New and Useful Ideas in Physics and Psychology from Swedenborg

Ian Thompson

There are many ideas from Swedenborg that would not otherwise be suggested or occur to us. I want to recall how Swedenborg has been a source of ideas in my own life of understanding, so I describe how I found Swedenborg's ideas to solve some problems in science. I have been interested in science for a long time, and I am going to address two parts of science.

The first part is a *physics* problem and the second part is a *psychology* problem. The physics problem is what is the *substance* of things. If you have heard of quantum physics, you will know how quantum physics is puzzling to very many people: scientists and everybody. We do want to know to begin to get an answer to help solve those puzzles.

The second problem is that there has been a lot of talk about stages of development in children and in adults, and from childhood to adulthood. Piaget, Erikson and many others have suggested *stages*. So what *are* these stages? How do they work and how to they connect to each other?

WHAT ARE SUBSTANCES?

My story began when I was very puzzled by mind-body problem, and by religion and physics since my 20s. I discovered Swedenborg when I was in New Zealand and reading Wilson Van Dusen's book *The Presence of Spirits in Madness*. There, he talks about good and not-good spirits, and Van Dusen referenced Swedenborg's ideas. So I started reading Swedenborg. As I was reading, I was simultaneously trying to learn and understand quantum physics. That was my professional life: I was doing research for a PhD in nuclear physics and my job has been in nuclear reaction theory until I retired last year. So I was specifically looking for a common ground to combine quantum physics and Swedenborg. Of course, Swedenborg did not know anything about quantum processes in science, so my question was

"What is the world like such that we have both Swedenborg true and quantum theory true?" We want in particular to get an idea of what the world is made of. If scientists and philosophers look at particle physics or quantum physics, they talk about particles existing, or they talk about waves, they talk about events, they talk about observations, they talk about qualities existing such as mass and charge. But they don't really know what existing things are actually made of in quantum physics. This is a big challenge!

Because the word *substance* has been used has many different definitions, I looked at Webster, who defines a substance is the ultimate reality of that which underlies manifestation and change. That is a very general definition. A *substance* according to Descartes is that whose existence is independent of anything else.

Note, however, that these definitions could be satisfied by God. As there is something very deep about these two definitions, I looked at first the question of "What is it that persists over a finite time interval?". Thus I was trying to answer more specific questions about created substances that are finite things. I wanted to know about atoms, molecules, electrons, etc. and all the things that quantum physics appears to describe.

Quantum physics has had problems for over 100 years. When we ask, "what is the world made of such that quantum theory could be a true theory?", we find many answers that have been suggested. Reality could be a wave, a shape, a form, an event, a particle or energy or experimental result or potentiality or actuality. Perhaps mind is responsible for producing reality, or some propensity. All of these ideas have been proposed over the last hundred years by people trying to understand quantum physics. The mathematics of quantum physics seems straightforward, and it can make good predictions of probabilities. So, is probability something that things are made out of? We are not really sure. There's still a puzzle, so I now you why it is a problem in quantum physics.

We have waves in quantum physics, but classical waves and quantum waves behave quite differently. A *classical wave* is like a sound wave going out in the air, or a wave on an ocean, or vibrations in a solid. As these waves spread out, they affect

everywhere where the wave is. It is clear that the wave actually has effects, and that its effects are at all the different places where the wave is.

A *quantum wave*, however like an electron or an atom or a photon affects only *one* place, and the wave has its final effect *only* there. This contraction from a wave everywhere to a wave only at one place, is called the reduction of the wave packet. You can start off with a spread-out wave, say for an electron going towards a photographic plate, but the electron ends up localized at only one grain. An electron can only trigger a single photographic grain, unlike a classical wave which can be detected at many places simultaneously. You need many quantum electrons to trigger multiple photographic grains. Thus quantum waves are really quite different from classical waves: classical waves are actually everywhere, but quantum waves are a spread-out set of possibilities, of which only one gets selected. And when it is selected, it looks like there is a particle being revealed even though there was not a localized particle when the wave was spreading out. These is one of the main puzzles about what is really going on in quantum physics. These processes are like a change, in which something potential which is spread out becomes an actual thing which is localized at one place to the exclusion of all others.

