse compared with those migrant workers with lower education level. Only a few of those well-educated young individuals developed very rudimentary skin-vison capability. It seems that the post-secondary education, which emphasizes more on logic reasoning, goes against the EHF training. Or maybe people who are good at academics are inherently bad at EHF. Despite that young students and scholars are the most stable group of candidates, and the most dedicated group who had genuine interest in EHF research, they had to be abandoned due to their poor performance. At last, the researchers at Fudan University tried to train young people with low education level and local residency in Shanghai, such as factory workers and unemployed young adults with permanent Shanghai residency. The results were as good as those of migrant workers. Therefore, the third

[12] English translation of the title of the Chinese journal 人体特异功能研究.
[13] English translation of the title of the Chinese book 人体特异功能的实验研究与诱发训练.

group of adults would be ideal candidates for EHF research due to their excellent EHF performance and stability.

One training session was carried out in January 1986 among young Shanghai residents. The training included one hour per day for 18 days. The human subjects were 11 local workers with age from 18 to 20. Their education level was from elementary school to junior high. After completing the training session, they could all perform skin-vision on numbers or Chinese characters written on samples sealed in a film case. In addition, everyone could bend a lead wire sealed in a film case without touching it. A few of them could even cut the lead wire, reconnect it, and move it to other places with their advanced EHF skills. This experiment and other experiments carried out by Fudan team proved that it is possible to train adults to gain EHF skills, especially for those adults with lower education levels.

With a stable team of EHF human subjects, researchers at Fudan University thoroughly studied various aspects of EHF. The research papers quoted down below are from their book *Experimental Studies on Exceptional Human Function and Its Training*. Those papers cover a wide range of EHF, such as parapsychological transference (similar to telepathy), ESP, psychokinesis, and the training procedure to induce EHF in adults. For our purpose here, I will focus on papers about psychokinesis since studies prove that human mind can directly act on the objective world without the means of our physical body. Those positive experimental results on psychokinesis are strong evidence to support the dream-like-world theory. Since those papers are in Chinese and therefore inaccessible to most US readers, I will explain them in great detail.

The first paper I am going to discuss here is *The Study of the Similarities and Differences Between Psychokinesis and Ordinary Motor Actions*. In this paper, three sets of experiments were designed and carried out to investigate the characteristics of psychokinesis and how psychokinesis differs from ordinary motor actions. Human subjects with exceptional human function (EHF) were tested in those three sets of experiments. They were asked to perform the tasks *as if they were using their hands in ordinary motor actions to get them done*. Please pay extra attention to this instruction and we will discuss its impact on experimental results in detail later.

The first set contains three experiments which were designed to investigate writing with EHF. Those three experiments were carried out in an orderly manner in order to explore the mechanism of EHF writing. In the first experiment, two human subjects with EHF skills were asked to write their names on a sheet of paper. Their names are Yun and Xian.

A carbon paper was sandwiched between two sheets of white paper. A pen was placed on top of those three sheets of paper. Two subjects, Yun and Xian, were asked to use their EHF to write down their names on the back of the plain paper on the bottom, i.e., on the side that touches the table. Yun was supposed to write down her name on the left side without carbon copy, and Xian was supposed to write down her name on the right side with carbon copy. They were not allowed to touch either the pen or the paper during the entire process. Please refer to Figure 20 for the diagram of the experiment setup.

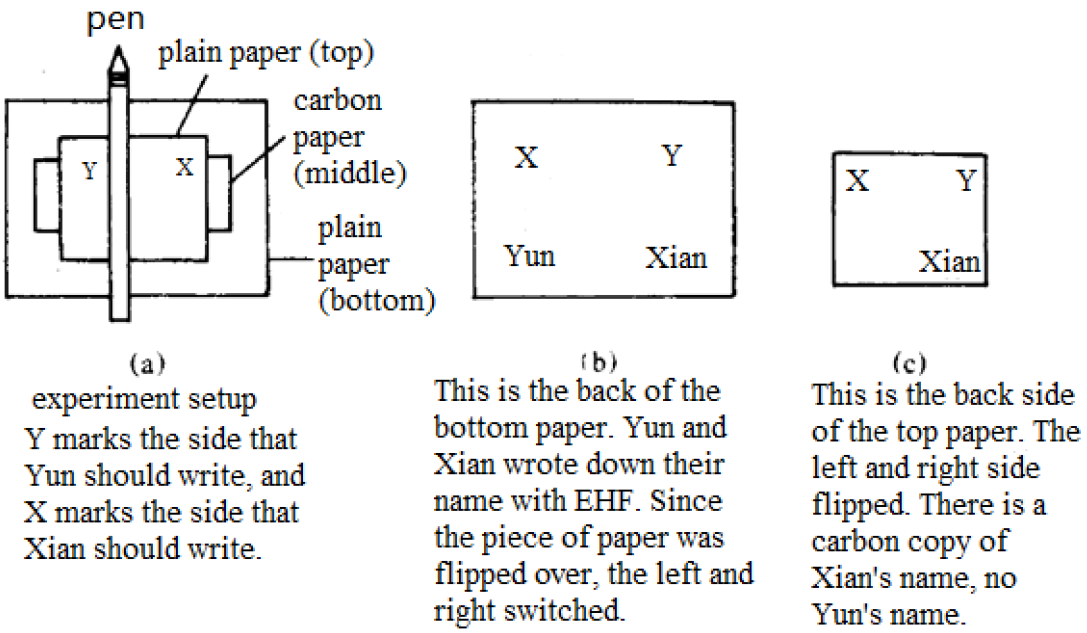


Figure 20. Experiment setup to detect if paper sheets were flipped during EHF writing and its result

Relabeled in English, original diagram on P. 55 in the book *Experimental Studies on Exceptional Human Function and Its Training*

The experiment started. Yun and Xian both sat quietly at the table. There was no movement of the pen and paper. After about twenty minutes, they both reported their success in performing the task. The result is shown in Figure 20 (b) and (c). On the back of the bottom sheet, Yun's name was written on the left side and Xian's name on the right. On the back of the top sheet, the left side was blank, and the right side had the carbon copy of Xian's name.

Given the result, researchers speculated that the sheets of paper have been flipped during the EHF process because the left and right side were switched. They also speculated that Yun used her EHF to take away the carbon paper before the EHF writing, and Xian left it there during the EHF writing. The self-reports from Yun and Xian confirmed those speculations. They did indeed flip the papers and write on the back just as what they would do with normal motor actions. In their mind, Yun did take away the carbon paper and Xian left it there. However, all their EHF actions could not be seen by surrounding observers. The observers only saw them sitting beside the table quietly throughout the entire experiment.

If Yun and Xian were doing the EHF writing task just in the same way as we ordinarily would do, except that their actions were invisible, did the pen touch the paper or not? The researchers at Fudan university conducted the second experiment to find that out. Down below is the diagram of the experiment setup.

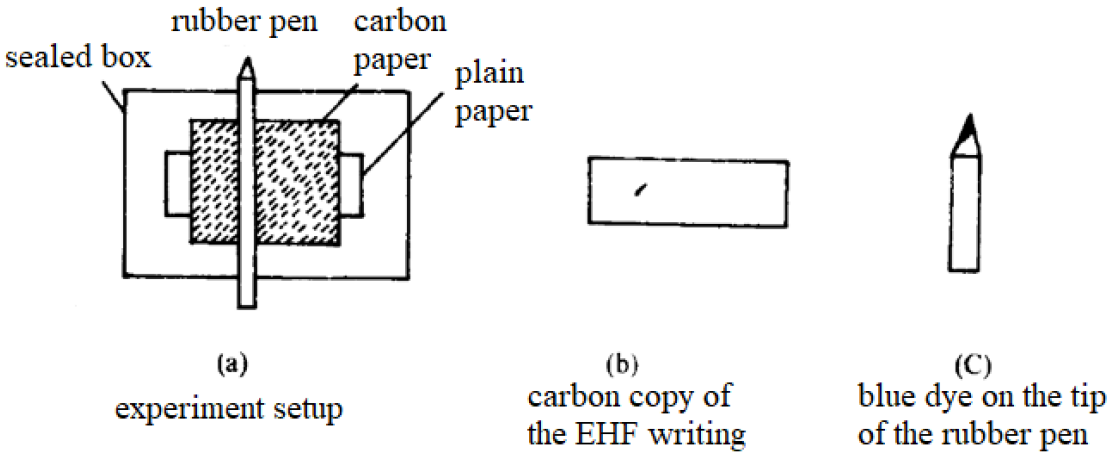


Figure 21. Experiment setup to detect contact of pen and paper during EHF writing and its result
Relabeled in English, original diagram on P. 56 in the book *Experimental Studies on Exceptional Human Function and Its Training*

A sheet of white paper was wrapped around by the carbon paper and then put inside a sealed box. A white rubber pen was placed on top of the box. The human subject, Lan, was asked to use her EHF to write on the carbon paper inside of the sealed box.

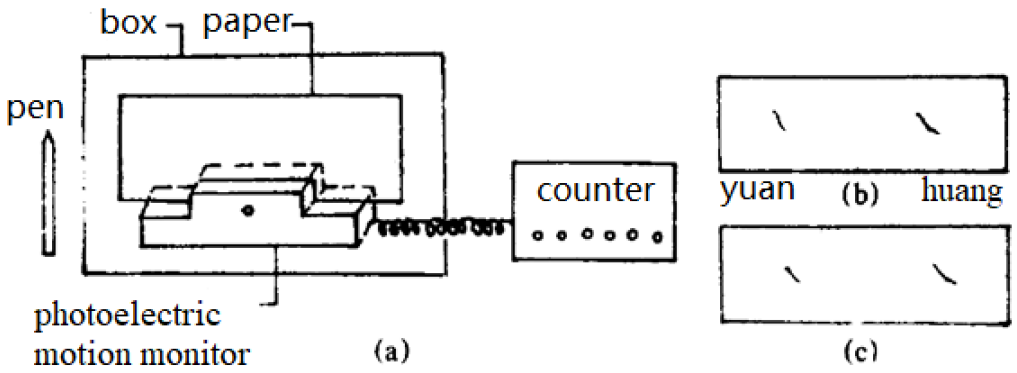
Lan sat beside the table quietly. There was no motion of the pen and the box stayed sealed. After about 30 minutes, Lan reported her success in EHF writing. Researchers then opened the box and saw a thick mark on the carbon paper and its print on the plain paper. Interestingly, the tip of white rubber pen clearly had blue dye from the carbon paper. Therefore, the researchers draw the conclusion that the rubber pen indeed touched the carbon paper even though the observers did not see any movement of the rubber pen.

The third experiment was designed to detect the motion of paper during EHF writing. Since human eyes cannot see the motion of either the pen or the paper, researchers tried to use a highly sensitive equipment to detect the invisible movement carried out through EHF. Here is the setup of the experiment. A carbon paper was sandwiched between two sheets of white paper, and then put in a photoelectric motion monitor, as illustrated in the following figure.

The photoelectric motion monitor would immediately start counting as soon as those sheets of paper were removed from it for even one microsecond. The photoelectric motion monitor, together with those sheets of paper, were sealed in a big box and a pen was set on the table outside of the box. Two subjects, Yuan and Huang, were asked to write on the white paper with then pen using their EHF.

Huang sat quietly at the table and Yuan sat there reading a book. After about 16 minutes, both reported their success. When the sealed box was opened, researchers saw that everything remained at their original position. There was a pen stroke on both sides of the

first sheet of white paper. One was written by Yuan and the other was written by Huang. They wrote with a lot of strength so that there were very deep carbon copies on the second sheet of white paper. Since the two sheets of paper and the carbon paper were in a vertical position and there was no support behind them for writing, researchers speculated that the human subjects must have used their EHF to take the paper sheets out of the gap of the photoelectric motion monitor and lay them flat on the table to write. The two human subjects reported that they did indeed use their EHF to take the sheets out, write on them, and then put them back inside of the gap of the photoelectric motion monitor. However, there was no recording on the photoelectric motion monitor. This finding indicated that either the photoelectric motion monitor could not detect the movement caused by EHF or the entire EHF process was so fast that it occurred in less than one microsecond, which was the resolution of the photoelectric motion monitor.



(a) experiment setup
(b) writings on the first sheet of paper
(c) carbon copy on the second sheet of paper

Figure 22. Experiment setup to detect motion during EHF writing and its result
Relabeled in English, original diagram on P. 57 in the book *Experimental Studies on Exceptional Human Function and Its Training*

Based on those three experiments mentioned above, we can see that EHF writing appears similar to ordinary writing. For instance, subjects can flip the paper sheets around. The pen touches the paper. There was enough force to cause the carbon copy being printed on another sheet of paper. However, all those movements caused by EHF could not be observed by human eyes. Neither could they be detected by any sensitive motion detector. It almost feels that those EHF actions happened in another realm or dimension, yet still had an impact on our 3D physical world.

After identifying the similarity between psychokinesis and ordinary motor actions in the first set of EHF writing experiments, researchers at Fudan University conducted the second sets of experiments, which were designed to verify whether any physical contact exists between EHF human subjects and objects they were handling. Plasticine was used to detect if EHF subject would leave their finger prints or other marks on it after they

applied their EHF skills to knead plasticine.

In the first experiment of this set, plasticine was sealed inside of a box and put half a meter away from the subject. Lan, the EHF human subject, was asked to knead various shapes out of plasticine with her hands using EHF. Again, the researchers could not see any movement of Lan's hands. When the box was opened, fingerprints were found on the plasticine. In addition, those fingerprints matched Lan's fingerprint.

In the second experiment of this set, the subjects were asked to wear a pair of gloves while kneading the plasticine with EHF to check if the gloves can be brought into the sealed box with hands. Two EHF human subjects, Lan and Ji, both successfully pinched the plasticine flat, and the marks caused by the fabric of the gloves were clearly visible on the plasticine.

In the third experiment, the setup was similar to the previous two experiments with one additional refinement that some ultraviolet fluorescent powder was sprayed onto the plasticine. After the subjects performed their EHF task, their gloves were examined under the lamp of 253.7nm wavelength ultraviolet light. The area of the gloves that emitted fluorescent light was exactly the spot that was reported to touch the plasticine by two human subjects. This result proved that the powder on plasticine was brought out of the sealed box by the gloves when two human subjects touched plasticine with their EHF skill.

The three experiments in this set proved that the subjects' hands and gloves indeed touched the plasticine even though the entire process was invisible to surrounding observers. And the contact between the plasticine and gloves/hands under EHF was very similar to that under normal motor actions. The powder on the plasticine attached to the gloves and therefore was bought out of the box under EHF, just as it would under normal physical contact. Therefore, it could be concluded that actions under EHF in those experiments were like normal motor actions except they were invisible.

The third set of experiments, which included two tests, were carried out to further verify the contact between EHF human subjects' hands and the objects they were supposed to work on. In the first experiment, a lead wire about 40 mm in length and 1.0 mm in diameter was put into a sealed plastic box. The lead wire was sprayed with red ink. Then the human subject, Ji, was asked to bend the lead wire into a "V" shape with her thumbs and index fingers on both of her hands using EHF. After Ji reported her success, the researchers noticed that her thumbs and index fingers had red ink. Apparently, Ji bent the lead wire with her hands as we would normally do. However, surrounding observers could not see any movement of her hands during the process. Researchers wondered if Ji needed to open the box first. Thus, in the second experiment, the lid of the box was covered with black powder and Ji was asked to wear a pair of white gloves to carry out her EHF. After Ji successfully finished the task, researchers noticed black powder on the right glove. Apparently, Ji did open the box with EHF before she bent the lead wire.

Based on the three sets of experiments described above, Fudan researchers concluded that

only the final results of EHF activities in those experiments were observable to ordinary people, and they were similar to the results of our ordinary human motor actions. However, the middle steps of EHF activities were invisible. Why? Fudan researchers attempted to analyze the observed EHF phenomena from the following three aspects.

1. Where do the middle steps of EHF happen?

   Based on the experiments, they cannot happen in our 3D space. Therefore, there might be higher dimensions in our world, and EHF might happen in those higher dimensions which are invisible to ordinary people.

2. What is the mechanism of the middle steps of EHF?

   According to our known physics, there must be some energy exchange for any motion to happen. Therefore, it is reasonable to assume that energy exchange is also involved in psychokinesis. Researchers previously had proposed such energy transfer happened through electromagnetic field or some unknown filed created by EHF. With the new evidence from those experiments, Fudan researchers concluded that there was physical contact between the EHF human subjects and objects they were dealing with. However, those EHF actions, despite being very similar to ordinary motor actions, were invisible to surrounding observers. Thus, researchers at Fudan University proposed that our universe has multiple dimensions. Objects and human beings not only exist in the ordinary 3D space, but also have some parts residing in the higher dimensions. EHF could be a process in which EHF human subjects act on the higher dimension part of an object with the higher dimension part of their hands.

3. What is the bridge between 3D space and higher dimensions?

   Since the result of EHF can be observed in our ordinary 3D space, there should be some sort of bridge between the higher dimensions and ordinary 3D space, so that the result of EHF in higher dimension can be sent back and manifest in 3D space. Researchers at Fudan University suspected that the bridge is the thoughts of EHF human subjects.

If the human subject with EHF had indeed touched the pen, paper, and lead wire, is it possible to measure the force exerted by their hands? Naturally, that was what researchers in Fudan University tried to find out in their next paper, *The Study of Force in EHF Writing*. They tried to measure the force in EHF experiments with mechanic balance, thermobalance, and piezoelectric balance. Yet those apparatuses failed to register any force exerted through EHF by those human subjects. Thus, researchers believe EHF force is an “insubstantial force.”

Here is the setup for the first experiment using mechanic balance. A box with a piece of white paper inside was set on the left side of the balance. The right side was weights placed to balance the left side. A black pen was put on the table beside the balance. The

human subject, Ji, was asked to write on the paper using her EHF. Ji tried nine times and three trials were successful, each of which took from 15 to 25 minutes. The writing on the paper matched the color of the pen. Out of those three successes, one writing was a dot and the other two were Chinese characters written clearly. However, the balance indicator did not move at all during the entire course of the experiment. It showed that the box and the piece of paper inside did not receive any measurable external force.

A thermobalance was used in the second experiment. A piece of white tape was stick on one side of the thermobalance. The subject, Ji, was asked to write on the white tape with her EHF. Her EHF writing was successfully performed. However, there was no detectable force in the process.

In the third experiment, a piece of white paper was glued onto a piece of piezoelectric crystal. Four human subjects were asked to write on the paper. Once again, EHF writing was successful, and the piezoelectric crystal did not generate any electric signal during the process.

Based on this set of three experiments, Fudan researchers concluded that there was no measurable force in the EHF writing. The result of the writing was not done through any physical force. Instead, they hypothesized that it was done through merging the matter-waves of pen and paper. Any macro object, such as pen and paper, also has the wave-particle duality. Fudan researchers believe that EHF human subjects can send out their "thought-wave" to resonate with those macro objects and make their matter-waves to reach a higher energy level. For instance, in the EHF writing experiments, the pen's matter-wave was greatly increased to the point that it can go beyond the barrier of 3D space and act on the paper. That is how EHF human subjects can write in an invisible manner without exerting any measurable force on the piece of paper.

Fudan researchers' hypothesis matches well with the reports from EHF human subjects. According to Ji, in order to perform EHF writing, she would first focus on the pen. Once the pen appeared on the screen in her mind, she would then visualize the paper. Finally, there needs to be a flash of action in her mind, in which the pen wrote on the paper. If that flash happened, the entire EHF writing process would end successfully. Sometimes, she would bring the paper onto the screen first, and then the pen. Finally, the flash happened, and the trials typically would succeed. Thus, Fudan researchers conjectured that Ji entered an excited state when she was focusing on the pen. Her excited state would have the same wavelength with the pen's matter-wave, so that the pen could appear on her mind screen. The same process was needed to bring the piece of paper onto her screen. The last flash might be an even higher excited state for the matter-waves of both pen and paper to interact and generate the result of EHF writing. Since the entire process was carried out in the wave form, there was no measurable force.

Fudan researchers' theory sounds compelling. However, I think the dream-like-world theory offers more explanatory power than their theory. Here are the reasons.

1. Fudan researchers' theory cannot account for the difference in EHF process

when EHF human subjects were given different instructions, while dream-like-world theory can explain the difference easily.

In the last paper on Fudan's book, *Experimental Research on EHF – Review and Explore*, authors mentioned big differences in the video recordings of EHF process among different research groups. As EHF study advances, researchers started to video tape the EHF process. Professor Lin, ShuHuang's team at Capital Normal University used low light video camera to record what happened to the samples in a sealed box. In the video clip, researchers saw that matchsticks got bent and cards stood up by themselves. It was as if an invisible hand was acting upon them. In contrast, researchers at Fudan University also recorded their EHF human subjects performing similar tasks. On their video recordings, images of EHF subjects' hands were clearly visible performing the EHF tasks inside of the sealed box, although at the same time their hands were seen laying on the table motionlessly by researchers in the room.

Why is there such a major difference between the two video recordings? The key lies in the instructions EHF human subjects received. In the case of Capital Normal University, EHF human subjects were asked to simply break the matchstick and hold card vertically. In the experiment conducted by Fudan group, EHF human subjects were specifically asked to perform the tasks as if they were using their own hands to do it. The subtle difference in the instructions resulted in very different video footages. If the mechanisms behind those two experiments were as Fudan team hypothesized – the matter-wave of samples was manipulated by EHF human subjects when they entered the excited states – the video tapes of those two experiments would have similar images. However, that was not the case. This difference strongly indicates that the EHF human subjects can apply their operators differently, thereby generate different physical results when they were given different instructions. Therefore, the dream-like-world theory would be a better explanation than the explanation proposed by Fudan researchers.

2. The "dizzy effect" observed in EHF experiments is very difficult for Fudan researchers to explain. In contrast, the "dizzy effect" is a direct result from the change of operator in the dream-like-world theory.

   A "dizzy effect" is often reported by EHF researchers during EHF experiments. At the exact moment when psychokinesis phenomenon happened, such as a lead wire was bent, the observers in the room often felt a moment of dizziness and could not see clearly what was happening, even though they were all staring at the lead wire intensively. When they could see clearly again, the psychokinesis tasks were already completed. This effect makes psychokinesis even more mysterious.

   This moment of dizziness felt by surrounding observers is very difficult to

explain. Researchers at Fudan University hypothesized that EHF human subject and observers have mutual constraints over each other because their thoughts can interfere with each other. In addition, human beings have the tendency of keeping secret. Fudan researchers hypothesize that EHF human subjects do not want surrounding observers to see the secret of their EHF. So, when they enter the EHF state, they unconsciously send interference to observers' visual cortexes and cause them to malfunction. That is why the observers felt dizzy and did not catch the crucial moment of EHF. It sounds like a plausible explanation for this weird phenomenon.

However, the dream-like-world theory offers a much better explanation. What the EHF human subjects did during EHF demonstration was to change their operators so that the wave function of the universe would pseudo-collapse to the result they want, for instance, the lead wire being bent without any physical contact. However, at the same time, surrounding observers' operators are still functioning in their usual way, i.e., try to produce the normal result, which is that the lead wire cannot be bent if no one touches it. Therefore, at the exact moment when EHF phenomenon happened, the EHF human subjects were changing observers' operators in addition to their own operators, so that all operators would achieve the same outcome of the experiment – a bent lead wire without anyone touching it. The dizziness felt by observers is the transition from the operator generating normal phenomenon to the one generating paranormal phenomenon. In another word, under the influence of EHF human subjects, the surrounding observers' operators had a "glitch," and the manifestation of their universes changed accordingly.

3. The dream-like-world theory provides a clear explanation of "observers' interference," while Fudan researchers' theory could not account for it.

   By "observers' interference," I here refer to the fact that observers' minds have a direct impact on the outcome of EHF experiments. If Fudan researchers' hypothesis were true, EHF human subject should always be able to perform EHF tasks as long as they were able to excite physical objects into their wave form. Such a hypothesis does not take into consideration the influence or interference from observers at the scene. Therefore, the success of the experiment depends solely on EHF human subject. However, based on numerous experiments in EHF field, we know that it is not the case. It is possible to block the EHF if observers in the room focus their minds to prevent it from happening.

   Let me provide some examples to illustrate the "observers' interference." General Zhang, ZhenHuan, shared the following story in his speech at an EHF conference in July 1993. General Zhang mentioned that Mr. Zhang, BaoSheng, a highly skilled EHF human subject, can erase whatever people write on paper with a wipe of his hand. It was not done with an eraser or correction fluid. Even if one writes with a ball pen or fountain pen, Zhang,

BaoSheng could wipe it so clean that the sheet of paper looks brand new. After his handwriting being wiped clean, General Zhang asked Zhang, BaoSheng to get the writing back. With a wipe of hand, Zhang, BaoSheng made the writing reappear. General Zhang was amazed when he was first exposed to this EHF skill. Later, he was told that he could impose a thought while he was writing the text to prevent Zhang, BaoSheng from wiping it clean. General Zhang subsequently did a test. While he was writing a Chinese character, he focused his mind saying to himself, "This character I am writing right now shall not be wiped away by Zhang, BaoSheng." The method worked. Zhang, BaoSheng could not erase the character written in this way. This experiment shows how a person without EHF can easily prevent EHF phenomenon from happening.

General Zhang mentioned another example during the same speech. One time when he was visiting an institution, Pan, ShuiYin asked him to bring Mr. Zhang, BaoSheng to perform an EHF demonstration. The demonstration turned out to be a disaster. Mr. Zhang tried extremely hard without any success. The demonstration started at 9am, and he did not get any result until 5:30pm. They had only a lunch break during the entire day. There were many high rank officers at the meeting. The EHF researchers in the room were under huge pressure and they did not know why Mr. Zhang had so much trouble demonstrating his EHF skills on that day. Under normal circumstances, Mr. Zhang would have finished many EHF demos in such a long day. Later the researchers found out that two young men at the meeting were deliberately focusing their minds to interfere the performance of Mr. Zhang, BaoSheng and they successfully jeopardized his demo.

Those two examples mentioned above clearly show that ordinary people can easily interfere EHF experiments with their opposing minds. The key for ordinary people to witness EHF is that they are willing to let their operators be changed so that EHF effect can be realized. Otherwise, it is very difficult to pull out any EHF effect. The "observers' interference" effect shown in EHF demonstration reflects the profound interplay of everyone's will, operator, and corresponding manifestation of the world. The impact of observers' mind on EHF experiments strongly supports the dream-like-world theory over Fudan researchers' theory of excited matter-wave.

4. Fudan researchers' theory emphasizes thoughts of EHF human objects, while the dream-like-world theory points to their operators, which match the EHF state better than thoughts.

   Fudan group and many other researchers in the field all emphasize the importance of consciousness or thoughts. They believe that thoughts or thought-waves are making those EHF effects happen. However, the so called "thought-wave" does not work as they assumed. If EHF were caused by thoughts, then any focused thought generated by EHF human subject should

> have an EHF effect. Apparently, it is not the case. EHF demonstration often went fruitless, no matter how hard EHF human subjects were concentrating on their thoughts. On the contrary, according to EHF subjects' own reports, the most important step for EHF demonstration to succeed is that they must calm down their minds first. They must get rid of their thoughts, concentrate to the extent so that the target object appears on the screen in their minds. Therefore, the key is not to think hard. Instead, it is to not think in the first step. Using the language in the dream-like-world theory, this process of quieting the mind and bringing forth the screen in the mind is to access one's operator. To modify anything in the physical world with EHF, EHF human subjects must eliminate their thoughts first, so that they can go deeper into their minds until they are able to access their operators. Only then can they cast a will to change the operator, thereby causing the world to be materialized accordingly.

For the reasons mentioned above, you can see that the dream-like-world theory is a better explanation for EHF phenomena than Fudan group's theory of "thought-wave" acting on "matter-wave." Because Fudan group had to explain EHF phenomena under the theoretical framework of dialectical materialism, they must hypothesize that those EHF effects were caused by physical means, either through some "invisible field" or some "insubstantial force" generated by "thought-waves" of EHF human subjects. However, such assumptions inevitably will evoke mind over matter effect in one form or another. If the mind exerts its influence through an "EHF radiation field" (the name given in Fudan papers), it would indicate that mind can control an unknown energy field. That is still a case of mind over matter/energy, which is in direct conflict with the prevailing materialism stance in science community. The same reasoning can be applied on "insubstantial force" or "thought-waves." No matter what they are, if they were a physical force or energy generated by EHF human subjects' mind, then they are an evidence of mind over matter. Because psychokinesis phenomenon is mind over matter in its nature, there is simply no way to explain around it under materialism ideology.

Theories based materialism not only cannot explain psychokinesis phenomenon, but also have difficulty in explaining why surrounding observers have such a huge impact on the result of EHF experiments. In comparison, the dream-like-world theory provides a better framework to explain EHF phenomena. Since the world is like a dream to begin with, it is possible to change the content of a dream if one has enough skills. Just like a lucid dreamer can modify his dream world, EHF human subjects can alter their physical worlds too. If a person had the skill described by National Master Qing Liang, he would be able to do much greater deeds than those relatively simple EHF effects described above (if you are religious, think about miracles in your religion.) In addition, the dream-like-world framework explains why observers also have an impact on the outcome. It is because their operators must concur the outcome (that is one of the reasons why faith is so important in all religions. Only those faithful followers will experience the miracles because they are willing to allow their operators to be modified.) As you can see, the dream-like-world theory easily resolve the issues that materialism fails to explain.

Even though people with EHF nowadays are probably far below the skill level of

National Master Qing Liang, they nonetheless possess astonishing and even unbelievable abilities. Many high-level EHF skills have been developed by EHF human subjects and verified by researchers in China during the last several decades, such as using an X-ray vision to diagnose illnesses, reducing the size of tumors or even eliminating them without touching the patients, moving objects to faraway places, taking photos of mysterious information with only negatives (no camera needed) etc. I will introduce several interesting examples of advanced EHF skills below. Current scientific theories simply cannot explain those advanced EHF skills, while the dream-like-world theory does not have any difficulty in explaining them. Therefore, they can be considered as supporting evidences for the dream-like-world theory in addition to psychokinesis.

Mrs. Sun, ChuLin, a highly skilled EHF human subject, has been working with Prof. Shen, JinChuan at University of Geosciences at Beijing for decades. She has developed amazing EHF skills in her long career of EHF research. One of those is to make peanuts, soybeans or other seeds to germinate and grow a couple inches of sprout in an hour or less. Those peanuts can be deep-fried peanuts bought at supermarket or peanuts specifically treated with chemicals to make them infertile. Mrs. Sun has demonstrated this skill for hundreds of times. Prof. Lee, Si-Chen from Taiwan heard about this EHF skill of hers. He then designed and conducted the following experiment.

In 1997, Prof. Lee asked Prof. Guo in the Department of Agriculture at Taiwan University to prepare several hundreds of peanuts for his experiment. Those peanuts were first put inside of a container together with saturated solution of calcium phosphate so that the relative humidity was kept at 95%. Then the whole container was put inside a thermotank with temperature set at 30C. After 30 days, those peanuts were thoroughly dead. A random sample of 100 peanuts were divided into two groups, and then given water and light cycles to help them germinate. None of them sprouted. The germination rate was zero. Therefore, Prof. Guo concluded that this group of peanuts were indeed dead. Prof. Lee then randomly picked 30 peanuts from the group, vacuum sealed them, and brought them to Beijing for his experiment.

At the lab in Beijing, Prof. Lee opened the vacuum sealed bag and randomly select five peanuts. He signed his signature on the skin of those five peanuts, and then asked Mrs. Sun to turn those peanuts back to life and make them germinate. Mrs. Sun saw his signature on peanut skin and responded that I would only turn the inside back to life and leave the skin dead. If I were to turn the skin back to life, your signature would disappear. The experiment started, Mrs. Sun put the peanuts in a small dish and added a little water. She pressed her fingers on the peanuts and concentrated on them. After 37 minutes, one of those five peanuts grew a sprout of 8 cm. It still had the dead skin attached to it, on which was Prof. Lee’s signature.

When being interviewed about how she did it, Mrs. Sun described her procedure as following. First, she needs to quiet down her mind so that she can enter the EHF state, then a screen will appear in front of her forehead. This first step is generally needed for all EHF tasks. Second, after the inner screen is up, she visualizes a peanut so that it appears on her screen. Sometimes, the image is shaky. She needs to concentrate more to

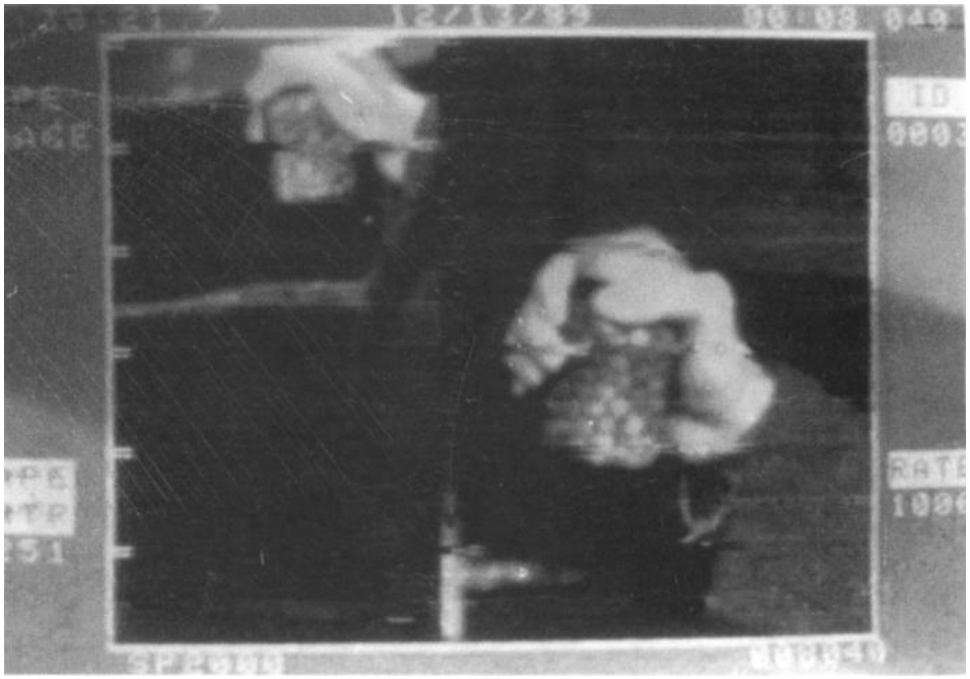
stabilize the image. Third, once the image is clear and stabilized, she sends her intention to the peanut and asks it to turn back to life. After a while, she sees a spark of light, which spins around and changes in color and shape. It sometimes moves fast and sometimes slow, sometimes blinks. This spark of light spins from outer layer of the peanut gradually into the inner core. Typically, the peanut turns back alive after a dozen circles of this type of spin motion. Forth, after the peanut turns back to life, an opposite spiral spin is needed to make the peanut to germinate. She communicates with the peanut which is alive now, and asks it to sprout. After a while, energy or light will spin in a spiral way from the core to the outer layer of the peanut. Wherever it passes, it causes change to areas of peanut on its path. As a result, the peanut germinates and grows a sprout.

Another famous EHF human subject, Mr. Zhang, BaoSheng, has an impressive EHF skill. He can reintegrate a chewed-up business card or a shredded painting on rice paper. The early mentioned general Zhang, ZhenHuan once led a delegation to promote EHF in southern China in the fall of 1986. Zhang, BaoSheng was one of the members in the delegation. During a demonstration at Zhu Hai, a city in Guang Dong province, Zhang, BaoSheng invited Mr. Liang, GuangDa, the Mayor of Zhu Hai, to sign on his business card and then pass it to a random audience at the scene. Zhang, BaoSheng then asked that audience to chew up the business card and spit out the paper pulp in a plate. After receiving the plate, Zhang, BaoSheng put the paper pulp in his hand, rubbed it for several minutes, and then said that there was still a little piece missing. The party secretary of Zhu Hai, Mr. Fang, Bao looked around and finally found a small piece hidden between the teeth of that audience. Using a toothpick, he collected the missing piece and handed to Zhang, BaoSheng. Zhang then kneaded, rubbed the paper pulp, and pressed it between his two hands so that it became a sheet. He then blew onto it gently and put in on the desk. He stared at it and used his hand to push and press it. Gradually the sheet of paper pulp was transformed into a business card right in front of everybody's eyes. And Mayor Liang, GuangDa's signature also reappeared. Mayor Liang picked up the business card and examined his signature. He confirmed that it was his business card with his signature on it. He passed this business card to the audience at the scene. Everyone was amazed.

Another high-level EHF skill is to shake pills out of a sealed bottle, often dubbed as "shake-pill" experiment. Sometimes individually marked glass pellets are used to replace regular pills to ensure the uniqueness of the samples. Mr. Zhang, BaoSheng was probably the first person who pioneered this skill in China, and later many EHF human subjects mastered it. Mr. Song, KongZhi and his colleagues from Division 507 of Commission of Science Technology and Industry for National Defense (COSTIND) conducted a series of shake-pill experiments with Mr. Zhang, BaoSheng from Nov. 1983 to May 1984. Out of a total of 50 experiments, 25 were successful, among which, 17 were videotaped and 6 were recorded with high-speed camera. In one of those experiments, the 400 frames per second high-speed camera caught the following. On the first frame, there was no pill. On second frame, two thirds of a pill appeared at the place close to the bottom of the bottle. On the third frame, the pill was outside, 3 mm away from the bottom of the bottle. The size of pill was 1 cm in diameter. Those photos taken from high-speed camera shows that pills indeed came through the glass bottom of the bottle and the entire process occurred in milliseconds.

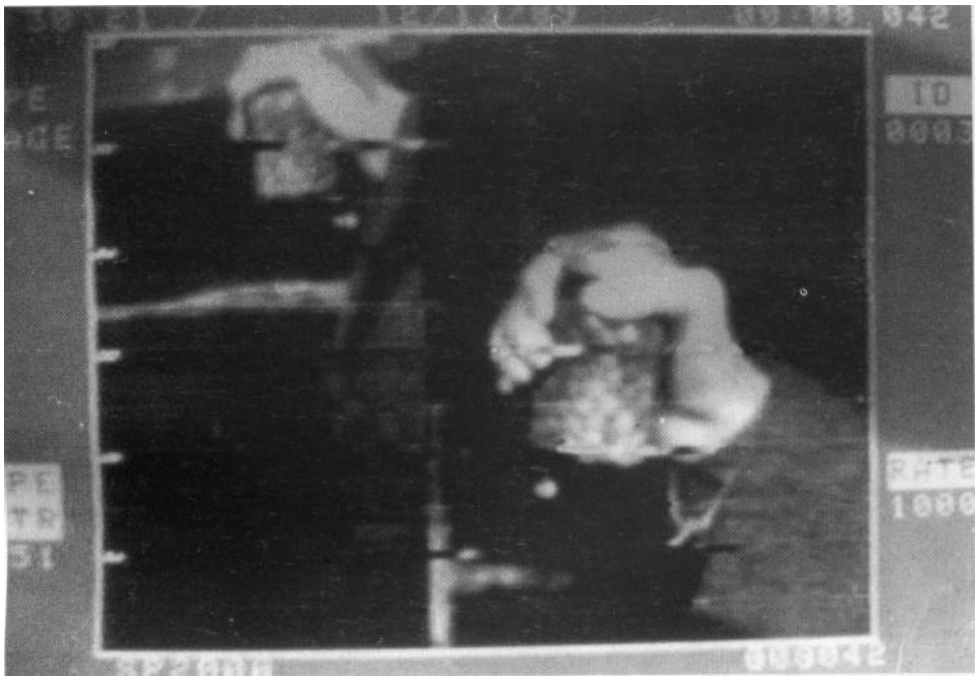
I could not find images from experiments conducted by Mr. Song, KongZhi et al. on the internet. However, I was able to find similar photos from Mr. Shen, Zhang's book *The Divine Confusion: Explore Secret of Exceptional Human Function and Qi Gong*[14] *(1997)*. The photos were taken during an experiment conducted at HuaYin base of the Commission of Science Technology and Industry for National Defense (COSTIND) on Dec. 13th, 1989. The EHF human subject who performed in the experiment was Huang, HongWu. Mr. Shen, Zhang chose the HuaYin base because of the availability of the high-speed cameras and camcorder, which were hard to find in China back then. The experiment setup was to position two high-speed cameras on both left and right side of Mr. Huang. In addition, a high-speed camcorder was set up facing Mr. Huang directly. Since the high-speed cameras and camcorder could shoot only a short period of time before running out of film, Mr. Huang needed to inform the camera crew after he had entered EHF state and was ready to perform. At 8:46:25 am, the cameras and camcorder recorded 30 seconds of images, 4 pills fell out of bottle during that period. At 3:30:14 pm, another set of images for 22 seconds were captured. The camcorder caught 4 pills and two high-speed cameras caught 8 pills. The difference in the number of pills captured was because the high-speed camcorder ran out of film. The two high-speed cameras ran a little longer and were able to capture images of 4 more pills. The following images were taken from high-speed cameras which operated at 1000 frames per second, i.e., one frame per millisecond. Each image down below contains two parts. The left half of image was taken by the high-speed camera on the right side of Mr. Huang. And the right half of the image was taken by the high-speed camera on the left side of Mr. Huang. From those four consecutive frames, we can see that the pills seemed to appear out of thin air, and then grow from a small pill to a normal size pill. Because those photos were taken at every millisecond by the high-speed cameras, it was impossible for Mr. Huang to fake or conduct fraud. Human hands simply cannot move that fast.

[14] English translation of the title of the Chinese book 天惑——特异功能与气功探秘 by 申漳.



Frame 1, Time stamp: 00:08:040 (upper right corner)

Frame 2, Time stamp: 00:08:041 (upper right corner)



Frame 3, Time stamp: 00:08:042 (upper right corner)

Frame 4, Time stamp: 00:08:043 (upper right corner)

Figure 23. Recording of shake-pill experiment
In the front of Shen, Zhang's book *The Divine Confusion: Explore Secret of Exceptional Human Function and Qi Gong*

There are many other types of advanced EHF skills studied by various research groups in China during the boom of Qi Gong and EHF research in China, and many people with

high EHF skills came out and provided demonstrations and services to public. *Explore the Science of Life*[15], a documentary series of 24 episodes on EHF and Qi Gong were produced and released by state owned media from 1993 to 1994. In that series, director Ke, YunLu faithfully recorded the demos and experiments of a dozen EHF human subjects and Qi Gong masters, both their successes and failures.

In episode 5 and 6 of the documentary, Qi Gong master, Mr. Zhou, DeRong, demonstrated his skill of pulling out patients' teeth with just a slap on their heads. After the slap, he asked patients to cough out their teeth. The teeth were indeed spit out by the patients. He did many such demos at different places. In the episode, some famous movie stars and singers tried out his EHF skill and it worked like a miracle. Please note that China was very underdeveloped back then. Even movie stars and pop singers did not have good teeth and were afraid of the pain and hassle at dental hospitals. After having their teeth pulled out without any pain, those stars happily expressed their gratitude and amazement to Mr. Zhou in front of camera. After many successful demos, the director asked Mr. Zhou to run a demo at a dental hospital even though he was reluctant because he was deeply worried about the opposing field of Qi at a hospital setting. Upon their arrival, everyone felt dentists' distrust and hostility toward Mr. Zhou. The field of Qi was indeed very negative. The demo was a disaster. This case further proved the existence of "observers' interference" in EHF demos.

The EHF experiments and demonstrations mentioned above strongly support the dream-like-theory. According to the dream-like-world theory, if we want to witness EHF effects, which is a materialization against the usual pseudo-collapse of our operators, we must be willing to mentally comply with the possible EHF effect. If we insist on the result that we are accustomed to see, i.e., the normal phenomena, the EHF demo is destined to be a failure despite the best effort of EHF human subjects or Qi Gong masters. Unfortunately, it is humans' tendency to fight for our believes instead of being open to possible new experience. We really need to overcome this tendency if we want to explore the deep secret of our world and ourselves.

13.4 Ready for a Paradigm Change?

In this long chapter, I have listed numerous paranormal phenomena ranging from powerful skills documented in ancient Chinese history to contemporary scientific studies on EHF. The prevailing scientific theories cannot explain even the most basic EHF skill of finger-vision, not to mention the more advanced skills, such as psychokinesis, reviving dead seeds and germinating them, making chewed-up business card reappear intact, shaking pills out of a sealed bottle, etc. All those paranormal phenomena pose a serious challenge to the current materialism paradigm which dominates the scientific community. When facing those "anomaly" data of EHF, what should we do about them? Do we choose to act like those hardline materialists who claim that all the evidences from EHF research are either fraud or misled by charlatans with their magic tricks? Or do we carefully evaluate and listen to the data and are willing to explore the new frontier of

[15] English translation of the title of the Chinese documentary series 生命科学探索 directed and hosted by 柯云路.

science? Do we dare to discard our materialism assumption in the face of solid empirical findings on EHF?

It is obvious that we should let data speak instead of debunking valid data for the sake of maintaining a materialism worldview. That is the appropriate way of conducting scientific research. However, the issue is subtler than that. Because of the "observers' interference," the results of EHF experiments are often shaped by the stubborn materialists. For the EHF demos they have been to, they either felt that they did not see clearly when EHF effect occurred due to the "dizzy effect," or they had such a strong concentration to oppose the EHF that the demo turned out to be a failure. Because of such experience, they are even more convinced that EHF is fake, "See, when I pay close attention to the demo, it never works!" Due to their materialism stance, they have never thought the possibility that their mind could have a nullifying effect on paranormal phenomenon which might occur if they did not fiercely oppose it. Because of their opposing mind, their versions of world would indeed manifest in accordance with their materialism stance. And such experience will further strengthen their belief that their materialism approach is the only scientific approach and EHF researchers are promoting pseudoscience.

Since materialism is so dominant in scientific community nowadays, it becomes the only accepted way of scientific research. Whoever dare to challenge it will very likely be rejected, ridiculed, or at least marginalized by their colleagues. This is a suffocating atmosphere which should be changed. The field of science should not be dominated by only one way of thinking. Instead, alternative approaches should be allowed and discussed openly. Looking back at the history of science, many major scientific discoveries came from the anomaly data that contradicts the prevailing understanding at the time. Similarly, paranormal phenomena are the anomaly data at present. By studying them, we could usher in a new paradigm of science and progress to the next level of human understanding of the universe and self.

Chapter 14 Ushering in a New Paradigm of Science

The materialism paradigm of science is impeding new discoveries in science because it is limited only to the physical world thereby neglecting or even negating the very existence of the subjective mind. It not only fails to solve the "hard problem of consciousness," but also lacks explanatory power on "the measurement problem," which fundamentally reflects the subtle connection between the subjective mind and physical world. It is ironic that every human's experience of physical world is ultimately a subjective experience, yet we do not even understand our subjective mind with advanced science.