Aristotle discussed how potentiality and powers produce actual outcomes. But the question is still: what is potential and what is actual? Karl Popper reminded us 70 years ago about the idea of *propensity*. Propensity is what is potential that exists before giving an actual result according to some probability. The term *propensity* is an idea that seems useful for explaining what quantum things are made of. But we still don't really know what a propensity is. Is it a property, a form, or a substance? We're not sure.

In trying to understand these questions, I was simultaneously reading Swedenborg. We read in Swedenborg from Divine Love and Wisdom (DLW 1) that love is the life of all creatures. It is essence and being of all creatures, not only God. The essence and being of all love is the essence and being of God. Nevertheless, all

the finite creatures and finite things still exist as substances, as we read in Divine Love and Wisdom (DLW 53):

> Things created and finite can have ascribed to them being and expression, substance and form, and even life, indeed love and wisdom, but these attributes are all created and finite. They can have these attributes ascribed to them not because they possess anything Divine, but because they are in the Divine and have the Divine in them. For everything that has been created is in itself inanimate and lifeless, but is animated and given life by its having the Divine in it and its being in the Divine.

Note the first sentence: things created and finite can have ascribed to them being and expression substance and form etc. So finite things have substance and form—*esse* and *existere* in latin—as well as God. Finite love is in a mind, a child, an adult, a spiritual being or even a even an insect. All these have desires. Every animal. You can actually see some kind of desires in single cell living creatures, when they swim to where food is. So every living thing has love in it in an important way.

Love, Swedenborg says, is the *substance* of a being. We understand for spiritual things that love is the substance, but now we have the further idea that *love* is what necessarily persists over an interval of time. The reason that love does this, is that love is something existing now that wants to create an effect in the future to be fulfilled. We feel the desire now, and we think about how and when to act and then we act at a later time. Love, therefore, has to persist over the interval time between the wanting and the effect. Thus Swedenborg gave me the idea that love is the substance of things: love is a substance in the sense of having a form and persisting over time. Its *form* is something else still to be explained, but the love is the substance itself.

From reading Swedenborg in my 20s, I could see that love is a substance. At the same time, I was trying to understand what is the substance of quantum things. Then I get the idea that the answers to those questions have to correspond to each other, in the same way that love of spiritual things correspond to desires in natural things. Spiritual substances should correspond to

whatever the substance is of quantum things, because we know the natural physical world is made out of quantum things. The challenge was to connect those together. Making the connection was my burning bush moment, so to speak. I got some ideas from Swedenborg which tried to answer a problem in physics, and the new understanding was is to see that love, compared with propensity in physics, correspond to each other. Swedenborg's concept of love is very similar to the concept of propensity used in the physics of probabilities. They correspond to each other because both persist over a time duration, both have form as well as substance, and they both produce specific discrete actions or selections after some interval of time. If love is the substance of spiritual things, then, by correspondences, propensity (which is the physical version of love) is the substance of physical things. Thus I began to have an idea of what is substance of quantum things, especially how it did all those strange things that quantum physics objects do. I began to see how both love and propensity must be an initial being that produces its final results.

In classical Greek philosophy, Parmenides says that everything is *being* and so everything has to remain *being*. Aristotle showed that beings can transform from one form to another but they still remain being. And so with love, Swedenborg claims. The love of finite objects comes from the love of God. The being of God produces the being of finite spiritual beings, and then the being of finite spiritual beings produces the actions. So the actions have being as well. The being flows continuously without break through these discrete degrees. And this agrees with what Aristotle says about being, with being transformed from one to another. And it actually agrees with Parmenides, when he said that whatever has being has to remain being because that is what being does. That is what being is. So we see that this is the reason there are correspondences between God and spiritual things and physical things: because the being is transformed. It remains some kind of being. One derives from the other. But the point is that we can see that the being of spiritual things, which is love, corresponds and is very similar to the propensity idea that some people have proposed for physics.

We can begin to see how propensity in physics is the substance of physical things. Let us take this idea of propensity which was proposed for physics, and use the fact that it corresponds to love and thus functions in the same way as love although spiritual and physical actions are quite different. In fact, *propensity* can be taken as a general concept. You can have physical propensities, and you can have mental propensities. You can have a spiritual propensity which is love, and you can have mental propensities which will be desire, and you can have physical propensities can be force in classical physics or Popper's propensities in quantum physics. Thus force and desire and love and even divine love can be all taken as in this the category of propensity, though applied at different discrete degrees. They of course still vary according to their interaction and what they produce, but the functions are similar.

One result of this is that we get also get an idea of *mental* substance, namely mental propensities, which are something mental that persists over time. It explores different possibilities and then produces a specific effect. That is what our desires are and do: our desires are a something now that is going to produce an effect. It uses our understanding to explore the different possibilities, and then it produces a specific result when we decide what we want to do.

These desires correspond to quantum substances. Quantum substances are like desires, since a quantum substance is a being and it first of all explores different possibilities like a wave spreading out so then it interacts with say a photographic plate and only one grain gets exposed from each electron. The waves being spread out are like exploring different possibilities with different probabilities, and one of them is selected and that is a specific action.

Thus we see the similar corresponding processes in different discrete degrees. We can see all this from Swedenborg saying that love in the spiritual world is the substance of things there. We can see that propensity in the physical world is the substance of physical things. And we get a new understanding of propensity in such a way that it tells us something about physics. We know

that physical things are made up out of quantum things. What is the substance? The substance is propensity. It is something that lasts over a finite interval of time at least, as it explores different possibilities and then it selects one and gives a definite result. And that is what quantum objects do. It is what mental objects do. And it is what spiritual objects do as well. And you can even think of God choosing how to create the world. He's doing something similar again because these all correspond to each other.

In summary: I used the idea from Swedenborg that, because love is a substance and love corresponds to physical propensities, we can say that physical propensities are the substances as well.

PSYCHOLOGICAL STAGES OF DEVELOPMENT

My second topic is a psychology problem. I was very interested in trying to understand how the mind works. Many psychologists have claimed that there are stages or levels of development in children and adults, because that is what they have observed. What are these levels? I was reading Swedenborg at the same time, and he talks about discrete degrees based on love, wisdom and use, and that this pattern of love, wisdom and use is going to be everywhere. So I want to use those ideas to try and understand what those levels of development are that were proposed by psychologists.

Let us to look at some of the historical ideas. Some of these are rather early ideas, but they're very useful because they do describe what happens in the different stages.

The earliest scheme was from Jean Piaget, who saw the cognitive stages in children summarized in Table 1. They begin with a sensorimotor stage when they just exploring, and learning that things exist. Then there is a pre-operational stage when they begin to think about their actions they can perform in the world. An operational stage is achieved when they can do things forward and backward like pouring water. If you pour water from one cup to another, even if the cup the bowl is a different shape, they then realize that the quantity of water must be the same. They thus know about reversible operations. When they get older, as a

teenager, they become interested in games and mathematics and other reversible operations as well, so they can deal with abstract ideas. Of course, when you are in a stages, you are already proficient in all the previous stages: you are building up the complexity of your mind.

Table 1: Stages of Cognitive Development, according to Jean Piaget. Each stage includes functions of previous ones.

Stage	**Ages (approx.)**	**Characteristic Thinking**
Sensorimotor	birth to 2 yrs	Sensing and motor actions, to recognize object permanence
Pre-operational	2 to 7 yrs	Symbolic thought and egocentrism
Concrete Operational	7 to 11 yrs	Grasp conservation, reversibility, and classification
Formal	12+ yrs	Abstract thinking, logical reasoning, and hypothetical concepts

Eric Erikson was another psychologist about the same time who looked at psychosocial developments in terms of feelings and desires. He looked also at the activities at different stages, as show in Table 2:

Table 2: Affectional and Social Stages of Eric Erikson

Stage	**Age**	**Opposing Issues**	**Details**
1. Oral-Sensory	Birth to 12-18 mo	Trust vs. Mistrust	The infant must form a first loving, trusting relationship with the caregiver, or develop a sense of mistrust.

2. Muscular-Anal	18 mo to 3 yrs	Autonomy vs. Shame / Doubt	The child's energies are directed toward the development of physical skills, including walking, grasping
3. Locomotor	3 to 6 yrs	Initiative vs. Guilt	The child continues to become more assertive and to take more initiative, but may be too forceful, leading to guilt feelings.
4. Latency	6 to 12 yrs	Industry vs. Inferiority	The child must deal with demands to learn new skills or risk a sense of inferiority, failure and incompetence.
5. Adolescence	12 to 18 yrs	Identity vs. Role Confusion	The teenager must achieve a sense of identity in occupation, sex roles, politics, and religion.
6. Young Adulthood	19 to 40 yrs	Intimacy vs. Isolation	The young adult develops intimate relationships or suffers feelings of isolation.
7. Middle Adulthood	40 to 65 yrs	Generativity vs. Stagnation	Each adult must find some way to satisfy and support the next generation.
8. Maturity	65 to death	Ego Integrity vs. Despair	The culmination is a sense of oneself as one is, and of feeling fulfilled.