How can we make progress with our science? How can we establish a science of mind? I believe a good starting point is the discipline of parapsychology. Parapsychology studies paranormal phenomena, many of which indicate strong connection or unity of the subjective mind and the objective physical world. For instance, finger-vision is a way that our mind eye observes the physical world directly. Psychokinesis shows the direct control that our mind exerts on physical objects. Precognition indicates our mind's knowledge about future events of our physical world. Once we have confirmed the existence of paranormal phenomena, parapsychology would no longer be labeled as pseudoscience, and therefore studying it would not be conceived as career suicide for researchers. With more manpower and consequently more discoveries in the field, we will usher in a new paradigm of science. We will overcome the one-sided materialism paradigm and embrace the new paradigm which realizes the unity of the subjective and the objective. We will eventually gain a deep understanding of the dream-like nature of our physical world. I believe that the dream-like-world theory, which provides a better explanation for paranormal phenomena, is an ideal candidate to replace the materialism worldview and usher in the new paradigm of science.

14.1 Paranormal Phenomenon Could be Considered Normal at a Different Place or Time

Let's first take a closer look at the paranormal phenomenon. All phenomena can be put into two categories, normal and paranormal. Please note that the distinction between the two is largely based on our understanding of the phenomenon. If we can explain a phenomenon with our current theoretical framework, we would consider such a phenomenon normal; otherwise, paranormal. Since people's worldview changes over time and differs under different culture, the boundary of normal and paranormal often varies across the world and shifts over time.

Some people claim that paranormal phenomenon does not exist because of the lack of evidence, while the hidden reason is probably because it goes against their worldview. Does paranormal phenomenon happen so rarely that there has been hardly any evidence? The answer is no. There are plenty of evidence. In fact, rarity of a phenomenon is far less crucial than its compatibility with our worldview in judging whether it is normal or paranormal. I will compare the rarity of Comet Halley's visit with reincarnation to illustrate this point. Comet Halley visit earth once every 74 to 79 years. You are lucky if you can live long enough to see it twice. Despite its rare occurrence, most Americans consider it to be a normal phenomenon since we understand its periodic motion very

well. It fits our materialism scientific worldview. In comparison, children's memory of their past lives is considered paranormal in the West, even though Prof. Ian Stevenson at University of Virginia had collected thousands of those cases throughout his career. Two hundred of those children even have birthmarks matching the wounds from the past lives that they have memory of. The shape and location of those birthmarks match the wounds shown on autopsy report and/or police report of the previous life which those children remembered. For instance, in his article *Children Who Claim to Remember Previous Lives: Past, Present, and Future Research*, Prof. Jim B. Tucker mentioned an interesting case of "a girl who remembered the life of a man who underwent skull surgery and who had what Stevenson called the most extraordinary birthmark he had ever seen, a 3-cm-wide area of pale, scarlike tissue that extended around her entire head." This remarkable scarlike birthmark matches perfectly with the girl's memory of head surgery in her previous life. More similar cases are recorded in Prof. Ian Stevenson's book *Reincarnation and Biology: A Contribution to the Etiology of Birthmarks and Birth Defects.* As you can see, the phenomenon of children remembering their past lives is not extremely rare. It probably happens hundreds of times more often than Comet Halley's visit. However, many people doubt if those children's memory of their past lives is real, or a hoax created by Prof. Stevenson and other members in his research team at University of Virginia. Their doubt roots from a lack of explanation to this phenomenon in their worldviews instead of rarity of reincarnation or lack of evidence.

Around the world, many cultures take reincarnation for granted in their worldviews. If a child starts talking about his or her past life, it is not considered as baby gibberish in those cultures. Instead, parents tend to believe their child, and they may even help the child contact the family members and relatives from his or her previous life. Reincarnation is considered as a fact by majority of population in India. Almost all Tibetans hold the same view. Current Dalai Lama is believed to be the 14th reincarnation of the original Dalai Lama who lived six hundred years ago in Tibet. Many Tibetan children are recognized as reincarnation of their deceased relatives by family members. Chinese used to be firm believers of reincarnation before being converted to dialectical materialism of communism ideology. However, even after the culture revolution, which was supposed to eliminate all "superstition" inherited from past, there are still plenty of Chinese believing in reincarnation. Nowadays, with more open atmosphere in China, a surge in reported reincarnation cases occurs. For instance, even the state-run TV stations reported that there are more than 100 reincarnation cases in Ping Yang, a small village in Tong Dao Autonomous County at Hunan province, China.[16] The population of Ping Yang is fewer than 8000, mainly Dong ethnics minority (Kam people). Among those reported cases, some are extremely interesting and intriguing.

[16] Li, ChangZhen published his 100 interviews of those Kam people with past life memory in his book "坪陽再生人─中國侗族 100 個轉世投胎案例實訪記錄" in Taiwan in January 2018. Its English translation "100 Reincarnation Cases in Pingyang: Extraordinary True Stories of Kam People Who Recall Past Lives" is available on Amazon. The book not only documented the "common" features of typical reincarnation cases, such as memory of past life, birthmark matching wounds from previous life, etc., but also recorded some rare cases in which people remembered their time between two human lives, living as ghost in the underworld. The details include how they, as ghosts, eat, travel, play, and follow orders from officials in the underworld.

Case 1: A boy who remembers himself being a white pig in his previous life

The boy's last name is Rong, YongYang. When he was about two years old, one day, he was playing in a pavilion in the village. He noticed that an old lady was foraging a certain type of wild plant for pig food, he immediately went to the old woman and shouted out, "do not pick this kind of plant for pig food, it is too spicy!" She was surprised to hear such words from a two-year-old boy. So, she asked, "how do you know this?" He answered, "I was a white pig." The old lady laughed, "a white pig from which family?" "I was a white pig in Rong, Mei's home." The boy answered. Later that day, the old lady told the story to boy's mom, Lu, JuTao. Mrs. Lu realized that her son had an unusual past life.

The boy spoke more details about his past life in bits and pieces from then on. He was one of the white pigs in Rong, Mei's house. Rong, Mei one day called three butchers to his pigsty and talked about his plan. He wanted to have his pigs slaughtered and sold. The white pig heard their conversation and was extremely frightened. As soon as they opened the door of the pigsty, it rushed out to the street and ran up a nearby hill. However, the butchers finally caught it, tied it up, and carried it back to village. When it was going to be slaughtered, one of the butchers joked to it, "look clear! It is Rong, YongYao who slaughters you today, not me!"

When the boy grew up a little, he became a good friend with Rong, YanLi, the daughter of the butcher Rong, YongYao. When being asked who slaughtered him in his previous life, the boy answered, "it is YanLi's dad!" Upon hearing the story, Rong, YongYao went to the boy's home and verified details of that incident. The boy was indeed the white pig slaughtered by him. Realizing that, he swore that he would never slaughter a pig again.

Case 2: Twin sisters whose souls could travel while their physical bodies were lying on the bed unconsciously

The twin sisters are Wu, ShiCai and Wu, ShiHang. Their mom Yang, XianHua had a dream of two girls stalking her right before giving birth to the twins. The twins started talking about their past lives at two years and seven months old. The complete story of the twins is too long to be quoted here. The following is one event of this case mentioned in Li, ChangZhen's book *100 Reincarnation Cases in Pingyang*.

When the twins were less than eight years old, their souls/minds were able to leave their body and fly to various places. Once, ShiCai's brother from previous life was throwing a birthday party for his daughter. The twins initially planned to attend. However, it rained very hard, so only their grandfather went. As soon as their grandpa left, the twins went to bed. They woke up before grandpa returned. Their mom asked them, "has your grandpa left the party?" They answered, "he is on the way back and will arrive soon." They further described the party. Two tables were put together to form a long table and an old lady sat next to their grandpa. Grandpa's cloth got all wet and was sitting next to the indoor fire pit to dry out his cloth. After the grandpa came back, their mom verified each detail of the twins' description. From then on, every family member believed that the

twins indeed could fly to other places while sleeping.

Case 3: A girl whose soul entered her body 90 days after her birth

Wu, LiChun was born in Dec. 1997. According to her mom, Su, YunJuan, she was very different from normal babies after her birth. She could cry, sleep, eat and excrete. However, her eyes were dull, and her face was emotionless. Even when being smiled at, she never smiled back. She had no interaction with her mom until 90 days after her birth. At two years old, she started talking about her past life as Wu, RenKou. On his day of death, Wu, RenKou helped a friend plow his field the whole morning. His friend treated him to a late lunch at 2pm. They were drinking and eating till sunset. While happily drinking, RenKou suddenly dropped dead. That day was 83 days after LiChun was born. Since RenKou died suddenly, there was no coffin built for him. His coffin was not ready even seven days after his death. Since it was a hot summer, his corpse started to grow maggots. His soul decided to jump out of the window and enter the new body (LiChun's body). When LiChun was born, there was a small white spot on her belly. When RenKou's soul entered the body on 90^{th} day, the white spot grew to 2cm in diameter. When being asked later by her mom, LiChun explained that the white spot was a hole in the corpse filled with white maggots in her previous life.

To many western readers, the cases mentioned above are unheard of. However, to the local Dong ethnics minority (Kam people) in Ping Yang, 2~3% of new-born children have memory of past life. Even though it is still a relatively rare phenomenon, reincarnation is definitely not a paranormal phenomenon to local Kam people. After those cases of children's memory of past life were reported on TV and widely spread over the internet, more Chinese accept reincarnation as the best explanation of such a phenomenon. As you can see, reincarnation shifted from being normal to paranormal due to the rise of communism ideology, and now is on its way back to normal again in China.

Reincarnation was considered paranormal by most people in US many decades ago. Nowadays, the number of people believing in reincarnation has grown dramatically and had already reached 20% in US according to a 2005 Gallup poll. Such a shift probably rooted from the research in this field, such as study on children's memory of previous life conducted by Prof. Ian Stevenson. Prof, his student Prof. Jim B. Tucker, and others in the Division of Perceptual Studies (DOPS) at the University of Virginia. Prof. Stevenson's first book in this field is *Twenty Cases Suggestive of Reincarnation* (1966). In the book, he documented 20 cases of children's memory of past life in detail and discussed possible explanations to this phenomenon other than reincarnation, such as group fraud conducted by all witnesses, false memory based on information gained from adults, or ESP, etc. Those alternative explanations may be able to explain some types of cases, but only reincarnation can explain all cases. *The Journal of the American Medical Association* described Stevenson's *Cases of the Reincarnation Type* (1975) as a "painstaking and unemotional" collection of cases that were "difficult to explain on any assumption other than reincarnation." In September 1977, *the Journal of Nervous and Mental Disease* devoted almost an entire issue to Prof. Ian Stevenson's research. Harold Lief, a psychiatrist, regarded Stevenson as a disciplined investigator and made such a claim,

“Either he is making a colossal mistake, or he will be known (I have said as much to him) as ‘the Galileo of the 20th century’.”

When reincarnation is no longer a taboo, more and more parents in US are reporting their children’s memory of past life. One case was aired on *ABC Primetime* hosted by Chris Cuomo on April 15, 2004. It was the case about a boy named James Leininger. He remembered his previous life as James M. Huston Jr., a US pilot shot down by Japanese at Natoma Bay during WWII. The ABC show generated great media attention and James Leininger case was published on many major newspapers worldwide. With more cases of children’s memory of past lives being discovered in US, maybe this phenomenon is on its way to shift from paranormal to normal in US culture.

As you can see from the example of reincarnation, various cultures have very different perspectives on it and those perspectives change over time. Therefore, reincarnation can be considered as paranormal at one time, but normal at another time. It can also be normal at one place, but paranormal at another place. Other phenomena are similar. For instance, Qi Gong is considered as a normal phenomenon by Chinese. Many people practice Qi Gong and benefit from it in China. Some reported to reduce the size of their tumors or even eliminate them with the help from Qi Gong. Others claimed to lower their blood pressures through the practice. Such claims would certainly be viewed as paranormal or coincidence by majority of Americans. From those examples mentioned above, we can see that the differences in worldview, due to either culture difference and individual experience, result in a great variance in the boundary between normal and paranormal phenomenon. Whether a phenomenon is normal or paranormal is not fixed. Instead, the answer depends on when, where, and to whom you ask the question. Therefore, we should not be constrained by the culture we are born in. We would be arrogant to think that our judgement is the best or most scientific. A better approach is to examine all possibilities with an open mind.

14.2 Challenges Faced by Parapsychology

Despite the great public interest in paranormal phenomena and many rigorous studies in parapsychology conducted by outstanding researchers, such as Prof. Ian Stevenson, parapsychology is still labeled as pseudoscience by mainstream science. What is the reason behind it?

In this section we will take a close look at the challenges faced by parapsychology research. In comparison with mainstream science, two unique challenges inhibit any significant progress in parapsychology. Firstly, experiments are often non-repeatable in parapsychology studies. Secondly, it lacks a theoretical framework to explain a wide range of paranormal phenomena which may seem to be completely unrelated. In fact, many parapsychology researchers complain that mainstream scientists dump all the unexplainable into paranormal phenomena. It makes it even harder to develop an overarching theoretical framework to explain them all. Of course, there is always a problem of lack of funding in parapsychology research and disbelief or even attack from scientists who firmly believe in materialism. However, if those two main challenges were

properly addressed, parapsychology would gain a seat in the mainstream science and the funding issue would be resolved too.

Now let's investigate the first challenge faced by parapsychology researchers – the experiments are often non-repeatable in parapsychology studies. Parapsychology studies a wide range of paranormal phenomena, such as ESP (extrasensory perception), psychokinesis (mind over matter ability), precognition (seeing future), out of body experience (OBE) and more. As you can see, those phenomena do not occur very often in our daily life. The relatively rare occurrence of paranormal phenomena is one of the reasons why the experiments in parapsychology research are difficult to repeat. However, that is not the main reason. As mentioned before, children's memory of past life happens more often than the return of Comet Halley, yet it is still considered paranormal by majority of US population. The main reason is that paranormal phenomena often depend on special kinds of human subjects, i.e., those who have psychic skills, such as ESP, psychokinesis, precognition skills, or those children who have memory of past life etc. To make things worse, human subjects cannot successfully demonstrate their psychic skills in each and every experiment. To perform those psychic skills, they need to enter a special state of mind, a focused relaxation, which is difficult to induce. Those who claim that they can perform successfully anytime are most likely to be fraud. In addition, "observers' interference" often plays an important role in the outcome of the experiment especially when the observers are mentally blocking any positive result. All the factors mentioned above make it difficult to repeat parapsychology experiments.

Due to its low repeatability, parapsychology is often questioned and challenged by mainstream scientists, especially those who hold a firm belief in materialism. They tend to claim that parapsychology is pseudoscience, and researchers in this field are conducting fraud. It is understandable for them to take such a stance since replicability is crucial in any scientific research. If an experiment could not be validated by other researchers, the validity of its findings would be greatly undermined. If peers follow the exact procedure laid out by the original published paper, they should be able to obtain the same result as described in the original experiment. That is the basic rule in scientific community. But is it appropriate to apply the universal repeatability in every study? My answer is not necessarily so, especially for experiments on paranormal phenomenon. There is a big hidden assumption in the claim of replicability under merely same physical conditions. We cannot assume that the influence from people at the scene is neglectable. Such an assumption is based on materialism stance which denies any possibility of the mind over matter effect. To achieve replicability, not only the physical conditions should be carefully replicated, but also the conditions of minds should be taken into consideration. After all, parapsychology studies how our mind could impact the physical world. How could we neglect the impact from mind, especially the minds of the experimenter and others at the scene! Therefore, when conducting parapsychology experiments, we should not take the materialism stance by falsely assuming the objective world is completely independent from subjective mind. Instead, we should start from the assumption that there is possible "observers' interference," then design and conduct the experiment accordingly.

Some people might ask, “Numerous experiments have been done on various normal phenomena, and there has not been any problem from the interference of the observers. Those experiments can be carried out in an objective way. Why must we take into consideration of observers’ interference while studying paranormal phenomenon?” The reason lies in the difference between normal and paranormal phenomenon. What is the difference then? As mentioned in the first section of this chapter, the boundary of normal and paranormal phenomenon depends on individual’s worldview, which varies dramatically from different cultures and time periods. The boundary of normal and paranormal phenomenon is not fixed, and it can move back and forth. Under the light of dream-like-world theory, the only fundamental difference between the two is the degree of how our operators are accustomed to them. A normal phenomenon is a result of pseudo-collapse which our operators are very used to generate, so that it feels normal to us. A paranormal phenomenon, as its name indicates, is the result which our operators typically do not produce. Thus, in comparison with normal phenomenon, paranormal phenomenon is a more fragile manifestation of the wave function of the universe and is easily disturbed by observers’ minds.

Only few people in the general population, i.e., EHF masters or psychics, can use their operators to generate paranormal phenomenon on a regular basis. Even skilled EHF masters still cannot guarantee it works every time. For a paranormal phenomenon to happen, they must overcome the resistance in every observer’s operator, so that the wave function can pseudo-collapse in such an extraordinary way that a paranormal phenomenon would appear. If their skill is not strong enough to overcome the resistance from the surrounding observers, the wave function of the universe will pseudo-collapse in an ordinary way, resulting an ordinary phenomenon which everyone is accustomed to see. According to EHF masters, they need to practice alone when they try to learn a new EHF skill. Only after they have mastered it, they can demonstrate it in public. Apparently, practicing in seclusion is to minimize observers’ interference.

If EHF masters can modify their operators and thereby change the physical world, why can’t the rest of us? In fact, we can to a much less degree. The power of ordinary people’s mind is shown in the “sheep goat effect,” a phenomenon which has long been observed in the parapsychology research. In the middle of 20^{th} century, Prof. Gertrude Schmeidler from City University of New York used a questionnaire to evaluate students’ belief about parapsychology. She used term “sheep” to refer to those who believe in parapsychology and “goat” for those who don’t. Then she gave them a test with ESP cards to let them try to guess the cards. ESP cards are a deck of cards printed with one of the five different symbols. So, by pure chance, one will be able to guess it right one out of five times, a 20% correct rate. It turned out that the sheep scored higher than chance and goats scored lower. Even though the differences were small, it is nonetheless statistically significant. This effect has been confirmed by many later studies.

People tend to think that the difference between goat and sheep is superficial. They have different opinions on paranormal phenomenon. They interpret data differently even if they are presented with the same information. The skeptics or "goats" will try to find other explanations even if they did encounter something paranormal, while believers or

"sheep" might interpret an ordinary event as something extraordinary to support their belief. There is some truth to such a claim. However, experiments done by Prof. Gertrude Schmeidler and others indicate that the sheep goat effect is deeper than that. They prove that one's belief or disbelief will affect the likelihood of whether paranormal phenomenon will occur or not. In another word, individual's belief somehow affects the physical world that they experience. For sheep or believers, the physical world manifests with a little higher chance for paranormal phenomenon to happen. And for goats, the disbelievers, the opposite. Why? According to the dream-like-world theory, it is because disbelievers block their operators from generating a paranormal phenomenon, while believers promote their operators to manifest a paranormal phenomenon. However, most people do not have the skill to alter their operator to a significant degree. That is why the result of experiment on sheep goat effect is only statistically significant, yet unnoticeable to an untrained eye.

The "sheep goat effect" reflects the interference on parapsychology experiment from test subjects' own mind. And "observers' interference" indicates the impact from surrounding observers. Once we realize the unavoidable interference from the minds of both the EHF human subjects and the surrounding observers in parapsychology experiments, we can greatly improve replicability of parapsychology studies through the following methods.

1. Try to educate the observers at the scene so that they understand their minds have a direct impact on the experiment result. Persuade them to focus their minds to help the EHF subjects instead of obstructing them. After all, if they fail, there is nothing extraordinary to witness. Why waste everyone's time and energy? On the other hand, if they succeed, everyone can observe a rare occurrence of a paranormal phenomenon. That is a preferred outcome for all participants.

2. Block participation of debunkers whose sole intention is to discredit parapsychology. Since they are definitely not open-minded toward the existence of paranormal phenomenon, it is the best to decline their participance in the experiment. Otherwise, their minds will likely nullify any possible successful result. Because most people harbor doubts about the existence of paranormal phenomenon in the first place, it is already a huge obstacle for EHF subjects to overcome the resistance from those people's operators. If a firm non-believer focuses his attention on EHF subjects to find any trace of fraud, that focused negative attention is enough to stop any paranormal phenomenon from happening. That is why those debunkers often succeed in forcing a negative result of experiments on paranormal phenomenon. Thus, it is crucial to block their participation.

3. Train more people to gain simple EHF abilities. Experiments on a paranormal phenomenon are difficult to repeat because that phenomenon is still considered as paranormal by majority. As mentioned before, paranormal can shift to normal once enough people in a society have experienced it and believe in its existence. Therefore, if researchers could train enough people to gain a basic EHF ability and demonstrate to their family and friends, that will help public accept the

existence of that specific EHF ability. And such acceptance would improve the repeatability of the experiments on that specific EHF ability. With a large pool of human subjects who master that specific EHF ability, researchers can conduct more studies, and thereby make more progress in the field.

Some people might worry about the possibility of fraud when all the onsite observers of parapsychology experiments are supportive or neutral. It is a valid concern and such possibility can be eliminated through good experimental design, such as using unique samples selected through random process. In addition, entire experiment can be recorded for later critique and a footage from a high-speed camera is extremely convincing.

The other huge challenge faced by parapsychology is its lack of theoretical framework. Despite all the difficulties they face, parapsychology researchers nonetheless have conducted numerous case studies and collected large amount of data on various kinds of paranormal phenomena. However, when being asked how those phenomena could happen and how they are linked, researchers often fail to provide an overarching theoretical framework to explain the large variety of paranormal phenomena, not to mention how the framework will fit into our existing scientific understanding. The seemingly incompatibility between parapsychology theory and scientific theory poses a great threat on credibility of parapsychology. The lack of convincing theoretical framework and practical application do not help either. To resolve this challenge, I will propose in next section that the dream-like-world theory can explain both normal and paranormal phenomena, therefore it can help address the tension between established scientific theory and paranormal phenomena, and provide an overarching theoretical framework for everything that living beings experience, both normal and paranormal.

14.3 The Dream-like-world Theory Provides a Framework for Explaining Both Normal and Paranormal Phenomena

Prevailing thinking nowadays makes a clear distinction between the normal and paranormal phenomena. However, that kind of thinking is limited because it does not look beyond the culture and time. If we look across different cultures and different time periods, we can see that normal and paranormal are man-made distinction and they have no inherent difference. Some parapsychologists complain that whatever unexplainable phenomena under current scientific paradigm are dumped into the category of paranormal phenomena. Therefore, parapsychologists face a great variety of unusual phenomena which they must come up with an explanation. It makes it even more difficult to generate an all-encompassing theory framework which can sufficiently explain this large pool of paranormal phenomena, ranging from ESP, psychokinesis, pre-cognition, reincarnation, OBE (out of body experience), NDE (near death experience), to medium (communicate with dead) etc. Not to mention that the candidate of parapsychology theory framework must be compatible with prevailing scientific paradigm which explains the normal phenomena extremely well. No wonder there still does not exist such a theoretical framework for all paranormal phenomena.

The dream-like-world theory does not make distinction between the normal and

paranormal. Both types of phenomena are manifestation from the pseudo-collapses of the wave function of the universe. The difference between the two lies in the tendency of which way the operator makes the physical world materialize. The normal phenomena are results which our operators tend to generate, and the paranormal ones are those our operators rarely generate. However, there is no inherent difference between the two. If one could master his operator, he would be able to make the paranormal become normal, especially when he is not disturbed by others. To make paranormal phenomena manifest to other people, he must adjust others' operators too, which sometimes is very difficult to do. To achieve higher success rate to witness paranormal phenomena, others should be willing to accept the possible paranormal outcome of their own operators. As the research on children's memory of past life has shown us, those cultures that are more tolerate or supportive to the concept of reincarnation have more of such cases being discovered. On the other hand, the cultures that strongly oppose reincarnation have fewer cases. The different rates of occurrence reflect the difference in people's operators from those cultures.