I'm not going to go into all the detail here, except to note that we can combine these with Piaget, as was shown by the psychologist John Gowan. Gowan modified Piaget by splitting an 'intuitive' stage from preoperational substage. He modified Erikson by splitting the 'young adulthood' (19-40) into two stages 'intimacy' (18-25 yrs) and 'generativity' (25-40 yrs), and he moved 'ego-integrity' from maturity to middle adulthood. Stages were relabeled with more general titles. This results in the 9 stages drawn in the 3 * 3 pattern of Table 3, where we start with birth on

the bottom right square, and moving to the left and then up a row as there is increasing development with age in stages 1 through 9. We think of Piaget as looking at the *thinking* at each stage and Erikson looking at the *feeling* at each stage, and now these are gathered in pairs. Michael Lamport Commons and others have further extensions of Piaget.

Table 3: Stages as combined and extended by Gowan

Gowan's 9 stages		**CREATIVITY** **2 thou** **The Other**	**IDENTITY** **1 I, me** **The Ego**	**LATENCY** **3 it, they** **The World**
ADULT	Erikson Erikson Age	**9 Agape-love** old age	**8 Ego-integrity** Renunciation-wisdom 40 - 65	**7 Generativity** Production-care 26-40
YOUTH	Erikson Piaget Erikson Age	**6 Intimacy** (Creativity) Love-affiliation 18-25	**5 Identity** Formal operations Devotion-fidelity 13-17	**4 Industry** Concrete operations Method-competence 7-12
INFANT	Erikson Piaget Erikson Age	**3 Initiative** Intuitive Direction-purpose 4-6	**2 Autonomy** Pre-operational Self-control-willpower 2-3	**1 Trust** Sensorimotor Drive-hope 0-1

I was looking at this chart for a number of years until I realized that there's something important here that I should recognize since I had read Swedenborg. How is this table related to Swedenborg's ideas? This was my burning bush moment: for this chart in psychology.

From Swedenborg I could understand why there are 9 stages!

- The three *columns* correspond to three aspects of love: as ends, thought, and action according to Swedenborg.
- The three *rows* also correspond to adulthood, youth and infancy. These also correspond to three degrees of how we think of love in our understanding. There are the three degrees of spiritual rationality, external rationality, and sensory thought as Swedenborg describes.

We must now think about what and how people are thinking and feeling at each stage, since Gowan has gathered together both the cognitive and affective stages as Swedenborg always encourages us to do. The three rows (from the bottom) are the natural, the outer rational (the Ishmael rational in the middle row) and then the inner (Isaac) rational in the top row. The successive thoughts and affections concern these:

1. The top layer is concerned with thinking about love. In particular, how to live from love (9), how to make sure that your love is organized in a proper way by the understanding (8), and then that our loves go into action (7).
2. The middle layer is concerned about thinking with ideas. It starts off (4) with thinking about actions, then thinking about thinking (5) and then thinking about love and principles (6)
3. The bottom (first) layer is all about actions: the sort of thing that a child does up to about the age of six. They first of all work out how to feel and act (1), then they think about the particular things they can do (2), and then they want to know why (3).

The Table 3 from Gowan, when you see it in the light from Swedenborg, shows that there are three-fold degrees are *both* in the columns *and* in the rows. And I was very surprised when I realized what was happening there. We can now use ideas of influx and degrees from Swedenborg (*Divine Love and Wisdom* in particular), and use correspondences to understand what's happening in the psychological degrees we can see as children grow from infancy into youth and from youth into adulthood.

We know from Swedenborg that thinking and feeling always go together in every discrete degree: if you have thinking then you have feeling there, and vice versa. That is because if you have feelings or wants, then you have to think in order to know *how* to achieve what is wanted. And if you have thinking then there have to be feelings in order to *motivate* what to think about.