As we can see, the dream-like-world theory allows the dynamic interactions between the subjective and the objective to play out because it views both as two sides of one unity. Therefore, it is more flexible and can account for both normal and paranormal phenomena. It can encompass all the scientific theories and shed new light on unsolved issues in science, such as the measurement problem and the hard problem of consciousness. In comparison, current scientific framework tilts one-sidedly toward the objective side and completely neglects the subjective side. Even when the subjective is studied under science, it was conducted under the assumption that mind is a byproduct of the brain. Such a materialism stance will certainly rule out any possible investigation on the interaction between the mind and the physical world. Thus, it is bound to throw away any data of paranormal phenomenon that defies materialism stance.

Before the rise of science and materialism worldview, paranormal phenomena were more prevailing, and some of them were even considered normal. Our ancestors have documented many paranormal events which we now consider as merely legend, superstition, or inaccurate records. Under the light of the dream-like-world theory, those historical records could very possibly be true. We would be arrogant and narrow-minded if we were to believe that all the paranormal events documented by our ancestors were either superstition or lies. How could we claim that those events did not happen simply because they are incompatible with our current worldview? If numerous ancient records from different cultures contradict our worldview, we should reflect upon our worldview instead of simply throwing those records into trash can. Current scientific framework has trouble explaining the paranormal records in history because of its underlying materialism stance. Based on the framework of dream-like-world theory, the contradiction between ancient records of paranormal phenomena and materialism worldview of our mainstream science reflects the change of our operators in human history. The operators of our ancestors allowed those paranormal events to manifest, thus they were able to witness such events and then recorded them accordingly. In comparison, the operators of people in the West nowadays are more aligned to materialism science so that those paranormal events barely occur. However, there are still

plenty of reports on paranormal phenomena in other cultures nowadays, such as in Asia and African. Apparently, the operators of people in those places are less rigid compared to those in the West. Such a difference in occurrence of paranormal phenomena around the globe further indicates the dynamics between the subjective and the objective, and shows the difference of operators among different groups of people.

In the western civilization, a grand change of operators started from the invention of scientific method, which emphasizes the repeatability of the scientific experiments and rigorous math behind the scientific theories. By emphasizing the repeatability and rigorous thinking, scientific method shaped our operators to become more rigid and homogenous. The result is amazing and at the same time devastating. It is amazing because any technology or device invented by one person could be universally applied to everyone else because of the emphasis on repeatability. And this grand shift toward uniformity of operators in turn makes the scientific theories become almost universally true. On the other hand, this grand shift of operators also gave rise to the dominance of the materialism worldview, which is devastating to human spirit. It suppresses the subjective side and make it less possible for humans to develop psychic abilities. The worst impact is the separation of the subjective and the objective. Emphasizing only the objective side causes human to become more and more materialized, and alienized from their spiritual core. Compared to ancients, we have abundant material possession. However, the unhappiness, stress, high devoice rate, and lack of purpose in life plague modern life. Those social problems are directly related to the materialism worldview and alienation of our mind.

Now, as modern physics pushes the frontier into Quantum Mechanics, we find that we can no longer ignore the effect of the subjective mind on the objective world. Therefore, it is time for us to rethink our scientific paradigm which swings too much toward physical side. We need to introduce a paradigm change, from division of the subjective and the objective to unification of the two. Such a paradigm shift not only enables us to explore the deepest secret of our mind and physical world, but also helps us resolve the social problems caused by materialism. Once people realize that we are not merely atoms and molecules, instead, those atoms and molecules are results of our operators, we will be able to rise above the materialism and put more effort on our mastery of operators, thereby creating a better world for ourselves and all living beings through unification of mind and matter instead of wasting our life in the endless pursue for material gains.

14.4 Suggestions to Potential Parapsychology Researchers and Public

With the dream-like-world theory as the framework for parapsychology studies, and proposed measures to improve repeatability of EHF experiments, the major challenges in parapsychology can be resolved. We can expect to see more studies being conducted in the field, which will bring more evidence of paranormal phenomena to public and open-minded researchers. Once the amount of evidence reaches the critical mass, we will pass the tipping point and enter a new paradigm change from materialism to the unification of mind and matter, the unification of the subjective and the objective. The dominance of materialism in scientific community will be overthrown by the dream-like-world theory

or other similar approach of unification. I exhort scientists (especially those tenured professors who have the luxury of pioneering the exciting new frontier of human knowledge without worrying about job security) to seriously consider the dream-like-world theory as a viable approach and try to conduct experiments on various EHF effects.

In this section, I will provide several suggestions regarding how to overcome the technical difficulties in EHF research. EHF or parapsychological researchers need to overcome the following four technical difficulties to succeed in their studies. First, parapsychology experiment relies heavily on the EHF human subject, which is rare among general population nowadays. If researchers could not find an EHF human subject or psychic, it would be impossible to conduct any experiments mentioned in previous section. Second, the result is often not guaranteed due to the inconsistent nature of EHF phenomenon. EHF human subjects must enter a special EHF state to perform. It is not easy to enter such an EHF state, especially if they receive a high level of disturbance from observers. Third, there are many fake psychics out there. Even EHF human subject with real skills sometimes choose to fake under pressure because they cannot enter EHF state at that moment. Fourth, there is always the problem of lack of research funding and channels for publication in EHF research due to the academic climate in US and the West in general.

Here are my suggestions on how to address those four obstacles mentioned above.

1. Train children and suitable young adults to gain EHF skills so that more EHF human subjects can be available for parapsychology research.

   Previous parapsychology research in US used mainly two group of individuals as their human subjects. One group is college students, whose EHF performance is only detectable through complicated statistical analysis. For instance, in the sheep goat experiment mentioned earlier, students were asked to guess ESP cards and the percentages of their correct guess were compared with pure chance. The students' performance is only a tiny bit higher (sheep) or lower (goat) than chance. Such a result is not too impressive to general public who typically lack the mathematical understanding to appreciate the statistical significance of the result. The other group is psychics, who can perform so well that the experimental results easily proved the existence of EHF without the need of any statistical analysis.

   Both groups of human subjects have their advantages and disadvantages. College students are easy to recruit and widely available. However, their performance is poor. The problem with psychics is that they are extremely rare and often later be labeled as fraud by mainstream researchers. To resolve this issue of human subjects, I suggest that researchers in the West to learn from Chinse EHF researchers. That is to try to train children and young adults with low education level. Those two types of human subjects have much greater chance to gain EHF skills after a relatively short period of training.

Prof. Lee, Si-Chen once ran a finger-vision training session upon the request of his student, who was a mom and worked at the bay area. Many Chinese and Taiwanese parents are excited to send their children to the EHF training. However, those children are not interested in a training called "finger-vision." Therefore, Prof. Lee had to rename the training session as "the Jedi Camp" and taught the children to use their "force," not their brain. The training was a huge success with 40% children gaining finger-vision skill.

Based on Prof. Lee's success in finger-vision training in bay area, I suspect that researchers may find higher success rate of finger-vision training in US than in China. That is probably because the schooling in US is less damaging to children's EHF potential than schooling in China. Chinese parents emphasize too much on grades and the study load in China is much higher than that in US. Even Chinese children's 20% success rate still provides a large talent pool of EHF human subjects for more advanced development in EHF skills and experiments. Therefore, once a pipeline of training can be set up, a pool of highly skilled EHF human subjects should not be too difficult to recruit and maintain in US.

2. Achieve high repeatability by various means to enhance the possibility of success, such as reducing disturbances from surrounding observers' minds, giving enough time for EHF subjects to enter EHF state, and having more EHF human subjects as backups.

   Regarding the repeatability issue of EHF research, several factors need to be addressed. First, experimenters need to block the possible negative impact from the deniers' minds. The best way is simply not inviting them to the scene. If they want to get involved, one role they can play is to provide suggestions on experimental design so to make the experiment fraudproof. And they can always watch the video tape of the experiments afterwards. If they want to be at the scene, they need to be open minded and do not create the negative field of Qi to disturb the EHF human subjects. Second, without disturbance, EHF human subjects sometimes still have difficulties entering the EHF state, therefore, unable to perform. Experimenters must be patient and supportive. During the shooting of the documentary series *Explore the Science of Life*, the personnel sometimes had to wait for nine hours until the EHF human subject finally could enter EHF state and perform. Another way to resolve this issue is to keep a large pool of EHF human subjects. Therefore, even if some of them cannot enter EHF state at that moment, others might be able to enter it and perform.

3. Eliminate fraud to maintain a good reputation for parapsychology.

   Fraud has plagued EHF or parapsychology research ever since its beginning. There are mainly two possible scenarios in those fraud allegations. First, there are charlatans who falsely claim to have mastered EHF or psychic skills, while the fact is that they are just con artists. They typically rely on magic tricks or psychological tricks to perform their EHF demonstrations. Those people would

not survive any rigorously designed experiment. If the samples are uniquely prepared by experimenters and entire demo is closely monitored, those con artists will have no chance to cheat at all. Second scenario is that the person does have EHF or psychic capabilities, yet he or she was caught faking it for various reasons. It typically happened when the stake was so high that EHF human subjects felt that they must succeed. However, the higher the stress, the less likely EHF subjects can enter EHF state to perform. Stubborn disbelievers were often at the scene to make it impossible for EHF subjects to succeed. So, they choose to fake a result.

How should a researcher prevent fraud from happening in an EHF experiment? There are several measures that researchers can take.

- Do not invite stubborn disbelievers to the scene because their focused minds can easily disturb the possible positive result of EHF experiment. EHF experiments are very sensitive to the observers' interference. The disbelievers can watch the video of experiment later if they are interested. Most of them probably only want to debunk instead of conducting an open-minded investigation.
- Design the experiment well so that there is no room for fraud. Use unique samples or random samples drawn at the scene and record every action of the EHF human subjects with a high-speed camera. Those measures are sufficient to screen out charlatans and convince those open-minded disbelievers.
- Educate EHF human subjects about the norms in scientific community. Since EHF human subjects are typically of lower education level, they do not understand the strict norms in scientific research. They need to be educated that they are allowed to fail no matter how high the stake of the experiment is. On the other hand, they would ruin their career if they were caught cheating just once.

Those measures mentioned above should help researchers avoid any possible fraud or cheating.

4. Be prudent when choosing a career in parapsychology and raise public awareness on paranormal phenomena to gain support in this field.

   Lack of research funding and publication channels can have serious downside for academic career development. This is a major challenge for researchers in US. Therefore, I encourage only tenured professors to pursue EHF research. Assistant professors can get tenure first before risking your career unless you are really fascinated by this research topic and willing to take the risk. New research field is always difficult to start and needs courageous pioneers to think of unthinkable and carry out the seemingly unfeasible research. Once the field is more established, more funding will be available, and new academic journals will appear. The easiest starting point is to train children to gain basic EHF skills, such as finger-vision. Once public witness that many children or even their own children can

> gain such skills, their doubt about EHF or parapsychology will start to dissipate. With public support and interest, more funding and other forms of support would come naturally. Maybe one day, EHF training would be as popular as the piano lesson or soccer camp, every child will give it a try to see if they have the talent in various EHF skills, such as finger-vision, remote viewing, psychokinesis, or precognition etc., or just simply enjoy seeing through their "heavenly eye."

Certainly, there are more obstacles than those four listed above. Anytime a new paradigm replaces the old one, there bound to be conflicts of ideas and heated discussions among different groups. Fortunately, we are lucky to be living in a more open era than Middle Ages. We do not have to worry about trials as Galileo did due to his heliocentric belief. Taking into consideration how much progress would be made if we could unlock the secret behind EHF phenomena, the risk of being labeled as working in "pseudoscience" is well worth taking. Therefore, I would like to call on scientific community in general, and researchers interested in paranormal phenomena in particular, to rethink about your attitude and/or approach toward EHF research or parapsychology study, and to consider the dream-like-world theory as a starting point for your theoretical framework. Your pioneering work may lead to the next revolutionary development in human's understanding of the universe and self.

As for public, I would like to invite you to give a try of the method in Part Two of this book. If you practice it with diligence, you will be able to master your operator, and consequently the world you experience. For those who have young children, please encourage them to try Prof. Lee's training method mentioned early. If your child could read simple text or numbers in a folded piece of paper with only their fingers, you would know for certain that EHF effect or psychic power exists. Some children are born with such skills, training is not even needed for them. All they need to do is to focus on the piece of paper for 20 minutes or less. Text or numbers will appear in their mind. Encourage your children to try and practice, the result might surprise you. The reason that many Chinese researchers are devoted to EHF research despite the unfavorable political climate is because their children had such skills. Thus, they are convinced that EHF effects do exist. If majority of our next generation could have direct experience with EHF during their childhood, they would certainly consider parapsychology as a legitimate branch of science and embrace the unification of the subjective and the objective and discard materialism after they grow up.

Once EHF effects are firmly established and widely accepted by public and mainstream scientists, we can then usher in a paradigm shift from materialism science to a new science. We will evolve from division to oneness, from separation of subjective and objective to unity of the two. Ultimately, we will realize that all humans, all beings, all matters, all energy, space and time, are one unity. And that one unity has the possibility of manifesting in numerous different versions of worlds. We would be omni-living!

Chapter 15 Religion – A Way of Shaping Our Operators?

People often put religion at odds with science. The fight between believers on both sides seems to be never ending. However, science and religion do not have to be mutually exclusive. Science emphasizes more on the objective side and religion often tend to pay more attention on the subjective side. As indicated in the dream-like-world theory, the subjective and the objective are one unity. Therefore, religion and science will come closer or even merge once humans start to realize this unity. In this chapter, I will provide some empirical evidence which may lead to the converge of religion and science, and ultimately the great unification of everything.

After several years into his research on finger-vision, Prof. Lee Si-Chen started to give public speeches on his findings in Taiwan. Public was fascinated by this topic. However, many scientists criticized him for conducting and promoting pseudoscience. More than a dozen of physicists and psychologists challenged him. They wanted to visit his lab and witness his finger-vision experiment under the following condition – the testing samples must be prepared by them, and any negative result will be published online if the experiment fails. Prof. Lee accepted the challenge. On Aug. 26th, 1999, those physicists and psychologists arrived at his lab and were ready to debunk his "pseudoscience research." Prof. Lee arranged his top three EHF human subjects to participate because he knew that EHF experiments could easily fail. There is always a possibility that the EHF human subjects cannot enter EHF state due to stress, personal health, hostile observers, or other unknown reasons. With three EHF human subjects, the chances of getting some positive result would be higher. The physicists and psychologists printed out 100 testing samples and selected random samples at the lab for EHF human subjects to read. After 6 or 7 positive results, they were convinced that it was not fake – finger-vision does exist.

Some of the physicists and psychologists left at noon and the rest stayed for the afternoon session. Little did they know, they were going to witness something beyond scientists' wildest dream. The scientists started to write down some random samples to test the EHF human subjects. One of them was a Buddhist, he wrote down two Chinese characters "佛光," in which the first character means "Buddha" and the second means "light," together they literally mean "Buddha light." After a couple minutes, the EHF human subject successfully recognized the character "光" (light). But she did not report the character "佛" (Buddha). The scientist who wrote this sample said that maybe she could not see this Chinese character "佛" (Buddha) because it is a holy word. Others were not so sure about his hypothesis. Sometimes EHF human subjects do miss characters and that is very normal. Therefore, they tested again with only "佛" (Buddha) written on the sample. To their surprise, EHF human subject reported something she had never seen in previous experiments. Here are details of the record in case you cannot read the fuzzy text on the following table (Figure 24) published by Prof. Lee in 2002.

16:29 start

16:32 something flies over the screen
16:33 flash
16:34 a bright person appears
16:37 bright person looking at me and smile
16:38 whole thing disappear, end

This EHF human subject had already done thousands of finger-vision tests prior to the test on Aug. 26th, 1999. And she had never seen anything like this. The typically finger-vision process is what we have described before. She needs to calm down her mind and enter EHF state. Then a small screen would appear in front of her forehead. This is the so-called "opening the heavenly eye." Typically, the color of text first flashes. A moment later, her heavenly eye would open and close again, and she would see part of the text. This process would repeat until she feels confident that she has seen every part of the text and writes it down on paper. She might miss some part of the text or get it wrong sometimes, but she had never seen anything like what she saw on Aug. 26th, 1999. The time stamps on the table (Figure 24) showed when her heavenly eye opened and corresponding records of images that she saw. At 16:32, she saw something flied over her EHF screen. One minute later, a flash on screen, and next minute, she saw a bright person. Three minutes later, her heavenly eye opened again, she saw the bright person looking at her and smiling. Then the whole thing disappeared.

Date	Samples	Test Results	Process Record
26/8/1999	佛光	光	
	佛		16:29 start 16:32 something flies over the screen 16:33 flash 16:34 a bright person appears 16:37 bright person looking at me and smile 16:38 whole thing disappear, end
	Christ	st	16:42 start 16:44 black "st" 16:46 end

Figure 24. Result of a finger-vision experiment with holy names as samples
http://sclee.ee.ntu.edu.tw/mind/20150427_2/SCLee-2-2%20(5-1).pdf

Every scientist at the scene was astonished. They immediately tried words from other religions. They wrote down "Christ." However, this time nothing happened. The EHF human subject reported "st" written in black ink. She was not able to capture all letters in

that word. So, the result was partially correct. It seems that her finger-vision ability worked normally and treated “Christ” as a regular word.

Later, Prof. Lee tried different words from Christian faith. The table (Figure 25) lists the result. Prof. Lee consulted religion expert for God’s name and he was suggested to try out “Sam.” “Sam,” short for “Samuel” that originates from Hebrew, which means “the name of God” or "God has heard" (שם האלוהים *Shem Alohim*) (שמע אלוהים *Sh’ma Alohim*). The result was astonishing, the same EHF human subject could not see the word “SAM.” Instead, she saw “a little bright” and then “brighter.” When given the word “耶穌,” Chinese translation of “Jesus,” she saw a cross. Same thing happened to the word “耶穌基督,” Chinese translation of “Jesus Christ.” The last row in the table above, אֶהְיֶה אֲשֶׁר אֶהְיֶה, is “I am that I am” in Hebrew Bible. It was what God said to Moses when he asked for God’s name. The EHF human subject could not read Hebrew. Nontheless, she saw a bright screen with a brightness of 20800 Lux. The brightness level was given by the EHF human subject when she was shown the similar brightness to her normal vision in the lab. Prof. Lee conducted many tests and found that Hebrew text tends to generate higher brightness than the corresponding English words.

Samples	Test Results	Process Record
SAM		“a little bright”, “brighter”
耶穌 (Jesus)	†	“the Cross”
耶穌基督 (Jesus Christ)		“the Cross”
אהיה אשר אהיה		16:39 start 16:43 bright screen (20800Lux) 16:45:55 blank 16:46:41 blank

Figure 25. Result of a finger-vision experiment with Christian holy names as samples
http://sclee.ee.ntu.edu.tw/mind/20150427_2/SCLee-2-2%20(5-1).pdf

Tibetan sacred text was also tested with the same EHF human subject. Figure 26 shows the result. The first line is “Mahakala” in Tibet. It is the name of the Dharma protector of Tibetan Buddhism. The EHF human subject saw a bright screen even though she could not read Tibetan. However, once this name was truncated as the sample shown in the

second row of the table, she had no problem seeing it. She copied it down accurately as shown in the table. The third row is “Padmasambhava,” the name of the sage who brought Buddhism from Indian to Tibet in 8th century. His name is also associated with unusual bright screen.

Date	Samples	Test Results	Process Record
5/8/ 2000	(Tibetan)		16:34:20 start 16:36:33 bright screen, color is different from usual 16:38:22 blank 16:39:13 blank
6/8/ 2000			11:12:10 start 11:14:01 black color in small region 11:14:18 “ ” 11:14:40 “ ” 11:15:14 “ ” 11:15:44 “ ” 11:16:07 “ ” 11:16:32 blank 11:16:48 blank
	(Tibetan)		11:18:50 start 11:20:38 bright light flash in a small region 11:21:07 bright light 11:21:45 blank 11:22:04 blank

Figure 26. Result of a finger-vision experiment with holy names in Tibetan Buddhism as samples
http://sclee.ee.ntu.edu.tw/mind/20150427_2/SCLee-2-2%20(5-1).pdf

The following table (Figure 27) reports the result for “Allah” (God) in Arabic. The first two rows show the same text was tested twice in 1999 and 2000. Even though the two experiments were one year apart, the response from the same EHF human subject was consistent. In the experiment in 1999, she reported that “screen appears, do not know what it is?” “unusual, very strange,” “very strange,” and “very strange” in the 12 minute test. In 2000, she reported “very strange,” “very strange,” “blank,” and “blank” in the 7 minutes test. Last row of the table is the result when the word was truncated. She did not have any trouble of copying it down even though she did not know its meaning.

Date	Samples	Test Results	Process Record
23/12/ 1999			15:00:30 start 15:10:00 screen appears don't know what it is? 15:11:00 unusual, very strange 15:11:30 very strange 15:12:00 very strange
25/12/ 2000			10:46:00 start 10:49:20 very strange 10:50:00 very strange 10:51:40 blank 10:52:30 blank 10:53:00 end
1/2/ 2000			22:37:00 start 22:44:00 end

Figure 27. Result of a finger-vision experiment with Muslin holy names as samples http://sclee.ee.ntu.edu.tw/mind/20150427_2/SCLee-2-2%20(5-1).pdf

Among many names of spirits and deities being tested in finger-vision experiments, one name was especially interesting. It is "關公," which means "Lord Guan" in English. His actual name is Guan, Yu and he was a famous general during the Three Kingdoms period (220~280AD). A Chinese novel written in 14th century, *Romance of the Three Kingdoms*, painted Guan Yu as an epitome of loyalty and righteousness. Even though the ficticious description in the novel may not accurately potrait Guan Yu's real life, it nonetheless created an image of the most popular general in east Asian, a red faced general wearing a long beard and embodying the utmost loyality. Guan Yu was deified and worshipped by many people in Hong Kong, Taiwan, and mainland China since as early as 600AD. To researchers' surprise, mysterious phenomenon happened when the EHF human subject was given a piece of paper written with "關公" ("Lord Guan"). She did not see the Chinese characters written on the paper. Instead, she saw light and felt a fierce presence. It seems that more than one thousand years of worship by Asian people has elevated Lord Guan to a deity status even though he had never played any religious role throughout his life.

One EHF human subject's test was not enough to confirm that sacred words in religions definitely cause mysterious visions to all EHF human subjects. Therefore, Prof. Lee tested the other two EHF human subjects who were at the lab on Aug. 26th, 1999. Here are the results. A piece of paper with "佛" (Buddha) written on it was given to the second EHF human subject, Wang. The experiment started at 5:03:00 pm and ended at 5:21:50 pm. Mysterious phenomenon also happened. Wang saw a temple far away and there was

a person standing in front of the temple, a flash, a flash, a temple appeared in a flash. Wang had done 355 experiments in the past three years prior to that day, and she had never seen anything like this before. The third EHF human subject, Chen, was also given the sample with "佛" (Buddha) on it. Chen was relatively new and less skillful compared to the first two EHF human subjects. He had only participated in 120 experiments till Aug. 26th, 1999. His test started at 5:01:55 pm. At 5:02:51 pm, he said the Chinese character is written in black ink and he heard a voice saying "7 strokes" (it means that the Chinese character "佛" has 7 strokes.) He then saw a bold person with Buddhist prayer beads in his hand. He reported in next opening of his heavenly eye, "I saw a bold person wearing a black jacket. On his jacket, there was a '佛' (Buddha) written on it." So, Chen picked up a black pen and wrote down "佛" (Buddha) as the test result. Chen's case was different from previous two female subjects who had higher EHF capability than him. Chen did get the Chinese character "佛" (Buddha) correctly. However, he did not attain it in the usual way, which is to see different parts of a Chinese character flashing on EHF screen and then combine them into one character. Instead, he watched a short video clip and the word was written on the jacket of the bold person in the video clip. Chinese Buddhism monks and nuns must shave their heads bold to symbolize their departure from mundane life. The bold figure in Chen's vision is compatible with the Buddhism tradition in Chinese culture.

Later, Prof. Chen conducted similar experiments with Mrs. Sun, ChuLin at mainland China. Mrs. Sun has much higher level of EHF skills than those three children mentioned above. When given the character of "佛" (Buddha) on a folded and sealed piece of paper, she reported seeing myriads of golden rays. When given two characters of "佛山," literally "Buddha Mountain," she said that she saw a crystal-clear mountain made of glass. She reported that she had never seen anything that beautiful. In comparison, the previously mentioned EHF human subjects at Taiwan could see "山," the character for "mountain," but could not see the Chinese character for Buddha, "佛." They reported seeing bright light to the left of the Chinese character "山" (mountain). Apparently, people with different levels of EHF skills saw different images on their EHF screens. Nonetheless, they all saw some kinds of mysterious phenomena instead of normal images of written texts when the samples were sacred words in various religions.

Prof. Lee has a theory to explain results of his experiments. He believes that those words are web addresses connecting to an "information field" or commonly known as the spiritual world. If the correct web addresses were provided, an EHF human subject could enter corresponding websites. Why didn't the word "Christ" trigger any mysteries phenomenon in the experiment conducted on Aug. 26th, 1999 (refer to Figure 24)? Prof. Lee believes there are two possible reasons. First, Jesus Christ lived long before English became a language. So, his name was not originally written as the English word "Christ." Second, the pronunciation of "Christ" in English may be different from how it was pronounced two thousand years ago. Therefore, it did not generate any unusual response from the EHF human subjects. Regarding the observation that different EHF human subjects responded differently toward the same Chinese word of Buddha (佛), Prof. Lee explains that different subjects possess different levels of EHF skills, which are like

different versions of web browsers. The lowest one is like Internet Explorer (IE) 1.0, and middle one is IE 5.0, and Mrs. Sun with highest EHF skill is like IE11.0. Therefore, a person with higher level of EHF skill can access more vivid content of the corresponding website in the "information field." In conclusion, Prof. Lee and his team believe that their experiments established a scientific foundation for religions and opened a new gateway for investigating the "information field" or spiritual world.

Prof. Lee theorizes the existence of the "information field" or spiritual world, and the possibility of using EHF human subjects as vehicles to enter that world. That is an extremely innovative idea. If more children were trained to gain finger-vision skill, new scientific research could be conducted in this age-old field of religion and spirituality. In his speeches, Prof. Lee reported the results of his experiments on accessing spiritual world. His top EHF human subject was able to visit Christian heaven, the herb gardens of Medicine Master Buddha, etc. Since the EHF human subject did not know what is written on the sample beforehand, her visions of different places in the spiritual world could not be merely hallucination because those visions match the texts on the samples. For instance, she saw a huge cross, the entrance of the heaven, when the Christian holy words were written on the sample. After speaking "hallelujah," she was able to enter the huge cross and saw some radiant figures, which are probably angles. She reported a sense of peace in that realm. When being provided with the sample text of "Medicine Master Buddha / Can I enter?" in Chinese, she saw shiny dots, five in a row. After getting permission, she was able to go inside several of those shiny dots, each of which is a garden of an exotic herb. Those herbs emitted light and she felt very comfortable while laying her eyes upon the herbs. The Medicine Master Buddha's gardens were independently verified by Mrs. Sun, ChuLin from mainland China. As a highly skilled EHF master, Mrs. Sun observed much more detail. There are not only five dots in a row, but also six dots and seven or more dots in a row in the herb gardens of Medicine Master Buddha. There are also many beings collecting herbs in those gardens. In addition, there is a pharmacy in Medicine Master Buddha's place. Such an independent verification proves that the visions are not merely hallucination of EHF human subjects. Therefore, Prof. Lee concluded that EHF subjects were indeed visiting different places in the information field or spiritual world, which is the invisible realm described by various religions.

Prof. Lee's theory is very compelling. I personally think that the dream-like-world theory provides a broader perspective on the entire issue of dichotomy of material world and spiritual world. The spiritual world is not merely accessible through EHF human subjects; rather, it is indeed one unity with physical world. Here are two reasons of why the dream-like-world theory is more favorable.

1. Prof. Lee's theory does not fully explain why the Chinese translation of "Jesus" (耶稣) or "Jesus Christ" (耶稣基督) triggered a mysterious response from EHF human subjects. Christian came to China rather late and the Chinese pronunciation of Jesus's name may not match the original pronunciation of Jesus Christ's name 2000 years ago either. Therefore, if "Jesus Christ" could not trigger a mysterious reaction in the finger-vision experiment, its Chinese translation "耶

穌基督” should not trigger anything unusual either. However, the experiments did register a mysterious response to “耶穌” (Jesus in Chinese) and “耶穌基督” (Jesus Christ in Chinese). Prof. Lee’s theory seemingly fails to explain the data clearly[17].

In contrast, the dream-like-world theory provides a better explanation for this discrepancy. As stated in the dream-like-world theory, each person sees their own world through their own operator. Therefore, it provides the flexibility that can match the results of Prof. Lee’s experiments well. For the girl who saw mysterious light when being presented with “耶穌基督” (“Jesus Christ” in Chinese), but nothing unusual when “Jesus Christ” was written on the samples, it is assumed that her operator made her world manifest in that way. Due to some unknown reason, her operator chose to manifest “耶穌基督” (“Jesus Christ” in Chinese) with special effect of light, but treat the English text “Christ” merely as text. As for other EHF human subjects, such as the other children from Lee’s lab and Mrs. Sun in mainland China, their operators are all different, therefore they each see their own versions of unusual phenomena associated with holy words. Nonetheless, there is one major similarity among their operators. That is, they all saw mysterious light or images when those sacred words of different religions were presented to them as samples for finger-vision experiments. This commonality indicates that religions do shape our operators in some way that mainstream scientists have never thought before.

2. As shown in the case of “Lord Guan,” long period of worship by Asian people can elevate Lord Guan from an ordinary general to a deity. It indicates that human minds have the power to shape that invisible “information field” or spiritual world. Using Prof. Lee’s website analogy, we not only can access those websites of heaven and Buddha land in spiritual world, but also can build websites over there. This further proves that spiritual world and our human world are interconnected and ultimately one.

Based on the two reasons described above, I think Prof. Lee’s website analogy is a good starting point to understand and investigate religion and spiritual world from a scientific perspective. However, it has not fully appreciated our mind’s power in creating the information field or spiritual world, which is especially obvious in the deification of “Lord Guan.” Here I do not mean that spiritual world is created as a hallucination in our mind. Instead, the heaven, Buddha land, and the presence of Lord Guan in EHF vision are all products of pseudo-collapses of the wave function of the universe. In the dream-like-world theory, everything we experience is like a dream, no matter in this physical world seen with ordinary vision, or in the spiritual realm viewed with EHF vision. Both are a result of pseudo-collapses through one’s operator. Therefore, we can say that the

[17] In Prof. Lee’s recent speech, he mentioned that the original pronunciation of Jesus’ name in Aramaic 2000 years ago is something like Ye-Shu-Wa, which is very close to Chinese pronunciation of “耶穌” (Ye Su) and rather different from English pronunciation of “Jesus.” He concludes that is the reason why “耶穌” produced a mysterious reaction in finger-vision experiment, while “Jesus” did not. This could very possible be the reason.

spiritual world is as real as the physical world, and at the same time, as illusory as the physical world.

One may wonder why those EHF human subjects can see lights and bright figures and sometimes can hear voices and laughs while performing finger-vision on religious deities or even deified humans. And why do so many people report miracles or divine intervention? Sometimes prayers do get a response from their favorite deities, even if that deity is a deified general who does not seem to bear any religious significance.

Those two questions are closely related. They are both human's responses toward the name of various deities. Under the light of the dream-like-world theory, the light and sound invoked by sacred names in EHF subjects reflect the accumulated effort which were applied by sincere praying of religious followers for hundreds even thousands of years. Because all beings are ultimately one, our mind are deeply interconnected even though we feel that we are individual life form with separate mind. Due to our connection in mind, the focused effort from worshipers of various deities or deified human affect our operators.

How exactly does the worshipers' effort shape our operators? According to the dream-like-world theory, the wave function of the universe can pseudo-collapse in any possible way. Why we can see only one version of universe is because our operators make it pseudo-collapse in only this way which we are accustomed to. We can call it the propensity of operator, which refers to the tendency of our operators that makes phenomenon world to manifest in a certain way. When our physical world manifests in the way we are accustomed to, we will not be surprised. The propensity of our operator is maintained. However, if something we are not accustomed to happens in our world, we call it a miracle, an anomaly or a paranormal phenomenon. Such a miracle or anomaly indicates an unusual change in our operators, a change against our propensity. For instance, when an EHF subject performs a mind over matter deed in front of you, your operator is modified by the EHF subject. You call it a paranormal phenomenon because it goes against the propensity of your operator and generates an unusual outcome.

The followers of religions typically do not have EHF skills to directly alter others' operators. However, they have changed and are changing the propensity of our operators through their focused attention. When they pray and carry out religious rituals, the sincerer and more concentrated they are, the bigger the effect on the propensity of operators. Such propensity is typically small therefore invisible to ordinary people. Yet it can be detected by EHF human subject while they are in EHF state. That is because EHF state is a state when EHF human subjects try to access and make change to their operators. Therefore, they will see mysterious phenomena when they read sacred words while in EHF state. What they see is the effect created by those religious followers with their sincere and focused minds. Such an effect would become visible to ordinary people if they could concentrate on their minds to a great extent. For instance, when people are in danger and sincerely seek help from their favorite deity, they sometimes get a response from their deity, and a miracle or divine intervention occurs. What happens is that they are so sincere that their minds are extremely focused during their pray. Therefore, they

have entered a state similar to EHF state. Then they can tap into the accumulated effect on the propensity of operators created by followers of the same religion. Therefore, they can modify their own operators to fulfill their wishes. Their world is thus realized according to the change of their operators, and they receive a response of their pray, a divine intervention, or a miracle. That is the reason why sincerity or faith is crucial to all religion. Being sincere or having faith will help one concentrate, and tune in the accumulated effect on propensity of operators built by his or her fellow believers, therefore resulting a higher level of mastery over their operators, and a better chance to get a response from their deity. Not only will devotees of major religions get a response from their deities, the worshippers of Lord Guan, the deified Chinese general, also often receive miraculous responses. There are plenty of records of his "divine intervention" in China even today. His intervention and other deities' intervention are results of people temporarily mastering their operators through a sincere and focused mind.

From dream-like-world theory's perspective, EHF effect and religious miracles are same at the fundamental level. EHF human subjects directly access the operators when they are in the EHF state. By modifying their operators and observers' operators, they can make EHF effect visible to observers and themselves. That is the process of changing propensity of operators in a small group of people. While religious practice has the effect to change propensity of operators within a much larger group. When the effect is observed by people, a miracle happens, such as making blind people see or cripples stand up etc. Even when the effect is not noticeable to ordinary people, it nonetheless adds into the propensity of our operators. And such effect can be felt by EHF human subjects when they are in EHF state. That is why they see light or images when they are presented with sacred texts which have been worshipped by people for thousands of years. Please note that EHF master or Qi Gong master can sometimes make the blind see and cripples stand too. They rely on the patients' faith in them and their access to their operators in EHF states. They modified the patients' operators so that their worlds manifested in a different version, in which the patient's normal vision or ability of walking is regained. Once we realized that we have the potential to master our operators and consequently change the world, it would not be too far-fetched to believe that we would be able to gain the "divine power" of altering our physical world. We can even access the marvelous states mentioned in National Master Qing Liang's ten mysterious doors once we reach that level of mastery.

Chapter 16 Implications on Morality

In this last chapter of Part One, I will talk about the dream-like-world theory's implications on morality from the perspectives of both noumenon level and phenomenon level. Morality is crucial to human being because it guides our thoughts and actions in our everyday life. Morality is also a complicated topic. Everyone has their unique stance in morality. Different cultures, religions, or traditions have their own perspectives on morality. It is extremely hard to find common ground for morality across the entire human race. A good starting point is the golden rule, which states "One should treat others as one would like others to treat oneself." Many religions and ethical traditions endorse this golden rule. Hypothetically speaking, if everyone were to act according to the golden rule, there would be no more discrimination, fight, torture, murder, or war etc. Here I assume that no one wants to be at the receiving end of those destructive human behaviors. Unfortunately, even though many people or even most of human population may agree upon the golden rule, the world is still plagued with tension and confliction. Apparently, greed, hate, cruelty, fear, and other poisonous human emotions can easily override our stance in morality. The lack of power of our moral systems to overcome negative emotions and malicious motivations in human minds is a serious hinderance to human progress.

Let's look at the hidden assumption of all moral systems to understand why they lack strength in front of human's greed, hate, fear etc. In the process of evaluating human interactions and giving guidance to their audiences, all moral systems categorize human actions into moral, immoral, and nonsignificant ones. No matter how different their stances are, all moral systems assume that each person is their own individual, who is a separate entity from the receiving end of their actions. The receiver can be other individuals, animals, plants, environment, or anything else in the universe. Starting from that assumption, those moral systems assign positive or negative moral values associated with various actions that one person could act on others. Typically, altruism behaviors are considered good, while selfish ones bad. Some moral systems put the interest of family members over that of strangers, while other moral systems treat all human beings equally. Despite differences among those moral systems, the separation of self and others is presumed by all of them. Without distinguishing self and others, the human interactions could not be defined from a moral aspect, not to mention putting a positive or negative moral value on each action.

When we realize the fundamental separation of self and others in all moral systems, it is easy to see why they lack strength when facing strong negative emotions and selfish motivations, which arise to serve self-interest or sometimes self-survival. Let's run a thought experiment to see how this competition of self-interest and interest of others plays out under extreme conditions. Assume that you and a colleague are riding horses across the beautiful African savanna. Unfortunately, one horse sprained its ankle and could not run anymore. Your colleague and you must share the only horse left. Burdened by two adults, the horse apparently felt the weight. To make things worse, a group of hungry lions appeared on horizon. Even though the horse galloped as fast as it could, it could not outrun lions due to overload. Soon it is apparent that one of you needs to get off

the horse and die at the mouth of lions so that the other one could survive. Now, you two have a life-or-death decision to make. Do you jump off the horse, do you kick your colleague off the horse, or do you flip a coin with your colleague? What if your colleague loses and still kicks you off the horse? That decision may be extremely difficult for some people, while others probably already carry out his or her karate kick without any hesitation. What if it is not your colleague, but your father, mother, spouse, or your only child sharing the horse with you? How about your life-long rival or enemy? Would you choose differently?

Even though the scenario we just discussed rarely happens in our daily life, it illustrates how our typically moral systems put us under the perspective of "me versus others." Therefore, it is also very easy to understand why our moral systems tend to become powerless when dealing with strong negative emotions which root from protecting ourselves or our self-interest, or even our own life. It is extremely difficult for people to take a loss of self-interest for the sake of benefiting others, especially when one's life is at stake. And people tend to discriminate others according to their distance to self. Family and friends' interest often comes before that of strangers. Our national interest is much more important than that of unknown nations in Africa or middle east, not to mention our rival. Our species' diet and nutrition can override animal's welfare or life. Underneath all those choices, it is the separation of self and others at work. Various moral systems may favor the decisions one way or another, however, they do not address the fundamental issue – the separation of self and others.

Under the dream-like-world framework, however, the separation of self and others is overthrown. All beings are one unity fundamentally. They are all projections from the wave function of the universe. Therefore, the dream-like-world framework has enormous implications on morality. It gets rid of the hidden assumption of duality of the self and others currently existing in all moral systems. Under the dream-like-world framework, morality is not based on one individual's action toward another individual. It is more about one illusory individual in a dream-like-world interacting with another illusory individual, who is fundamentally oneself.

We can think the dream-like-world at two levels. One is at the fundamental level of unity, i.e., at the noumenon level. The ordinary concept of moral values is not applicable at this level. One can say that morality does not exist at this level. The other is at the phenomenon level, i.e., manifestation of all beings and physical world after pseudo-collapse of the wave function of the universe. When we are in this state, we do perceive everyone and everything being different from ourselves. Morality issues arise naturally once we separate ourselves from everything else in the universe. However, that separation is merely an illusion, and ultimately we are one with others. Whoever we think we are doing the right action to is fundamentally done to ourselves. And whoever we think we have done wrong to is done to ourselves as well. Everything we do to others is doing it to ourselves, no matter it is good or bad. Of course, we already know this intuitively. Just as what our grandparents used to tell us, "what goes around comes around." In Asian or eastern religions, this concept is called "karma." The old Chinese saying says, "Good deeds bring good rewards, and evil deeds bring bad retributions. It is

not the case that there is no retribution. It is just that the right time has not come yet." Therefore, before we wake up from this dream-like life, it is wise to do right thing to others who are ourselves in another form. Benefitting others is just benefiting ourselves and harming others is harming ourselves. Even if others harm us, let it go and there is no need to revenge. Instead, consider it as paying back our debt from past lives. If you still harbor a strong feeling toward "injustice," try to channel your energy into your practice of the method in Part Two, which will help you realize the oneness with every being. Then you will have a deeper understanding about morality at the phenomenon level and beyond-morality at the noumenon level.

It is hard to image what people would feel if they realized their oneness with every being. Fortunately, we have an example from EHF research. In previous chapter, I mentioned Mrs. Sun, ChuLin, the highly skillful EHF human subject in mainland China who can bring dead seeds back to life and make them germinate. As you have already known, her procedure is to first quiet down her mind, open the heavenly eye or EHF screen, and then bring the seed onto the screen. Once its image stabilized, she will make it germinate on the screen. And the seed in physical world will germinate accordingly. During this process, Mrs. Sun needs to communicate with it so that it will germinate on the EHF screen. If it refuses to collaborate, the experiment will not succeed. Mrs. Sun published an article with title of *Spiritual Dialogue – Experience of Communication with Plants* on the 9th issue of Journal of *Chinese Qi Gong Science* in 1999. In that article, Mrs. Sun explained in detail what happened next after she brought the image of the seed onto her EHF screen. Here are her own words, in which she shared her experience of turning deep-fried peas back to life.

> To make a deep-fried pea germinate, I need to turn it back alive first. That is to transfer a pea with dead cells back to a fresh pea full of water, and then make it germinate. Prof. Shen asked me to keep the deep-fried skin intact as an evidence to show that the pea was indeed deep-fried, hard and crispy. I accepted his request and started to communicate with the pea. I asked it to germinate without destroying its crispy skin. The inside of the pea started to become soft. During the transition, she [the pea] complained to me, "Ahhh! Why don't you let me transfer my skin? How painful I am without my skin!" However, she kept transforming from outside layer to inner core. During the process, it was as if I heard the sound and felt her struggle trying to break the spatial constrain [from the hardened skin]. Squeak … squeak … It seemed that the pea was cracking its crispy skin. It gradually had more water as the revival process progressed. It was as if I merged with it. I was it and it was me. The plant became part of my body, united into one. Before it was turned back alive, it felt thirsty and I felt the same. After I turned it back alive and saw it became green and fresh again, I also felt very comfortable. It felt like drinking sweet water from a spring after a long draught, very pleasant. Then I asked it to germinate, it did so quickly.

According to Mrs. Sun's description, she apparently felt that the pea became conscious on her EHF screen. Not only did they communicate, but also, she merged with the pea

during the process. She could feel its pain, its thirst, and its pleasure. Its growth felt like her growth. At that moment, were Mrs. Sun and the pea two entities or one unity? Most people will say that they are two. Even Mrs. Sun herself may still consider the pea being different from her. I would like to point out that they are two when they could not feel each other's feelings and sensations, and they are one when they can. It is as if their minds and bodies merged into one.

Now, imagine if Mrs. Sun could enter a super EHF state so that she could feel every being's feeling and sensations in the room, she would be one with all of them. The boundary between her and every being in the room would disappear. At that moment, whatever she does to those beings are essentially done to herself. She would then experience morality at the fundamental level where there is no morality based on separation of self and others, or duality of the subjective and the objective.

If you still remember the ten mysterious doors described by National Master Qing Liang, you would realize that those ten mysterious doors describe this state of unification on the scale of the universe. For instance, the third door says, "One and many merge with each other, without losing their own peculiarities." And the fourth door says, "All things are interdependent, so that one is all and all is one." When the boundary between self and others disappear and yet the particularities of self and other still exist, two people will be like left hand and right hand of the same body. If left hand hurts right hand, the same body feels the pain. If left hand helps right hand, the same body receives the benefit. Thus, the moral and wise choice is always to treat others well, that is ultimately to treat oneself well because others and self are one unity. Even though we have not yet realized the oneness with everything and have not yet reached the state of ten mysterious doors, we can still try our best to treat others as if they were ourselves.

Majority of us cannot yet enter EHF state, we must deal with morality rooted in the illusory separation of self and others at present stage. Even though we may theoretically know and believe that self and others are one unity, we are still driven by our own endless desire for personal gain in our dream-like life, sometimes causing pain and suffering to others in the process. How to avoid such pitfall? A good starting point is to follow the golden rule – treat others as one would like others to treat oneself. Try to put ourselves in others' shoes by seeing from their perspectives and feeling from their hearts. Furthermore, we should aspire to realize the oneness of the entire universe. To do that, we truly need to wake up from this dream-like life. A good method will be introduced in Part Two of this book, please read on.

Part Two

Chapter 1 Understand and Experience "KNOWING without Knowing"

In this latter half of the book, I am going to introduce to you the very method to wake up from this dream-like life. Some of you might have read the preface and jumped directly here. Others may have gone through part or entire discussion in Part One and are ready to explore this method now. Either way, you will find out that it is a completely novel way of using and training your mind. Chances are that you have never heard it before, not to mention trying it out. The method is difficult to practice, but the result of a successful implementation is way beyond your imagination. Even a partial success is still so wondrous that it is well worth the effort.

1.1 Could Our Life Be Like a Dream?

Those who have read Part One probably are somewhat convinced that our life could be like a dream. For those who jumped directly here, I will briefly recap why I claim that our life and our world are dream-like. Let's use the following scene from the movie *The Matrix* to show you this possibility.

The scene is a conversation between Morpheus and Neo in the movie after Neo took the red pill, which will wake him up from the Matrix.

```
      MORPHEUS
      Have you ever had a dream, Neo, that you were so sure was
      real? What if you were unable to wake from that dream? How
      would you know the difference between the dream world and
      the real world?

Neo reaches out to touch the mirror and his fingers disappear
beneath the rippling surface. Quickly, he tries to pull his
fingers out but the mirror stretches in long rubbery strands like
mirrored taffy stuck to his fingertips.

      NEO
      This can't be...

      MORPHEUS
      Be what? Be real?
```

I am asking you the same question. Your life also feels so real, as real as Neo's life in the Matrix. What if it were only a dream? What if you were unable to wake up from this dream which you call life?