Infants start off by dealing with actions. And then they think about recognizing actions, performing actions and planning actions. And then they think about thoughts. Then they think about doing thoughts and then forming thoughts and then inventing new thoughts. And then when they get older, when they begin to have spiritual regeneration, That is the first day of creation. They realize that there's love which they can think about as well. They can think about the actions of love. They can think about the means of that love operates, and then they can work out what loves are and how they are motivated and selected.

Table 4 shows the three degrees in these three rows from childhood up to young adult to full adulthood. Here red is for celestial love, blue is for spiritual understanding, and green is for natural actions. These three degrees correspond to the three stages of focus of the mind and of the feelings.

Table 4: Three degrees within the Understanding of the Mind (red: love, blue: wisdom, green: use)

		LOVE	**UNDERSTANDING**	**ACTION**
Inner Rational	**LOVE**	9 (AGAPE-LOVE) old age	8 EGO-INTEGRITY Renunciation-wisdom 40 - 65	7 GENERATIVITY Production-care 26-40

Outer Rational	**UNDER-STANDING**	6 INTIMACY (Creativity) Love-affiliation 18-25	5 IDENTITY Formal operations Devotion-fidelity 13-17	4 INDUSTRY Concrete operations Method-competence 7-12
Sensual	**ACTION**	3 INITIATIVE Intuitive Direction-purpose 4-6	2 AUTONOMY Pre-operational Self-control-willpower 2-3	1 TRUST Sensorimotor Drive-hope 0-1

Table 5 again shows the three degrees, but in the three columns from childhood up to young adult to full adulthood. Again red is for celestial, blue is for spiritual, green is for natural.

Table 5: Three sub-degrees (Love, Thought, Action) with the three degrees of Child, Youth and Adult.

	LOVE	**THOUGHT**	**ACTION**
Inner Rational - adult	**9 (AGAPE-LOVE) old age**	8 EGO-INTEGRITY Renunciation-wisdom 40 - 65	7 GENERATIVITY Production-care 26-40
Outer Scientific Rational - youth	**6 INTIMACY (Creativity) Love-affiliation 18-25**	5 IDENTITY Formal operations Devotion-fidelity 13-17	4 INDUSTRY Concrete operations Method 7-12
Sensual - child	**3 INITIATIVE Intuitive Direction-purpose 4-6**	2 AUTONOMY Pre-operational Self-control-willpower 2-3	1 TRUST Sensorimotor Drive-hope 0-1

We see more details from Swedenborg for how we need to think about all the stages of love, of wisdom, and of use. Table 6 labels all 9 stages in terms of ends, thoughts and actions, as these come from love, wisdom and use respectively. So we can see in Table 6 that within thinking-of-love there are three sub-degrees and within thinking-of-wisdom there are three sub-degrees because you have to think about wisdom and do things. And then with even within thinking-of-action there are three sub-degrees. Table 6 shows all the 9 sub-degrees and what each one does. These sub-degrees are all connected by influx downward and to the right.

Table 6: The thinking functions of each sub-degree

Stage where appears	**Swedenborg's descriptions**	**1. Thoughts of Love**	**3. Thoughts of Thinking**	**3. Thoughts of Effects:**
Maturity	**Higher rational:** thoughts of **loves**:	thoughts of ends of love	Thoughts of means of loves	Thoughts of effects of loves
Youth	**Scientific rational:** thoughts of **thoughts**:	thoughts of ends of thoughts	Thoughts of means of thoughts	Thoughts of effects of thoughts
Child	**External mind:** thoughts of **actions**:	thoughts of ends of actions	Thoughts of means of actions	Thoughts of effects of actions

We can begin to use these ideas to see the ideas of influx in degrees and correspondences. We learn from reading Swedenborg about how these are set up, and thus we can understand some of the basic steps of what happens in psychology when stages of behavior have been observed.

THE GENERAL PICTURE OF DISCRETE DEGREES

I now finish by showing where these ideas lead to. I had learned something new from Swedenborg by seeing first how love could be a substance, and secondly how there was love, wisdom and use in both the degrees and the sub-degrees of the mind. I used those two insights in order to understand some things new both in physics and in psychology. Now we look at the broader picture. We are going in Table 7 to put Table 6 into the middle column of another set of bigger degrees: the spiritual above (red to the left in the picture), and the physical below (green to the right in the picture). Table 8 shows these same nine degrees and sub-degrees but in Swedenborg's terminology.