The best way to find out definite answers to those questions is to wake up by yourself. Unfortunately, I cannot offer you a red pill as Morpheus did to Neo. Waking up from the Matrix is relatively easy. Neo took a red pill and 15 minutes later he woke up in the real world. By then, he knew without any doubt that Thomas A. Anderson, his avatar in the Matrix, had been living a dream-like life all along. As we all know, things are always

much more difficult in the "real life" than in a movie. Without a magic pill, we will have to work hard to wake up from our dream-like life.

You may ask, "I see the possibility of life being dream-like, but how can I be sure that our life is indeed like a dream so that I am not wasting my time on practicing your method?" That is a valid concern and let me borrow the following scene from movie *Inception* to illustrate how we can reasonably confirm that life is dream-like.

In the early part of the movie, Cobb recruited Ariadne, a student in architecture, and gave her a training session of shared dreaming. Here is the conversation between them.

> COBB
> They say we only use a fraction of our brain's true potential. That's when we're awake. When we're asleep, our mind can do almost anything.
>
> ARIADNE
> Such as?
>
> COBB
> Well, imagine you're designing a building. You consciously create each aspect. But sometimes it feels like it's almost "creating itself," if you know what I mean.
>
> ARIADNE
> Yeah, like I'm discovering it.
>
> COBB
> Genuine inspiration, right? Now, in a dream, our mind continuously does this.

Cobb has drawn a circle made of two arrows.

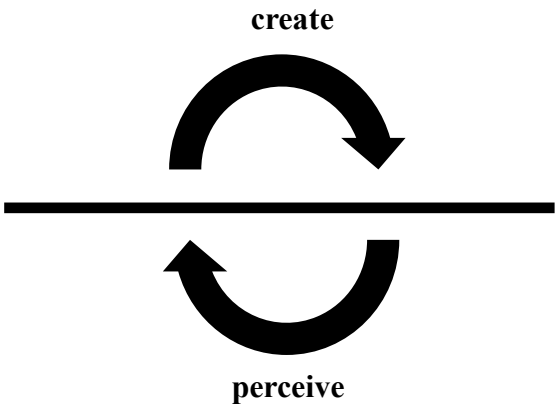


Figure 28. Diagram of "create and perceive" in a dream (labels added) from the movie *Inception*

> COBB
> We create and perceive our world simultaneously, and our mind does this so well that we don't even know it's

happening. That allows us to get right in the middle of that process.

ARIADNE
How?

COBB
By taking over the creative part…

Cobb draws a straight line between the two arrows.

COBB
Now this is where I need you. You create the world of the dream. We bring the subject into that dream, and they fill it with their subconscious.

ARIADNE
How could I ever acquire enough detail to make them think it's reality?

COBB
Well, dreams, they feel real while we're in them, right? It's only when we wake up that we realize something was actually strange.

During this training session, Ariadne started to modify Cobb's dream world dramatically. Her creative architecture designs were shown by stunning visual effects in the movie. She erected a city block into the air and then folded it down onto the next block so that the roofs of buildings in two blocks touch each other. This scene and other similar scenes in the movie *Inception* help us see the possibility of changing the world with our mind in a dream. You might ask, "how could it be possible?" That is because the "physical" world in a dream is not real. It is an illusion created by the dreamer's mind. Therefore, it could be modified by the mind too.

Have you ever tried to change anything with the power of your mind in a dream? If you have, congratulations! You are one of the lucid dreamers. If not, do not worry. Lucid dreaming is a skill that can be learned. A lucid dream is a dream that the dreamer knows he is dreaming. Once he realizes he is in a dream, he knows that the entire world he is experiencing is merely a dream; in other words, it is an illusion created by himself. Therefore, he can use his mind to directly change the dream world. Anything is possible in a dream world once he masters the skill of lucid dreaming. Too lazy to get up from couch in a dream? Easy, he can turn on a light without touching the switch. Bored to walk around as a human? No problem, he can shapeshift into a unicorn. Tired of walking on the ground? Not an issue, he can even fly in the dream. (Please refer to the section about lucid dreaming in Chapter 11 of Part One if you are interested in more details.)

Just as lucid dreamers can modify their dream world, similarly, we should be able to change our world with our mind if our world were indeed dream-like. As unbelievable as it sounds, people with exceptional human function (EHF) can modify the world with their mind (please refer to details in Chapter 13 of Part One). In numerous EHF studies conducted by researchers in both mainland China and Taiwan, human subjects with EHF

skills have performed various mind over matter tasks. For instance, in a study conducted at Fudan University in January of 1986, eleven ordinary factory workers in Shanghai were successfully trained and thereby mastered the skill of bending a lead wire without touching it after merely 18 hours of EHF training. That is nothing compared with "miracles" performed by EHF masters. For example, Zhang, BaoSheng can take a chewed-up business card and press it back to an intact one with the witness's signature still on it. Sun, Chulin can turn a deep-fried pea back to life and make it geminate within half an hour. Those empirical evidences (and many more in Chapter 13 of Part One) strongly support the idea that our world is dream-like.

1.2 Understand Direct-knowing

Once you have realized the possibility of physical world being dream-like, you are ready to take the leap of faith and seriously try out the method of awakening. To understand how this method works, you need to first understand a crucial concept in it – direct-knowing, an ability which everyone uses all the time without even being aware of its existence.

How could direct-knowing be used every day without being noticed? Let us reflect upon how we typically use our mind every day. For instance, you are reading this book and looking at this sentence right now. The very first thing that happens is that your mind takes a snapshot of an area of this page at this exact moment. This is the moment when your subjective mind meets the objective world – you see the page. After taking the snapshot, your mind starts the pattern recognition process, during which you pick out those curved patterns in black ink and recognize them as English letters. Then you put letters together to form words. Finally, you combine words into a sentence and figure out its meaning in your mind. All those steps after taking the snapshot are pattern recognition and information processing, which can be loosely labeled as "thinking" for our purpose here. And the phase of taking snapshots can be designated as "direct-knowing" since it is direct and does not involve thinking. For those who cannot read English, such as a toddler or a non-English speaker, they will think differently in the "thinking" phase compared with English speakers. But the "direct-knowing" phase is the same for everyone. Everyone can take a snapshot of the page. They all see the same curved patterns of each letter. Therefore, direct-knowing is a universal ability in all human beings. In contrast, the ability of reading English is limited to only English speakers. English readers can read this text and understand its meaning, while non-English speakers cannot figure out the meaning of those curved ink patterns.

Now, let's compare those two phases of "direct-knowing" and "thinking" in detail. Even though the "thinking" phase occurs after the "direct-knowing" phase, it happens so fast that we cannot tell it apart from direct-knowing. Yet, there are major differences between the two.

1. We are all born with the ability of "direct-knowing." We can take snapshots of external world through our senses ever since our birth, or even in our moms' wombs. We do not need to learn how to see, smell, or hear etc. We inherently

possess those capabilities. On the other hand, we must learn to master various skills at the level of "thinking." We need to learn the alphabets, vocabulary, pronunciation, grammar, and learn to understand the underlying meaning in a context.

2. "Direct-knowing" happens at the conjunction when the subjective meets the objective. Yet "thinking" takes place only on the subjective side. Our thinking mind performs its information processing internally.
3. During the "thinking" phase, we make mistakes in pattern recognition and/or interpretation. That is why we tend to have various kinds of misperceptions and misconceptions. The optical illusions mentioned in Chapter 6 of Part One show various misperceptions we inherently have. In comparison, "direct-knowing" does not make mistakes. We see what we see. We hear what we hear.[18]

In summary, "direct-knowing" is the knowing without any thinking process. It is the gateway between the subjective and the objective. In order to wake up from this dream-like life, we need to open this gateway of the subjective and the objective – direct-knowing.

1.3 Use Our Attention to Open Direct-knowing

Now, you have understood direct-knowing – the gateway between the subjective and the objective. How do you open it? The key is your attention. By paying constant attention to your direct-knowing, you can open this gateway, thus remove the artificial separation of the subjective and the objective, thereby enter the sacred hall of grand unity. That is the essence of this method of awakening.

During the implementation of the method, it is very easy to get confused at what direct-knowing truly is, not to mention focusing on it. When people try to practice this method, they do not know whether they are focusing on direct-knowing or not since they have never done this before. They tend to think, either think about this method or think about their practice. All those thinking is counterproductive. The major hurdle of applying this method is the thinking mind. Therefore, I would like to illustrate the subtlety of direct-knowing from the following four aspects, so that you know where to focus attention on and whether you are doing it correctly. The first three aspects illustrate the difference between expressible thoughts and direct-knowing. The last one discusses how it differs from inexpressible thoughts. Any form of thinking or feeling, no matter expressible or inexpressible, will take your attention away from direct-knowing, therefore should be avoided.

1. Thinking can be verbalized, while direct-knowing can't.
   Thinking is to analyze information which we have already collected from our senses or retrieved from our memories. Thinking is based on concepts or symbols, therefore any mental activity that can be written down or talked out aloud, i.e.

[18] However, the scope of our direct-knowing is still greatly limited by our sense organs. By successfully implementing the method which I will introduce to you in next two chapters, you could open the true potential of your direct-knowing. It is unimaginable when it is no longer limited by your sense organs.

anything that can be expressed through language or drawings is thinking. In contrast, direct-knowing is indescribable by words or drawings. It happens before the thinking process, so it is inaccessible to our thinking mind. Words or symbols come into existence only later at the thinking stage, and they cannot possibly describe direct-knowing, which precedes thinking. Therefore, whenever you notice words or an internal narrative in your mind, you are not focusing on direct-knowing. Instead, your attention slips onto thinking.

2. Thinking is not always on, while direct-knowing is.
   When you are in a dreamless sleep, your thinking mind shuts off. In comparison, your direct-knowing is at work 24 hours a day. You hardly notice it because you have never paid attention to it. Some people might disagree and argue that they have no idea of the surroundings when they are sleep, therefore, their direct-knowing is not working during sleep. That is not true. If they were truly unaware of surroundings, there would be no way to wake them up. Apparently, it is not the case. Others can always shout out their name or push their body to wake them up. So, they do know the surroundings even during sleep. It is just that they do not process as much information pouring into their senses during sleep as awake, therefore they do not generate as many thoughts about surroundings if any at all. However, sensations can still sneak into their thinking mind while they are dreaming. For instance, if they were sprayed with a little water while dreaming, they would most likely dream about river, rain, or something else related to water. They are aware of the presence of water through direct-knowing, even though they do not consciously know it. In the dream, their thinking mind does not recognize sensory inputs correctly and processes them in a distorted way. Nonetheless, they do sense the presence of water through their direct-knowing.

3. Thinking distinguishes, while direct-knowing doesn't.
   Direct-knowing takes in everything and does not make any distinction. In contrast, thinking process distinguishes objects from background, puts names and labels on the perceived objects, and evokes analytical and/or emotional responses. So, as soon as you start to distinguish things or run pattern recognition, you know that you are not focusing on your direct-knowing. Instead, you are again in the thinking mode.

4. Inexpressible feelings are still not direct-knowing.
   Sometimes, you might experience something in your mind that is inexpressible by words. Even though an ineffable feeling is deeper than the conceptualized thinking, it is still not direct-knowing either. Instead, they are feelings that are known by direct-knowing. In another word, direct-knowing knows, while those ineffable feelings are something to be known. You will encounter such deeper feelings more often once you can successfully calm down your bubbling thoughts. Before that, your mind will likely be swamped by thoughts that you can barely notice any ineffable feeling underneath them. Occasionally, people might notice inexpressible feelings when they just wake up or after hiking in solitude for hours. That is because their wandering thoughts almost completely disappear under those

situations, thus they can peek a little deeper beyond their thinking minds. Noticing those ineffable feelings is an indication of progress toward direct-knowing. However, do not mistake them as direct-knowing. They are merely a deeper layer which you need to penetrate.

To sum it up in a koan format, focusing on direct-knowing is "KNOWING without knowing." The first "KNOWING" is direct-knowing. The second "knowing" refers to the thought of "I know such and such," which is the result from thinking process. Whenever a thought arises, it covers over direct-knowing, and a conceptualized thinking process takes over.

The method of waking up is to constantly focus on direct-knowing without being disturbed by any thought or ineffable feeling. As soon as there are words or thoughts arising in your mind, you should realize that you are not using this method correctly because you have let your attention drift away from direct-knowing onto thoughts – from "KNOWING" to "knowing." That is the biggest challenge of this practice. This method is very hard to implement since we humans typically have a strong tendency of riding our train of thought. We are prone to let our attention slip onto those thoughts all the time and completely ignore the underlying KNOWING. It will take great effort to overcome our tendency of thinking.

1.4 How to be "Without Knowing"

As you can see, calming down your thinking mind is the necessary condition for focusing on direct-knowing. Any form of thinking will prevent you from experiencing direct-knowing. How to reduce and even eliminate thoughts so that you can reach KNOWING without knowing? Different methods are available to deal with different kinds of thoughts. I will roughly categorize thoughts into three levels – disturbing, ordinary, and subtle, and then discuss corresponding methods to reduce thoughts at each level.

1.4.1 Method to Eliminate Disturbing Thoughts

Disturbing thoughts are typically related to strong emotions. They are often so powerful that they fill up one's mind. If something really bothers you so that you are constantly thinking about it, you can always tell yourself, "It is just an event in a dream called life. It is not real. Why should I think about it? I have a very important task to focus on. That is to wake up from this dream-like life." That argument might persuade you to let go of whatever bothers you and focus on your practice.

The "let-go" method is sometimes powerless in dealing with extremely strong emotional thoughts. Therefore, prevention is always a better solution. You should always try to avoid the activities that might stir up your emotions in the first place, such as fighting with other people, harming others, or lying. Those behaviors will come back and bite your consciousness sooner or later. Especially when your mind calms down, the debt from past will emerge. If you have already committed wrongdoings, sincerely apologize to whoever you hurt, repent and turn over a new leaf, so that you can come clean in your

consciousness. People tend to fight or harm others for personal gains. If you realize that whatever to be gained is merely an illusion in a dream-like world, you will eventually stop pursuing them. Fame, money, or power becomes meaningless once you realize their illusory nature.

As mentioned in Chapter 16 of Part One - Implications on Morality, all beings are one unity and interconnected at a fundamental level. Whenever you harm another being, you are actually harming yourself without knowing it consciously because that being you harm is fundamentally you. Your harmful intentions and actions are registered deeply in your mind. They will manifest and materialize in some future time as punishment (think about final judgement if you have faith in Catholic, Christian, or other western religions), retribution (think about karmic retribution if you believe in Buddhism, Hinduism, or other eastern religions), or bad luck (if you are atheist.) Under the dream-like-world theory, the beings who you harmed became extremely angry and upset, therefore they intensely focused their hate toward you. Such intense focused hatred will sink into their operators and will manifest when they encounter you either in this life or a future life. Since you and they are one unity fundamentally, you can feel their hate when you calm down your thinking mind to an extent, and that hatred will hinder your progress of awakening. Therefore, it is better not to harm anyone. If you have already done it, repent and reform sincerely, that will reduce or possibly eliminate the hate toward you.

Disturbing thoughts are not too many in an ordinary life, but their destructive power is overwhelming. As mentioned above, to eliminate any future disturbing thoughts, you can apply the method of prevention. You should not intentionally involve in any activity against your own consciousness. To silence current disturbing thoughts, you can use the method of repentant and reform, through which you can regain a clean consciousness. In addition, the let-go method is very effective, especially for those thoughts rooted from your yarning for fame, money, and power etc.

1.4.2 Method to Eliminate Ordinary Thoughts

Once you have eliminated various sources of disturbing thoughts in your mind, solitary walking, Taiji, and sitting meditation are all good ways to get rid of ordinary thoughts, i.e., thoughts related to the mundane concerns of your day-to-day life. You can choose whichever method most effective to you. You probably need to find a teacher to learn Taiji, and you already know how to walk. So, I will briefly explain how to meditate here.

Meditation is an effective way to calm down your bubbling thoughts. You do not necessarily need a teacher to learn meditation. There are plenty of resources on meditation either in books or online. What I will discuss here are the basics. There are two aspects of meditation, namely body and mind. What is needed to be done on the body side is to facilitate a favorable bodily state so that you can apply your effort on the mind for a prolonged period.

Regarding body, you should sit straight. If you can sit in half lotus or full lotus posture,

that is even better because lotus posture facilitates the flow of energy (Qi[19]) in your body and enables you to sit for hours or even days. If you can't, just sit in a relaxing way. You might need to sit on a thin cushion so that you can keep your lower back straight. The key is to relax and keep your back straight at the same time. Close your eyes to the point that you cannot see anything clearly except a little bit of fuzzy light. If you fully close your eyes, you might doze off easily. If you open your eyes widely, you might get distracted by whatever you see in front of you. Breathe naturally. You should not intentionally hold or prolong your breathing. It will naturally become slow and gentle once your mind calms down.

There are also a couple precautions worth mentioning. If you sit in half or full lotus posture, you need to cover your knees with a blanket so that your knee joints are kept warm. You also do not want to lean against anything while meditating. It is better to keep your back at least several inches away from the wall. After a period of sitting meditation, you can get up and walk for a while to circulate your blood before next round of sitting meditation. Those are the basics on the body side. These measures are taken to enable us to work on our mind for a long period.

Regarding the mind side, many techniques are suitable for beginners, which provide concrete and tangible topics for mind to focus on. One technique is to focus on one's own breathing. You can count your breath from one to ten, and then start counting from one again. Each inhale and exhale count as one breath. Or you can focus on your abdomen's rising and falling as you breathe. Such a practice may seem tedious at the beginning. However, after practicing it for a while, you will notice that your mind is much calmer and the number of your thoughts is greatly reduced. Another technique is to hold a mantra. There are many mantras available, such as "Om mani padme hum." Pick one and stick with it. Recite it silently in your mind over and over, so that your bubbling thoughts are driven away by the mantra. The principle behind those two and other unmentioned techniques is the same. That is to calm down your mind through your focused attention on the meditation topic, however those topics may differ. Through performing such repetitive and tedious task, your mind is kept busy and has less a chance to think about other things, thus your bubbling thoughts will gradually subside. By then, you will have a better chance to stop the "thinking mind" for a while, and thereby have a better chance to experience "direct-knowing."

Practice of meditation takes patience and it feels boring at the beginning. Most people cannot sit very long when they first start. You might feel pain in your legs or on your back, or your mind feels like a boiling pot to the point that you cannot stand it any longer. That is very common. Just keep trying and sit a little longer each day, you will pass this stage quickly. After the initial hurdle, you will become more familiar with meditation and it actually feels wonderful. You will feel the subtle energy in you. When you get out of meditation, you will feel energized and refreshed. Many people enjoy this early stage so much that they do not make further progress. You must remember that those good

[19] According to Chinese traditions, such as Tai Ji, Qi Gong, Chinese medicine etc., Qi is the invisible energy circulating through the meridians in human body. Those who cultivate and master Qi can gain various benefits, ranging from good health, longevity, to spiritual awakening.

feelings are nice, but they are still far away from your goal. You are looking for the means to wake up from the dream-like life. This stage of relaxation is like the preschool in your long journey.

1.4.3 Method to Eliminate Subtle Thoughts

Once you can calm down your mind to the extent so that thoughts are few and far between, you can try to focus on topics subtler than breathing or mantra. Such subtle topics are more difficult to grasp but can give access to deeper level of your mind. If thoughts were like dirt and dust in your mind, breathing method would be like a broom to sweep away big chunks of dirt, while a subtle topic is a brush for fine dusts hidden in the deep corners of your mind.

A popular subtle topic is called Hua Tou in Zen tradition, which is to constantly focus on the question "Who am I?" It can take various forms like "Who is dragging this body around?" or "What is my original face before being born?" etc. The technique of investigating Hua Tou hinges on a key mental state – maintaining a consistent doubt, which I will designate with capital DOUBT. All those questions mentioned above are to trigger such a DOUBT. You are not supposed to think analytically about "Who is dragging this body around." Instead, you should focus on the "who" – a sense of doubt in your mind. Such a focused DOUBT will drive away all your rambling thoughts.

It is hard to explain the Zen practice of Hua Tou with mere words. Let me give you an example to illustrate it. The following is an encounter recorded[20] by Zen Master Jie Chen when he met Master Xu Yun (Hsu Yun), the greatest Zen Master of China in the 20th century.

> At that time [around 1901AD], the senior master Xu Yun was living in a hut at Mountain Zhong Nan. I had the opportunity to discuss Zen with him. I was eloquent and argued fiercely. Master Xu Yun responded to me, "You are forcing your argument. The death god will not let you go off the hook! The karma-revealing mirror[21] is not afraid of your eloquence. You should know that the ancients could focus on their understanding and pay less emphasis on practice because they had few hindrances. Thus, the Six Patriarch [638~713AD] remarked, 'only talks about seeing one's essential nature, never talks about meditative absorption or liberation.' However, people nowadays have so much defilement and so many ideas. Even if they had any understanding [of the ultimate truth], it is merely [superficial knowledge] in their thinking mind.
>
> You should earnestly practice, then one day you might turn the whole thing

[20] The conversation was recorded in Master Jie Chen's book 關中寐語 (Somniloquy in Seclusion).
[21] A mirror reveals one's karma after his or her death. It is supposed to show what a person have done during his entire life, both good and bad. Many people who come back from near death experience have reported a quick review of their entire life in several minutes. Such an experience of life review can be considered as the result of the karma-revealing mirror.

around. It would be like being reborn from death. By then you would gain some genuine benefit. Despite that, you still cannot be your own master when facing death. Even though you may have entered the door of awakening [by then], if your wisdom had not reached the subtlety, your power from the practice still could not overcome your habitual mind. Thus, at the time of death, you would still be dragged down by your karma. Only through meticulous practice, can you cut off the subtle and fine thoughts. You can test your mind to see if it will be moved by any external event. Once you could let go [your mind, as if you let it go] at the edge of a cliff and make further progress above the summit, you would finally be a free person. Such a state is still a rest stop along the way, and there are more to practice later."

I said, "I have studied under Venerable De, Venerable Xiu, Da Lao, and Chi Shan. I believe that I have already reached nonproduction[22] in my practice. What else could there be?"

Master Xu Yun said, "You said that you have reached nonproduction. How is it to reach nonproduction?"

I replied, "If one knew that there was no thought in the mind to begin with, one would know that what is produced is illusorily produced, and what is ended is illusorily ended. At the point when both the produced and ended are all ended, one naturally reaches nonproduction."

Master Xu Yun said, "That is what the ancients said. What is your own nonproduction?"

I could not answer.

Master Xu Yun continued, "You are like those people who memorize others' words. It is merely lip-service-Zen. You can only cheat those blind masters. If you do not believe what I said, let's try a sitting meditation to see your genuine practice."

Master Xu Yun sat there for seven days straight. I had many thoughts boiling in my mind, and defiled seeds in my 8th consciousness[23] started to germinate. At that time, my Zen practice had no strength [to deal with the manifestation of thoughts and defiled seeds in the deep corner of my 8th consciousness]. I could not sit still for even half a day. I was deeply shamed

[22] In Buddhism, nonproduction means that not a single phenomenon is produced. Reaching nonproduction refers to reaching the absolute truth, truly seeing that nothing is produced. In dream-like-world theory's terminology, nonproduction corresponds to the state of seeing the universe at the noumenon level, which is space-less and timeless, beyond senses, and unchanging.

[23] In Buddhism terminology, 8th consciousness is the deepest consciousness which holds all the seeds of karma.

of the fact that the Zen I had been studying was useless.

After he got out of his mental absorption, I asked Master Xu Yun, "When you were in mental absorption, do you know? Or do you not know? If you know, it is still not absorption. If you do not know, that is a withered absorption[24], so-called 'dead water cannot hide dragons'."