Table 7: The Mental degrees of psychology are part of the Bigger Picture

Spiritual degrees	**Mental degrees (from Table 6)**	**Physical degrees**
1. **Spiritual Degrees** **Spiritual substances forming loves:**	**2.** **Mental Degrees** **mental substances forming thoughts:**	**3.** **Physical Degrees** **physical substances forming effects:**
love of loving: 1.1	**thoughts of loves:** **2.1**	effects from loves: 3.1
love of thoughts: 1.2	**thoughts of thoughts:** **2.2**	effects from thoughts: 3.2
love of actions: 1.3	**thoughts of actions:** **2.3**	effects from effects: 3.3

Table 8: A Bigger Picture in Swedenborg's terms, with three degrees as columns, and nine subdegrees inside.

interior mind: love	**exterior mind**: understanding	**natural world**: (physical) effects
1.1 Celestial	2.1 Internal Rational	3.1 Formative level
1.2 Spiritual	2.2 Scientific (External Rational)	3.2 Virtual processes
1.3 Spiritual-Natural	2.3 Sensual	3.3 Actual effects

In Table 7 you can see that thoughts are just one of three things. We have in 1.1 love of loving. Below this , in 1.2, we have love of thoughts, love of actions. Using Swedenborg's terms in the version of Table 8, these are the three heavens: the celestial heaven in 1.1, the spiritual heaven in 1.2.

The third degree is spiritual natural heaven in 1.3 where people are concerned about doing the right actions, obedience and wanting to do the right things even if they don't have the detailed thoughts to do them and or the love of doing them in the full way. Thus loving and thinking details are the responsibilities of the heavens above them, which provide mediated influx going down into the 1.3 lower degree.

On the right we have a physical degree. We first in 3.1 have effects from loves which are ends, purposes, targets. These things are the 'final causes' that have been removed from science, but from the Writings we know there must be some 'formative degree' for purposes in the physical. We have in 3.2 the effects from thoughts in the physical, and then in 3.3 the ultimate effects in the physical from actions in the mental. Quantum physics and quantum field theory are needed to understand the details of 3.3 and 3.2 respectively.

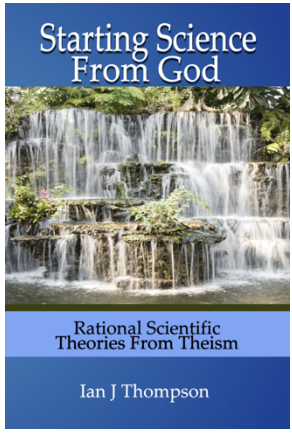
The Greek word for nine is ennead, so I call a group of 9 subdegrees an *ennead*. We can have trines for sets of three and enneads for sets of nine degrees or subdegrees.

CONCLUSION

In this article I have described occasions in my earlier life (my 20s) when I took some important ideas from Swedenborg and brought them to understand physics. I was trying to understand in a better way what Swedenborg was talking about when he says that love is being or substance. I thus used the ideas from Swedenborg trying to understand what the substance of physical things is, and then I worked back and got a new idea what the substance of mind and spirit could be.

I was reading psychologists such as Patricia Churchland in her book *Neurophilosophy* in 1986. She argues against dualism, which the idea is that mind and brain are independent. Because we don't have any idea what mental substance is, she concluded therefore we have no idea how a mental substance could be connected to the brain. But from Swedenborg, we do have an idea of mental substance. In fact, everyone knows what mental substance is: it is the desires we have. That is our mental substance. Our desires that we have all our life are the mental substance which keep us going. Then we use Swedenborg's ideas of influx, which explain causes from above and constraints from below. We can begin to understand how the mind and brain are connected by using those ideas, after we make these steps to connect them with discrete degrees and to understand what love is as a kind of substance.

These ideas have been expanded and discussed in more detail in my book *Starting Science from God*. The principles (*principia*) are where you start from. Most scientists begin from material hypothesis. We need though to start from assuming the principle that there is God according to the way Swedenborg described, and then work out what are the conclusions that you might expect on that basis. I first made the website theisticscience.org, and the book itself is described at beginningtheisticcience.org.



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