Master Xu Yun responded, "You should know that Zen does not take mental absorption as the ultimate achievement. Instead, Zen practice aims at the ultimate understanding of the mind. When the DOUBT arises, mind naturally calms down. Because the DOUBT was continuous, I was not 'not knowing'. Because there was no thought, I was not 'knowing' either. Despite being free of 'knowing' that is based on thoughts, I still would know even if a needle were to fall on the ground. However, due to power of the DOUBT, I would not discern it. Though I did not discern anything, I was not in a withered absorption either because I had continuous DOUBT. Such a state of mind was merely a practice in the middle of the journey, not the destination yet. And those seven days felt like a snap of finger. Once I started to discern, my mental absorption ended. One should apply this DOUBT to the extreme, one day when time is right, this DOUBT will be broken. By then, one truly touches one's own nostril, and that is called 'reaching the nonproduction'."

"O*ne truly touches one's own nostril*" is a saying in Zen and it refers to the great awakening. Before awakening, we live in a dream. So, when we touch our own nostrils, those are not really our nostrils. Only after waking up, we can truly touch our nostrils so to speak. In his question to Master Xu Yun, Master Jie Chen asked "*When you were in mental absorption, do you know? Or do you not know?*" He was asking about the knowing based on the thinking process. If Master Xu Yun still acquired knowing based on thinking, he was not in real mental absorption because he still had thoughts. If Master Xu Yun did not know, he would be like a rock without the ability of knowing. That is called a withered absorption. Master Xu Yun's answer was perfect. It is exactly "KNOWING without knowing." Even when a needle drops on the ground, Master Xu Yun "KNOWs" it. However, he will not discern it, that is "without knowing." Thus, he did exactly "KNOWING without knowing" during those seven days. As you can see, Master Xu Yun was telling Master Jie Xian how to focus on direct-knowing with the help of the DOUBT. If you could do that, you would be able to sit for seven days straight and it would feel like a second to you. On the other hand, if you were like Master Jie Xian, having a lot of rambling thoughts arising in your mind, you would not be able to sit in stillness for even half a day.

In this section, we discussed various methods to deal with random thoughts in your mind. It takes determination and enduring practice to reduce their presence in your mind. Once you can eliminate most random thoughts in your mind, you are ready to experience

[24] A withered absorption refers to the kind of mental absorption in which the meditator loses all his awareness of the surroundings.

“KNOWING without knowing.”

1.5 Experience “HEARING without hearing”

In previous section, we discussed how to be “without knowing.” So, how to reach “KNOWING without knowing,” i.e., focusing on direct-knowing? To answer that question, I will pick one sense organ to illustrate the method. Direct-knowing exists in every sense. It is the ability of seeing through eyes. It is also the ability of hearing through ears. The same to nose, tongue and tactile sense. Even though the things being known are different to each sense, direct-knowing in every sense is of the same characteristic. That is the ability to know.

I am going to describe how to work on direct-knowing in ears. The same method can be applied to direct-knowing in eyes, tongue, or any other senses. Ear is chosen here because direct-knowing in ears is sharper than other senses of human beings. To wake a person up, we need to either push their body or talk to them. Both direct-knowing of body and ear can easily penetrate the barrier of sleep. Of the two, direct-knowing in ears is sharper. If you prefer to work with other sense organs, feel free to do so. The same principle applies to every sense.

To make our discussion easier, let’s name direct-knowing in our ears as “direct-hearing” or “HEARING.” What needs to be done is to concentrate your attention on direct-hearing. In your daily life, you have never focused on direct-hearing. Instead, you always pay attention to the content of sounds. For example, at any given moment, you might be focusing on your favorite song, or maybe focusing on conversations in a TV show, other people’s voice, or the sound of ocean, rain, or bird chirping. But you have never paid attention to the direct-hearing, which enables you to hear all the sounds.

How to focus on direct-hearing and what is it like? Because direct-hearing is not tangible like an orange or graspable like a thought, it is extremely difficult to focus on it. Fortunately, there is a trick to accomplish the goal. All you need to do is to NOT focus on any sound. By NOT paying attention to any sound, your attention has nothing but the direct-hearing to focus on. That is how you can focus on your direct-hearing. How do you know if you are performing this step correctly? Once your attention is on the direct-hearing, various sounds will appear in the direct-hearing simultaneously, and yet you do not slip your attention to any one of them. That feeling is completely different from focusing on any single sound. Whenever your attention is on one sound, you lose the awareness of all other sounds. Try it at home. When you listen to the conversation of your family members attentively, even though the TV is still on and loud, you will not hear it. When you switch your attention to TV, you will miss your family member’s conversation. At any single moment, you can hear only one sound. It is because your focus is on that sound. On the other hand, if you could inhibit your attention from chasing after any one sound, all sounds would then appear simultaneously in your direct-hearing. That is the state of “HEARING without hearing.” The first “HEARING” here refers to the direct-hearing and the second “hearing” means to discern and make sense of any particular sound. Once you have had such an experience, you would know how to apply this

method. That state of mind is very subtle and completely different from the way you typically interact with the external world. So, be patient if you do not experience "HEARING without hearing" right away. It may take years. Be patient and keep trying, one day you will have a taste of such a wonderful state of mind.

Some people have had experienced this kind of direct-knowing unintentionally. I once read a posting online written by a college student. She said that she was meditating one day. After her meditation, she walked up to the window and saw several birds flying in the sky. Just at that moment, she had a weird sensation. She realized that she saw all those birds simultaneously, even though they were at different locations and flying toward different directions. She had never been able to see in such a way. That is an example of experiencing "SEEING without seeing." Because her meditation calmed down her bubbling thoughts to such a degree that her attention was no longer on any single object, thus she could have a taste of the potential power of the direct-seeing. As soon as she started to think about how this could happen, that sensation went away, and she could no longer see all those birds simultaneously. She dropped back to the ordinary way of using her attention, seeing only one bird at a time.

In a way, learning "HEARING without hearing" is like mastering a sport. Athletes perform extraordinarily when they are in the "zone," which is a state of relaxed focusing. If they were asked to think about how they carried out their moves in the game, they would lose the "zone." The reason is because their attention shifted to the thinking mind when they were asked to think. Therefore, they could no longer be in the "zone." Similarly, the method of awakening also requires you to stop thinking and instead focus your attention on direct-hearing. This practice can only be carried out in an intuitive way, not through any analytic thinking. The more you analyze direct-hearing with your thinking mind, the further you are away from it. On the other hand, you are more prone to experience it while you just wake up from a nap or sit in a meditation. Because the thinking mind is not very active under those circumstances, thus there is a greater chance for your attention to focus on direct-knowing.

A good practice to experience direct-hearing is to sit in meditation at the dawn while everything is still quiet. Gradually, the world starts to wake up and all kinds of sounds will appear in your direct-hearing, such as the sound of cars, people, dogs, and birds, etc. All those sounds emerge in your direct-hearing, which are like various images popping up on your computer screen when you turn it on. Even though the images may change dramatically, the screen itself does not change a bit, yet it displays all kinds of images. The same is to the direct-hearing, the ability of hearing sounds does not change a bit, despite all those sounds come and go. When sounds emerge from silence, do not pay attention to any of them. Do not discern any sound, not to mention thinking about its meaning. Instead, keep focusing on the direct-hearing, by doing that, you will be able to hear all the sounds simultaneously. As soon as you start discerning and thinking about one sound, you will not be able to hear any other sound. For example, if you think "That is my neighbor's dog barking," you will find that you no longer hear the bird chirping or wind blowing at that moment. That is because you have switched back to your old way of hearing – one sound at a time. Whenever you find that your attention slips away, simply

bring it back to your direct-hearing. Such slip-away of attention will happen a lot since almost everyone has a strong habit of discerning sounds. There is no need to get frustrated. All you need to do is to bring your attention back to direct-hearing.

Theoretically, this method is simple and straightforward once you understand what direct-hearing is and how it is like to focus on your direct-hearing. However, it is rather difficult to experience “HEARING without hearing” in practice. Despite the difficulties you might encounter, you should have full confidence that you can reach there sooner or later. Why? It is because your direct-hearing is always there, and you are using it at every single moment. Without it, you would not be able to hear at all. It is just a matter of focusing on it without being distracted.

Chapter 2 The Simple Version of the Method

Once you can experience HEARING without hearing, you have overcome the greatest hurdle in this method. Now you are finally ready to seriously practice it and on your way to great awakening. This method is based on Zen Master Jiao Guang's book *The Proper Commentary of Shurangama*[25]. I will provide two versions to describe the detail of this method. One is a simplified version in this chapter and the other one is the complete version in next chapter which offers more technical details.

At the beginning, it will be easier to apply this method while you are in sitting meditation because you can calm down your thoughts more easily during meditation. Try to sit in a quiet place so that there are few distractions. When you are more skilled at it, you can carry it out at any place and at any time. You can try to focus on your direct-hearing while riding a bus, walking in a park, or at any other occasions when your attention is not needed. Disclaimer: don't try it when you are driving, operating machines, or conducting any other activities which need your full attention, otherwise it can be dangerous.

As your skill gradually progresses, you will find that all the sounds start to die off. Only your direct-hearing is clearly shining like a giant screen. All the sounds appear and then disappear on the screen of direct-hearing, like bubbles popping out of water and vanish without a trace. Since you no longer pay attention to them, they will gradually fade away. Do not worry, you are not becoming deaf. Just keep focusing on your direct-hearing. Then the world seems to go completely silent and sounds no longer appear in your direct-hearing anymore. The complete silence might feel weird or even frightening at first, but do not let any thought of worry or anxiety stop you. After all, those feelings of worry and anxiety are only thoughts in your mind. Always remind yourself, sounds and silence are merely things to be known, not the knower. The things to be known will come and go, appear and disappear. Even if they once existed, they will sink without a trace sooner or later. On the other hand, the knower, the direct-hearing, is always there, forever shining.

By paying no attention to any sound, you have reached stage of silence. To progress further, you should pay no attention to the complete silence either. Keep applying your effort and focus on the direct-hearing. It may take some time before you pass the stage of complete silence. So be patient and march forward with courage and determination. Until one day, the direct-hearing will suddenly crack open. Then all the sounds, no matter loud or low, far or near, will all appear in your direct-hearing. You can hear sounds from far away cities so clearly just as if they are happening right in front of you. Not only that, you can also hear the tiniest sounds you could not hear before, such as footstep of ants walking in your backyard. Your direct-hearing will be expansive and sensitive. The result will be beyond your wildest dream. Be warned, do not use your newly attained ability to eavesdrop on others. If you let your attention slip away from direct-knowing onto any sound, especially intentionally doing immoral deeds, your newly gained ability will disappear in no time.

[25] Master Jiao Guang (交光大師) and his book's title in Chinese is 大佛頂首楞嚴經正脈疏.

Don’t just stop at current stage and consider that as a great accomplishment. It may feel like being a superman to common people. But it is nothing for those who strive toward the great awakening. This stage is still far away from reaching the ultimate. Continue applying your effort, keep focusing on your direct-hearing. During the process, all kinds of things might emerge from deep corners of your mind. You may feel some extreme emotions or sensations. They can be very strong and feel extremely real. The possible scenarios are too many to be listed here and they vary by individuals. The principle of dealing with those disturbances is to pay no attention to them, and just constantly focus on your direct-hearing. Again, keep it in your mind, all those things you feel are contents on the big screen of your direct-hearing. The key is never to pay attention to any content. Instead, always concentrate on the direct-hearing itself. If you could do that, no matter how strong those disturbances were to begin with, they would gradually die off by themselves. Be warned! If you failed to follow the above instruction and let your attention slip onto those contents, they would very possibly drive you crazy. So, be extremely prudent when you reach this stage. Never let your attention slip onto the contents no matter how real they feel. Always remember those are like dreams and they are all illusory. The only thing real is your direct-hearing which you should constantly focus on. I cannot emphasize this point more. During your practice, even if your deceased love ones or your favorite deity appear in front of you or whisper into your ears, neglect them and remind yourself that those are merely illusions popping up from the deep corners of your own mind. Those scenes are illusions. In fact, even your own life is dream-like. Thus, you should not pay attention to any content. Always remind yourself that the only thing true is your direct-hearing which has not changed. Everything else are just like movies showing on this giant screen of direct-hearing.

If you can keep up the practice and isn’t confused or dragged away by the anything appearing in your direct-hearing, you will reach the stage in which it is the same to be asleep and awake. You will be able to hear everything even during sleep. You may wonder how it is possible. As mentioned early, the direct-hearing is at work even when we are asleep. We can easily wake people up by shouting out their names. However, people typically do not respond to whisper while they are sleeping. Once you have reached the stage that being asleep is the same as being awake, you will be aware of all the sounds no matter how deeply you sleep, even as others may see you lying on the bed and snoring loudly. Why is it so? It is because being awake or asleep is a state associated with the thinking mind, which can be on or off. On the other hand, the direct-hearing is always there, forever on. It is still on when one is sleeping. Thus, once you have mastered your direct-hearing, you will always HEAR no matter being awake or at sleep.

The following is a story told by a novice monk about his own experience with Master Xu Yun, the most famous Zen Master in modern Chinese history mentioned before.

> When the old Master Xu Yun took a rest after lunch, he sometimes would doze off. Even though he sat there in meditation, his head would drop down and he even snored occasionally. Once, several of us novice monks heard him snoring again. So, we sneaked out and took some snacks and fruits outside to eat and had fun. When he woke up, he scolded us for each and

> everything exactly as what we had done. We asked, “Didn’t you doze off and snore a moment ago? How could you know exactly what we have done?” He said, “I even know all the thoughts in your minds. How could I not know that you took snacks out to eat?” From then on, we realized that those who are truly awakened have smashed all kinds of obstructions. Even though he is sleeping, his mind is always clear and shining.

From Master Xu Yun’s example, we know that it is possible to reach constant knowing no matter being asleep or awake. As marvelous as it is, that is still only the middle way to the destination. Keep your mind focused, and you will go through the rest of the stages, which will be described in detail in next chapter. And finally, after accomplishing the last of the six stages, all the KNOWING in your ears, eyes and other senses will merge into one single universal KNOWING. Everything will appear in your unified KNOWING as if they are shown on a giant screen. The unified KNOWING can flow through any sense organs and perform any type of sensing. You can hear through your eyes, see through your nose etc. (remember finger-vision in Part One? Those EHF human subjects need a long time to read one Chinese character with their finger. It is nothing compared with this state, in which the person can see small and large, near and far with his ear, nose or any other sense organs.) All the sensing functions can be performed through any sense organ. You can use all the senses interchangeably. Congratulations! At this point, you are firmly on your way to great awakening. At end, you will be able to see what the universe truly is and who or what you truly are. Or using words in Zen, you finally touch your nostrils.

Chapter 3 The Technical Version of the Method

In the previous chapter, I gave a simple description of the method. For those who want to know the technical detail, I will lay out a complete description of the method based on Master Jiao Guang's book *The Proper Commentary of Shurangama*. Some of those texts are difficult to understand because they refer to something that we have never experienced. Once you reach that level, those words will serve as a good guidance for you. It takes six stages to reach the state of interchangeable sensing mentioned at the end of previous chapter. They are:

1. Turn around the flow of attention from flowing out to the external sounds to flowing inwardly onto the direct-hearing, so that sounds disappear.
2. When all that flows into ear becomes still, both sound and silence no longer arise.
3. As the inflow gradually progresses, "what can hear" and "what is heard" will both come to an end.
4. Do not stop at the ending of "what can hear" and "what is heard," then "what knows" and "what is being known" will be emptied.
5. When the emptying of "what knows" and "what is being known" reaches ultimate perfection, "what empties" and "what is being emptied" will cease.
6. When the "coming into being" and "ceasing to be" both vanish, the ultimate stillness manifests.

Let me explain each of those six stages in detail.

1. Turn around the flow of attention from flowing out to the external sounds to flowing inwardly onto the direct-hearing, so that sounds disappear.

   First and foremost is to have a clear understanding of what the direct-hearing is. As described in previous chapters, the best way to experience direct-hearing is to meditate at the dawn when the world starts to wake up, i.e., in transition from quietness to bustling sounds. When there is no sound, your direct-hearing feels boundless and clear. When sounds appear, none of them can escape the direct-hearing. The sound of tree branches waving in the breeze, the sound of your neighbor's footstep, the sound of dog barking from far away, the sound of traffic on the street, all those sounds appear in your direct-hearing. Because you can hear those sounds, you know theoretically that your ability to hear – direct-hearing – is always there. However, you never noticed it before. Your attention has always been focused on various sounds, not the direct-hearing itself. That is because you were always chasing after sounds and their meanings. You have never turned around to look at the direct-hearing, which can hear all those sounds. Once you identify the direct-hearing, you can apply your effort to concentrate on it.

   Before encountering this method, we are so accustomed to let our attention flow out onto external sounds that we do not know there is another choice.

Now, we know that we can choose to turn around our attention and focus on the direct-hearing.

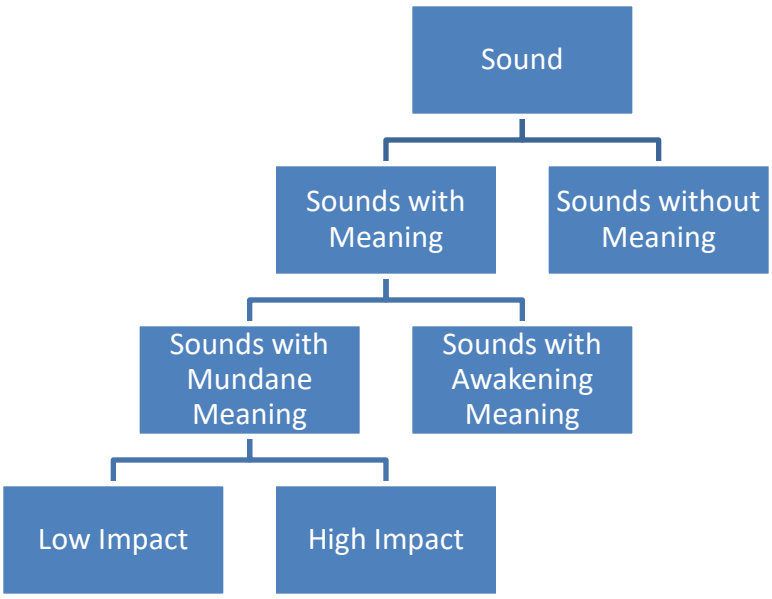


Figure 29. Subcategories of sounds

To turn back the flow of our attention, let's first examine sounds, which attract our attention. Please refer to Figure 29. There are two kinds of sounds, one is with meaning, such as conversation, movie dialogue, and speeches etc. The other is meaningless, such as the sound of wind, water, and animals. The sound with meaning can easily draw your attention. There are further two subcategories in it. One is mundane speech and the other is the speech about ultimate principles which will lead us to the great awakening. Very few people speak principles of awakening. People tend to engage in mundane conversations all day long. Mundane sound can further be divided into two groups, one has low impact on you and the other with high impact. What are them? The one with low impact are talks unrelated to you, such as the weather, the ancient history, or news that you do not care, etc. Those conversations will scatter your attention but will not stir up your emotions. On the other hand, mundane talks with high impact are those that stimulate your strong emotional reactions. For instance, criticizing or even humiliating someone in front of his colleagues or friends most likely will cause strong emotions in that person's mind. Same goes to praise and flattery. Imagine how difficult it would be to maintain your attention on your direct-hearing when those words with high impact were thrown at you. It takes genuine skills or mastery over your own emotion to stay calm and stay focused under such circumstances. No matter what kinds of sounds reach your ears, you should not let our attention flow onto them. Instead, you should try to turn your attention back onto your direct-hearing.

Once you can focus on direct-hearing, your attention is flowing in and you

will no longer discern the sounds with meanings. The meaningless sounds of breeze and creek will then become more noticeable. You must let your attention flow in more attentively and they will gradually go away too. Here are some rhetoric questions raised by Master Jiao Guang to help readers better understand how to make progress at this first stage. I will add my comments wherever necessary, so that these ancient texts are not too difficult for modern readers.

Question: if we could really let our attention flow in by following your instruction, wouldn't we hear nothing like those who are asleep or drunk?

Answer: No, it is not the case. The sounds still exist, and we can hear them perfectly. However, we would not pay attention to them since our full attention is on the direct-hearing.

My comment: Master Jiao Guang's answer to this question is "HEARING without hearing." The sleeping or drunk person can all HEAR, even though they are not hearing any sound consciously. However, they are not practicing HEARING without hearing because they do not focus their attention on the direct-hearing. Their attention is lost in their sleeping state or drunk state. In comparison, a practitioner of this method is fully concentrating on the direct-hearing.

Question: It is easy to know that we are not paying attention to those sounds with meanings. How would we know that we are paying no attention to meaningless sounds? Many sounds around us could disturb our attention, how do we know that our attention is not flowing out at any given moment?

Answer: For those who are fully attentive, the direct-hearing is always crystal clear without a moment of missing. If you start losing your focus on direct-hearing, the following two signs will manifest. First, your direct-hearing is no longer crystal clear. Second, if you pay attention to any one sound, you would not hear all other sounds. I will give you an analogy. Suppose there is a person who faints whenever he sees water. However, he needs to cross a bridge over a river. He can rely on the help from his friend who will hold his hand and lead him across the river. His friend tells him, "Look at the sky and never look down." If he could do that, he would be led across river safely. However, if he forgot about it and looked down at water, he would faint and fall into the river. This method is the same. You need to pay attention to your direct-hearing as if that person looks at the sky. Do not let your attention slip into any sound. That is like not looking at the water. The sounds are all around you just as the water is beneath the person in the analogy. You should pay no attention to any sound just as that person avoids looking at water.

My comment: the question says that it is easy to know when we are paying no attention to sounds with meanings. That is because we would not know the

meaning of those sounds once we pay no attention to them. We would be like those absent-minded listeners who do not process the content of the sounds. From that, we know that we are not paying attention to sounds with meaning. However, how do we know whether we are paying attention to meaningless sounds? Master Jia Guang's answer was to check the two signs. One is whether direct-hearing is still clear. The other is whether you can hear all sounds simultaneously. if the response is no, then you have already let your attention slip away.

Question: Will I always hear those sounds? Or those sounds will die off?

Answer: There is a difference between "not hearing" and "sound dying off." If you lose your attention, you would not hear all those sounds, even though they still exist. If you let your attention flow in every day, your direct-hearing will only become clearer as time goes by. In that case, you have not lost your attention, therefore you can hear all sounds clearly. However, when you deepen your practice day by day, you will gradually separate from the external sounds, till one day the sounds will completely die off because they ultimately are empty.

My comment: Master Jiao Guang pointed out the difference between "hear those sounds" and "sounds die off." Hearing is on the subjective side. You can HEAR or hear. HEAR is to focus on direct-hearing, while hear is to focus on any one sound. "Sounds die off" refers to the sounds themselves, which are on the objective side. At this very first stage, the sounds are there to be heard. As your practice progresses, the sounds will die off once you enter the next stage of silence.

Question: Sounds exist right now. How could you say that they are empty?

Answer: It is like a person dreams thunderclap and is scared by it in the dream. The thunderclap does not exist. However, it does feel real in a dream. The sounds you hear right now are just like that.

Question: If the sounds were unreal like a thunderclap in a dream, wouldn't an awakened person be like a deaf?

Answer: An awakened person is not deaf. And all sounds do not really die off when you reach the state of hearing nothing. That is a temporary deaf in the process of melting away current inferior hearing ability which is locked up in the ear. This scenario is like a person who sits in dark room. He cannot see anything even though his vision is perfect. Once there is light, he then can see everything clearly. Similarly, you cannot hear anything because you apply your effort to the point that this inferior hearing starts to melt. If you keep up the effort, soon your direct-hearing will open. You will then be able to hear everything from heaven to earth. You will hear even the crawling of a worm or

footsteps of an ant, not to mention those sounds that you can previously hear.

My comment: This part can be difficult to understand because we have never experienced what is mentioned in the answer above. The stage of silence happens when a practitioner applies his effort to the point that he hears nothing but complete silence. He is not going deaf. This happens because all his attention flows onto the direct-hearing so that no external sounds can enter his mind. After his effort reaches a threshold, he will be able to melt the "inferior hearing locked up in the ear." The reason this hearing is called "inferior hearing locked up in the ear" is because it is inferior to the universal hearing ability which can manifest in all sense organs. The inferior hearing ability can only manifest in ears. That is to say we can only hear with our ears, not with other sense organs. In comparison, once we have mastered the universal hearing, we can hear with eyes, nose, as well as any sense organs. To realize the universal hearing, we need to first melt the inferior hearing locked up in the ear.

Question: Should I practice this method of inflow attention during sitting meditation only? Or should I also practice when I am doing other activities?

Answer: If it were for sitting meditation only, why would I bother to explain different categories of sounds in detail previously? One should be able to focus on direct-hearing regardless whether sitting quietly or being in the middle of activities. Only then one will be able to achieve the great mental absorption.

My comments: Any moment is a good time to practice this method. It is not limited to the sitting meditation only.

Questions: How should beginners apply effort and what things should they be aware?

Answer: Even though the application of this method is not limited to the sitting meditation, beginners should practice it during sitting meditation more often because it is easier to focus that way. The process is so-called "forgot the mundane stuff as if one is dead." You should focus only on direct-knowing to the extent that you do not even try to do anything good, not to mention doing anything mundane or bad. You should avoid giving speeches about awakening, not to mention uttering mundane words. Even when someone comes to you and ask about teachings on awakening, you should still focus on your direct-hearing, and talk whatever in your mind for only a sentence or two. During your daily chores, such as eating and putting on cloths, you should keep direct-hearing extremely clear. Even at night, you should sit in meditation and avoid scattered thought or sleepy mind. If you feel extremely tired, sleep for a short while, then get up and walk. When your direct-hearing is clear again, sit more in meditation.

My comments: As you can see from Master Jiao Guang's instruction, implementation of this method should be 24/7. Keeping constant focus on the direct-hearing means that you do not waste any time. Even volunteering for charity work is not encouraged. Simple labor is allowed if it does not scatter your attention away from the direct-hearing.

Question: What if my attention runs out to sounds in dreams?

Answer: This might happen to beginners. After waking up, keep applying your effort and no need to be remorseful. Soon, you would be able to flow in your attention even during dreams. That is a good sign of reaching the state of equality of being awake and in dreams, i.e., you would always HEAR no matter being awake or in a dream. Before that, however, one must go through the stage of silence. You should not feel confused or bored about it. It is a natural stage to go through. Once you have gone through it, you will open your direct-hearing and hear sounds that you could not hear before.

2. When all that flows into ear becomes still, both sound and silence no longer arise.

   At the previous stage, the practitioner works hard to focus on direct-hearing. However, he might still have some thoughts popping up in his mind now and then. Even though he controls his attention to flow in instead of out, it may still occasionally slip onto external sounds. After he breaks through the previous stage and reaches this stage, he has already eliminated the outflow toward external sounds, and is now facing the challenge of withholding outflow toward silence. It can be said that he has already untied the "knot" of sounds and now he needs to untie the "knot" of silence. The "knot" refers to the fact that his direct-hearing is tied together with the sound or silence. Previously, by turning back his attention and let it inflow onto the direct-hearing, he can separate his direct-hearing from external sounds, thus untie the knot of sounds. The same needs to be done to silence. By keeping up his effort, he will break through this stage and reach a point where silence also completely disappears.

   Question: It is easy to untie the knot of sound because sound is completely different from the direct-hearing. However, silence and direct-hearing seems to be very similar. They are both still, boundless, and without discern. They are like water mixed with milk, hard to separate. It might not be easy to untie the knot of silence. How should a practitioner handle it?

   Answer: If you could truly see the direct-hearing clearly, how could you get it confused with silence? Direct-hearing is your mind's ability to hear, yet silence is an external state to be known. Your mind knows everything, and external silence does not know anything. How could it be difficult to tell them

apart? For instance, if an ordinary person goes to a quiet place. He knows the quietness of the place. However, he does not know anything about his direct-hearing at all. When he returns to city, the quietness is lost completely. That is because that quietness belongs to that quiet place. Once he leaves that place, it disappears.

There is a deeper kind of quietness which is also temporary. A practitioner might be able to quiet his mind to the extent so that no thoughts arise in his meditation. Therefore, he feels a boundless stillness in his mental absorption. However, when he loses his mental absorption, the boundless stillness disappears too. What he experiences is another kind of temporary quietness. Even though it is deeper than the quietness in a quiet place, it is still something being known, not the direct-hearing that knows.

In comparison, if a practitioner could see his direct-hearing and focus on it, he would see this direct-hearing to be ultimately still and boundless. Its stillness does not depend on anything being known. Those who do not know how to turn their attention back onto their direct-hearing certainly do not know its existence. However, if they could focus on their direct-hearing, they would see that its quietness is forever existing. No matter whether they are in a quiet place or in a buzzing city, its quietness does not change at all. Even before they apply this method and are unaware of its existence, the direct-hearing still exists. After a practitioner applies his effort and sees the direct-hearing, how could he lose it again? Therefore, the quietness in external world has nothing to do with the direct-hearing. If you could continue focusing on the direct-hearing after the first stage, you would be able to break through this second stage too. By then, even silence no long exists.

My comment: This is the stage of silence or the knot of silence, the second of the six stages. We have already mentioned it in our discussion of the first stage. The state of complete silence is what you will experience once you untie the first knot of sounds. The question here is to ask how we can be sure what we focus on is the direct-hearing, not silence, since they seem to be similar. They are both boundless, quiet, and do not discern. Master Jiao Guang's answer is that they are completely different. The direct-hearing knows, and silence is something to be known. The direct-hearing is forever still and everlasting, yet silence will disappear once the silent environment changes. Master Jiao Guang also mentioned a deeper kind of silence which meditators experience in their deep mental absorption. That kind of silence is rarely experienced by ordinary people. Even though it is deeper, it is still a quietness to be known, and it disappears when condition changes. In contrast, direct-hearing is forever still, unaffected by any conditions.

3. As the inflow gradually progresses, "what can hear" and "what is heard" will both come to an end.

When practitioner reaches this stage, the sounds and silence from external world have both disappeared. His attention has nowhere to go externally, it must completely flow inward. Not only will his attention not flow out through ear onto sounds or silence, but also not outflow through any other sense organs, such as eyes, nose, tongue either.

Here are some rhetoric questions given by Master Jiao Guang to further illustrate this stage.

Question: The practitioner reaches here by focusing on his direct-hearing. Now at this stage, it is said that "what can hear" and "what is heard" will both come to an end. Wouldn't there be nothing left, are we falling into nihilism?

Answer: This stage is to end "what can hear," i.e., the inferior hearing ability which is locked in ears. It is not to eliminate the direct-hearing, which is the universal ability to hear through all sense organs.

Questions: Are the two different?

Answer: Not different, but not the same either.

Question: How so?

Answer: "What can hear" is locked in ears and it is like ice. And the direct-hearing is like water. Ultimately water and ice are of same substance, therefore they are not different. However, ice blocks and water flows, thus they are not the same either. Now "what can hear" comes to an end. It is as if ice melts and turns into water. It is not the case that it is completely dried up and gone. When the inferior hearing ability "melts," it is no longer locked up in the ear. Instead, it becomes the direct-hearing and can flow into any sense organs.

My comment: Our ability to hear at present is locked in our ears. We can hear only through our ears. That is the inferior form of this hearing ability, which is like ice stuck in our ears. At this stage, our practice advances to the point that we can melt this "ice" in our ears. Therefore, this inferior form of hearing becomes the universal hearing, which is no longer locked in our ears and therefore can flow into all sense organs.

Question: In previous stage, when the sounds and silence both disappear, it is said that one sees the direct-hearing is ultimately still and vast. Now, "what can hear" also comes to an end, what would this stage feel like?

Answer: Previously, we set up the method so that there are sounds and silence in external world, and there is "what can hear" inside of our mind. So, there is a dichotomy of external and internal, the subjective and the objective. At this

stage, when external sounds and silence die off, the internal "what can hear" has nothing to hear, so it will gradually melt. Then the practitioner will feel what is truly boundless. In addition, the previous stage still has bound, which is the boundary between external and internal. Now the practitioner experiences the true boundlessness without the boundary between internal and external. Lastly, in previous state, there still exists the self, i.e., "what can hear" is considered as the self. And both the sounds and silence are the non-self which is everything else existing outside of the self. There is clearly a dichotomy of self and everything else. Now at this stage, the boundary between self and everything else is melted away. Therefore, the practitioner truly experiences "no self" or "nonexistence of self," and understands everything is one unity.

My comment: The question asks about the boundless felt in this stage and how it differs from the boundless in the previous stage. And the answer is that the boundless in previous stage is not truly boundless. It was said to be boundless because you feel that both sound and silence manifest in your boundless screen of direct-hearing. However, there is still a boundary between the internal and external, between the subjective side and objective side, between the knower and what to be known. Sounds and silence, are external, the objective side, and what to be known. Direct-knowing is internal, the subjective side, and the knower. Now at this stage, this very boundary disappears. There is no longer any difference between internal self and external world. You truly experience the unity of everything.

4. Do not stop at the ending of "what can hear" and "what is heard," then "what knows" and "what is being known" will be emptied.

   One should not stop at the previous stage. Even though the state of boundlessness and stillness is wonderful, however, there is a wisdom that knows this state of boundlessness and stillness. It is called wisdom because it possesses the ability of knowing. Therefore, there is still a duality of the state of boundlessness and stillness, which is being known, and the wisdom that knows it. That is why it says, "what knows" and "what is being known" will be emptied. One should keep moving forward, dissolve the dichotomy of the wisdom that knows, and the state being known - the quiet and boundless state which practitioners experience in previous stage.

5. When the emptying of "what knows" and "what is being known" reaches ultimate perfection, "what empties" and "what is being emptied" will cease.

   To empty the duality in previous stage, a deeper wisdom of empty is at work. It is called a deeper wisdom because the state that it knows is deeper than that of the previous wisdom. It will cease to exist when it reaches perfection, i.e., when it completely empties the duality in previous stage. This is like to set fire by drilling one piece of wood into another. When the fire is set, both piece of wood will be burned away. During this stage, one piece of wood is the

duality in previous stage. The other piece of wood is the deeper wisdom that can empty the duality in the previous stage. When those two burn each other out, both will cease to exist.

6. When the “coming into being” and “ceasing to be” both vanish, the ultimate stillness manifests.

   Both what comes into being and what ceases to be have many layers. In the first stage, sounds cease to be, thus the silence comes into being. In the second stage, the silence ceases to be, then “what can hear” comes into being. In the third stage, “what can hear” ceases to be, then “what knows” comes into being. In the fourth stage, “what knows” ceases to be, then “what empties” comes into being. In the fifth stage, “what empties” ceases to be, then “what ceases” comes into being. If a practitioner stops here, he is still covered up by the appearance of “cease.” He should make one more effort to advance. However, it cannot be done with any intentional effort. One’s mind should not try to do anything, just stay effortless and free. Eventually when the right moment comes, the ultimate stillness will manifest. This ultimate stillness is not a stillness in contrast to motion. It is stillness beyond the existence of time. Once it manifests, the entire universe immediately transforms into the KNOWING which is everywhere and throughout all time.

At this point, a practitioner can use all his senses interchangeable. He can see with his ears, nose, or tongue. He can hear with his eyes, nose, or body. He can use any part of his body to perform any kind of sensing function. You will realize that your world is dream-like and you can be omni-living. The marvelous states in National Master Qing Liang’s ten mysterious doors will eventually manifest (Those readers who jumped directly to Part Two can refer to Chapter 12 in Part One.) Welcome to great awakening! The description for last three stages is very short. There is not much to say about them since they are ineffable. Once your practice reaches that point, those words will serve a good guide to your practice.

In conclusion, going through those six stages is like peeling onion. When one layer is peeled off, another layer appears. You must march forward and never stop in the middle, until you can use your senses freely in an interchangeable way.

Chapter 4 Dangerous Pitfalls Along the Way

When you practice this method, you should not only be persistent, but also be prudent because there are many potential pitfalls along the way. During the process of practice, as you dive deeper and deeper into your mind, states rooted from the deepest corner of your mind and events from your unfathomable past may manifest in front of your eyes. They would be like dreams, but you are experiencing them with a waking mind in your deep meditation. I will list some of those potentially dangerous states, so that practitioners are well-informed and do not fall into those pitfalls. The states listed here are a small portion of fifty dangerous states mentioned in Shurangama Sutra. Master Xu Yun mentioned that numerous mental states could arise during meditation and they tend to be different for each individual. The key is to understand the principle of how to deal with such potentially dangerous states. That is to never pay attention to them and stay focused on your practice. Those dangerous states will only arise when your practice reaches certain level. In that sense, they are a sign of progress. However, if you were distracted by them or attached to them, you would certainly lose direction and fall back to the dream state of life once again. If you are too attached to those states which seem to be marvelous for ordinary human, you might drive yourself crazy.

Down below are a brief description of some possible states.

- When the practitioner focuses his attention on direct-knowing, his body might be able to go through walls temporarily. It happens because the mind flows forward and melts the external objects. He will lose this ability in no time once his attention is no longer focused. He should not consider himself as a sage or awakened one. Instead, only consider this as a good sign indicating his progress. If he thought he achieved sainthood, he would walk down numerous deviant paths.

- When the practitioner focuses his attention on direct-knowing, suddenly he might see through his body. He can pick out the parasites in his body and his body is still perfectly intact afterwards. This happens because the mind flows into his body and melts it. He only temporarily gains this ability due to his vigorous practice. He should not consider himself as a sage or awakened one. Instead, only consider this as a good sign indicating his progress. If he thought he achieved sainthood, he would walk down numerous deviant paths.

- When the practitioner focuses his attention on direct-knowing, suddenly he might hear marvelous principles being proclaimed in the air. Or he might hear sounds of secret meanings from every direction[26]. It happens because his mind

[26] Many writers or artists probably have experienced a lesser state like what is mentioned here. When they focus their attention to an extreme, they sometimes will get inspiration in their dreams or a trance state. For instance, they may see images or hear voices which give them inspiration. That is because their mind is freer during sleep so that the information underneath could emerge. In comparison, this practitioner experiences much marvelous state because he is more focused and at the same time more relaxed and freer

interconnects with other minds. He only temporarily gains this ability due to his good karma from past. He should not consider himself as a sage or awakened one. Instead, only consider this as a good sign indicating his progress. If he thought he achieved sainthood, he would walk down numerous deviant paths.

- When the practitioner focuses his attention on direct-knowing, suddenly he might see the entire space filled by different colors. Each color fills entire space and does not cover up other colors. For instance, the space is filled with green, yellow, red at the same time, and the colors are not mixed. In other words, the space is simultaneously filled up with all those colors in every corner. This state is similar to the third of ten mysterious doors described by National Master Qing Liang, "One and many merge with each other, without losing their own peculiarities." It happens because the practitioner applies extra effort in his focus on direct-knowing. He only temporarily gains this ability. He should not consider himself as a sage or awakened one. Instead, only consider this as a good sign indicating his progress. If he thought he achieved sainthood, he would walk down numerous deviant paths.

- When the practitioner focuses his attention on direct-knowing, suddenly he might see things not originally there in a pitch-black room. However, the objects originally in the room do not disappear either. They could see ghosts, spirits or other beings invisible to ordinary people. It happens because the mind settles down to the point that previously invisible beings are unveiled. He only temporarily gains this ability. He should not consider himself as a sage or awakened one. Instead, only consider this as a good sign indicating his progress. If he thought he achieved sainthood, he would walk down numerous deviant paths.

- When the practitioner focuses his attention on direct-knowing, suddenly his limbs becomes like wood. No matter being burned or stroke by knife, he does not feel anything. His body does not become warm even when burned by fire. It happens because his body expels its material nature and merges with mind. He only temporarily gains this ability. He should not consider himself as a sage or awakened one. Instead, only consider this as a good sign indicating his progress. If he thought he achieved sainthood, he would walk down numerous deviant paths.

- When the practitioner focuses his attention on direct-knowing, suddenly he sees his relatives in faraway places during the middle of night. Or maybe he hears their conversations. It happens when he focuses his mind intensively so that its awareness reaches faraway places. He only temporarily gains this ability. He should not consider himself as a sage or awakened one. Instead, only consider this as a good sign indicating his progress. If he thought he

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than normal dreaming state, thus he can tap into an even deeper level of the mind.

achieved sainthood, he would walk down numerous deviant paths.

Why would the practitioner walk down deviant paths if he thought that he had attained sainthood? It is because he clings to the marvelous states he had temporarily experienced. Because of that attachment, his attention slipped away from direct-knowing and slipped onto that state. Therefore, he would no longer be able to focus on the direct-hearing. The only correct path is to focus on direct-hearing, that is to flow one's attention inward. All other paths lead the attention outwards. Thus, they are deviant paths. Getting too attached to those marvelous states could eventually drive a person crazy. So, be warned!

There are also other states directly related to the emotional side. For instance, a practitioner might suddenly feel extremely compassionate toward all living beings, to the point that he feels pity and cries when he sees insects. Or a practitioner might suddenly feel extremely sad and cannot stop crying. Or a practitioner might suddenly feel extremely courageous and thinks he can reach the goal of his practice in one day. Or a practitioner might suddenly feel extremely arrogant and look down upon everyone. Or a practitioner might suddenly feel withered in his mind. Or a practitioner might suddenly feel extremely content. Or a practitioner might suddenly feel extremely happy. Or a practitioner might suddenly feel extremely at ease. Or a practitioner might suddenly feel extremely lustful. No matter what feelings a practitioner might experience, positive or negative, he should use the same method mentioned above to deal with such states. That is to consider them as a good sign of progress and do not attach to them. Those are merely some passing states that he should not be distracted by, and he should not consider himself to achieve anything significant. Instead, he should continuously apply effort, focusing on the direct-hearing. If he were to attach to those emotions, he would become mentally unstable or even go mad. So, be warned!

As his practice progresses, a practitioner might reach some more advanced states. For instance, he might suddenly see millions of years in the past, see other worlds near and far, or start to see the interconnection of all beings. However, he has not yet seen the entire picture and often comes to incorrect conclusions based on the limited scope of his present knowledge. The same prudent measure should be applied. He should not consider those marvelous states to be a great achievement. Instead, he should keep applying his effort on direct-knowing.

All those examples mentioned above are a tip of the iceberg of countless possible states that a practitioner might experience during the implementation of this method. As mentioned above, no matter what states you may encounter, always remember they are illusionary and you shall never pay attention to them. You should always focus on your direct-knowing and never let your attention slip away on anything, no matter how marvelous, intense, or interesting it is. If you could be unmoved and stay focused, you would be able to reach the stage of interchangeable senses and finally wake up from this dream-like life.

Chapter 5 Final Words on Our Dream-Like Life

In this final section of the book, I want to say that the method I introduced here is relatively easy to understand, yet extremely difficult to practice. However, the benefit of success is so great that you ought to try it out no matter how difficult it is. Even though it may feel like that you retreat from the world and live like a hermit in your direct-hearing, it is a journey leading to the ultimate universal knowing. As a monk said in his verse over one thousand years ago, “One step backwards is actually one step forward.”

The entire process of waking up from this dream-like life is like the process of waking up from a dream. When you are dreaming, you will consider yourself as the avatar in your dream, which we can name as “mini-self” for the sake of discussion here. Mini-self will continue his existence when your mind keeps creating more content for him to engage in. So, being locked into the mini-self, how can you wake up from a dream? Therefore, the first step toward awakening is to disengage from the dream world. When mini-self pulls his attention away from everything in the dream world, he will not see anything in the dream world. He will not hear any sounds in the dream world. He will not smell any odors in the dream world. The same applies to all other sense organs. By the time when mini-self can stop the outflow of his attention, the content of the dream stops. Yet, mini-self has not yet woken up. He is at a transitional phase of darkness and quietness between sleep and awake. That is similar to the stage of silence mentioned in the method, which practitioners will enter after accomplishing the first of the six stages. When you pull your attention completely away from our physical world, you will enter the stage of silence.

The next step for mini-self to wake up is to disengage from silence. When mini-self pulls his attention away from silence, he would no longer have anything to hear, not even silence. That is similar to the second stage in our method, untying the knot of silence. With neither sounds nor silence to hear, the hearing ability which was previously locked up in mini-self’s ears will melt. That means, you start to wake up, and you can hear sounds outside of your dream. Your hearing ability is no longer locked in the mini-self’s ears, which hear the sounds and silence in your dream. Now the direct-hearing is liberated, and you can hear every sound in your bedroom and beyond. That is similar to the third stage of our method, which is to melt the hearing that is locked up in the ear.

If mini-self stopped without further eliminating the deeper level of dualities, he would not become completely awakened. Only when he completely gets rid of all the subtle dualities of his mind and his world - the dream world, he truly wakes up from the dream. He disappears, and you wake up. Similarly, you need to completely go through the subtle dualities mentioned in the fourth, fifth, and sixth stages to truly wake up from the dream-like life. By that time, your small self disappears, and you realize that you are one unity with everything in the universe.

During the process of waking up, mini-self could possibly experience many different states in the dream world, maybe he gains some super-dream abilities due to his effort of awakening. He may be able to walk through walls, or pick out parasites from his body, or gain ESP, precognition, or even fly in the dream. At that time, he should try to disengage

from the dream world no matter how marvelous those super-dream states are. Otherwise, he would fall back into the dream world and deviate from the path of awakening. Similarly, when you practice this method, you could potentially experience many marvelous states mentioned in the Chapter 4. It is repeatedly emphasized that you should never pay attention to those states, no matter how marvelous they are. Otherwise, you would be dragged back to this dream-like life and fail to stay on the path toward the great awakening.

In this book, we discussed great ideas from both East and West philosophers. We talked about practical methods in both science and meditation. We studied research findings about both normal and paranormal phenomena. With all those efforts, I hope that you now have a good answer to the question, "is our life dream-like?" Einstein's theory of relativity points to the direction of grand unification of time, space, energy, and mass. Quantum Mechanics seems to indicate the unity of subjective mind and objective world, which is similar to the unity of mini-self and the physical world in the dream. Therefore, in my dream-like-world theory, I propose that our life is dream-like and we can be omni-living much like those lucid dreamers in their state of lucid-dreaming. Experiments on EHF phenomena provide empirical evidence to support the dream-like-world theory. And ancient texts give detailed instructions on how to realize the oneness of our mind and our physical world. In Part Two of this book, I introduce a six-stage method based on Master Jiao Guang's book.

I hope that this book will encourage more researchers to venture into the research field of EHF study and promote public to train their children to gain basic finger-vision ability and more advanced EHF skills. After both academic and public witness and experience EHF phenomena, we will usher in a paradigm change in science, a switch from materialism-based science to a new science based on the unity of the subjective and the objective. It will be the beginning of a new era. I also hope that this book will inspire dedicated individuals to practice the method described in Part Two of this book and eventually be able to realize the dream-like nature of life. If they could successfully reach part of or even all the six stages, they would be great inspiration to others. Let's march toward omni-living together!

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