The essence of formal logic: Simple and useful rules that are not objectively true

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Abstract: Logic is the rule of rational thinking. When thinking is expressed in language, logic becomes the rule of language. Logic is not the law of objective things, each discipline studies different laws, while logic is applicable to all disciplines because all disciplines use rational thought and language. Logical judgment is not necessarily the truth. In the subjective world, the simple atomic concepts can never change. In the objective world, concrete things are complicated, so A can be different from A. The rules of formal logic, such as the law of identity, the law of exclusion of middle and the law of non-contradiction, are the rules of the subjective world, and are the methods to deal with the logical structures in the subjective world, rather than the methods to deal with the real things in the objective world. The understanding of any objective thing requires a process from simple to complex. In the beginning stage of cognition, we must simplify and abstract complex objects, and use formal logic when simplifying and abstracting. For example, suppose that the Chaobai River this year is the same river as the Chaobai River in the past ten years, and then use the hydrological data of the past ten years to predict the situation of the river this year. This hypothesis is simple and useful but not objectively true. Making objective things obey the rules of formal logic is entirely artificial. Because only by following these rules can we derive useful conclusions. The purpose of simplification is to make the sentences do not contain contradictions, easy to thinking and calculation. The actual objective things contain contradictions and do not conform to formal logic. So dialectical logic negates the rules of formal logic.

1. Introduction

If I say that I first saw the lightning and then heard the thunder, this statement is logical. If I were to say that I heard thunder and then saw lightning, it would be illogical. So what's the logic? The theory in the logic textbook is of course logic, but we are talking about much more than that. The following will discuss the true meaning and value of logic, analyze the nature of formal logic, and then compare the difference between formal logic and dialectical logic.

2. What is Logic

2.1 Definition of Logic

Our brains are in constant motion, in addition to receiving sensory experience, they are also constantly thinking. Thinking is to make new products of thought from existing products of thought. Thought includes perceptual thinking and rational thinking. Perceptual thinking is thinking without rules, rational thinking is thinking with rules, also called reasoning. Logic is the rule of reasoning. When thinking is expressed in language, logic becomes the rule of language. The rules of words and single sentence are called grammar, and the rules of relations between sentences are called logic.

Definition: Logic is the rational rule of relations between statements.

Logic is not the law of objective things. Logic appeared after the emergence of human rational thinking, there is no logic before the emergence of rational thinking. If logos means objective laws, then logos is quite different from logic. For example, the relationship between force and acceleration is an objective law that has existed since the Big Bang, but there was no logic then.

Objective laws need to be expressed in language, so many philosophers call objective laws logic,

which is completely wrong. Each discipline studies different laws, and logic applies to all disciplines because all disciplines use rational thought and language. When language is used to reflect reality, language is a simulation of reality. Simulation is to imitate a real thing with a fake thing. Some of the structures and properties of the fake thing should be the same as those of being imitated, so some rules must be laid down for the use of language, and this is how logical rules arise.

Logical judgment is not necessarily the truth. Logical unity can be used as an alternative criterion for judging truth, but it is not the final criterion, the final criterion is practice and value. For example, the conclusions of quantum mechanics work well in practice, but are illogical. On the contrary, the content of judgments and reasoning may be wrong, but these wrong judgments and reasoning may be logical. For example, all crows are white birds, and the bird I saw today is black, so it can't be a crow. The main premise and conclusion of this reasoning are wrong, but the process of this reasoning is not logically wrong.

2.2 Extended Meaning of Logic

In the mechanical craft class, teachers often tell a case called hollow ball. A designer designed a hollow metal ball, after drawing let the factory make it out. The factory worker said he could not. If the two hemispheres were processed separately and then assembled together, they could be hollow, but how could the hollow part inside a complete ball be processed? How did knives get in? If it was cast, how did the sand core come out? It was not logical, it was easy for a designer to draw such a ball on a drawing, because the drawing was fake and could ignore the logic of everyday life, but to actually produce a real hollow ball, it must be logical.

So what's the logic here? The worker at the factory may not have studied logic, but he knew it was illogical. The logic he spoke of was his experience, processes of production that he had repeated thousands of times. There were some technical specifications in these production processes, and when the worker thought about production problems, he always followed these specifications, and these specifications became the rules of their rational thinking, so he calls these specifications logic. In fact, this kind of logic is not logic in the real sense, it can be said that the extended meaning of the concept of logic, this kind of logic can be violated.

Many new technologies will change the relationship between things, breaking past norms and making people feel illogical. It is not illogical, the logic that is the basic norm of rational thought has not changed. The magician's performance makes it seem illogical, a living person can be squashed. If a magician can do it, it must be logical. It's just that he hides some of the middle and props, which makes it seem illogical. In life, we treat the relationships between common things as rules that cannot be broken, and then treat these rules as rules of rational thought, and call these rules logic.

In addition, there is no transcendental logic in the world, even if there were, it could not be described. The logic we usually use is based on experience through induction, Western philosophers always talk about a priori logic is completely wrong. We must adopt a pragmatic attitude towards the right and wrong of logic, and whether the logic we use is correct depends on whether it solves problems, rather than whether it conforms to a priori logic.

3. Formal Logic

3.1 Subjective Things Follow Formal Logic

Logic includes formal logic and dialectical logic, both of which are the rules of rational thinking, but they are very different. Formal logic follows the law of identity, the law of exclusion of middle and the law of non-contradiction. A is A, A is not non-A, and if A belongs to B and B belongs to C, then A belongs to C. Logical relations like this belong to formal logic. What is the nature of formal logic? Why should our thinking obey the rules of formal logic?

Every objective thing is infinitely complex, and the experience or concept in the human mind is always very simple at the beginning, and then the concept can gradually develop from simple to

complex. Simple concepts abide by the law of identity, that is, are always the same as themselves, expressed as A=A. It's not going to happen that A is not equal to A. In the objective world, concrete things are complicated, so it is possible that A is not equal to A. For example, I am a very different person today than I was ten years ago. You can't step into the same river twice. No two leaves in the world are the same. But in the subjective world, I, as a simple atomic concept, can never change. In order to express my change, many comments must be added to the concept of "I", for example, I of today, I of ten years ago, and so on. "I of today" is a combinatorial or molecular concept that combines the three atomic concepts of "I" , "of" and "today". This molecular concept is different from another molecular concept, "I of ten years ago," but the atomic concept of "I" has not changed. Every molecular concept is always the same as itself.

In the same way, it can also be proved that subjective things obey the law of exclusion of middle and the law of non-contradiction. In the past, everyone believed that the law of identity, the law of exclusion of middle and the law of non-contradiction were objective laws. Through the above argument, it can be found that they are originally rules of the subjective world, and methods for dealing with logical structures in the subjective world, rather than methods for dealing with real things in the objective world.

Theorem: The law of identity, the law of exclusion of middle and The law of non-contradiction are the rules of subjective things, and objective things do not abide by the law of identity, the law of exclusion of middle and the law of non-contradiction.

3.2 Cognition Process from Simple to Complex

Objective things are too complex to follow formal logic. If we want to make objective things obey formal logic, we must simplify objective things. For example, each game has its own rules, chess stipulates that pawns can only move one square at a time, only forward, not backward, the chariots can only go straight, the phase can only go diagonal, and so on. These rules are different from objective reality, where chariots can't just go straight. But to play the game must abide by such rules, otherwise it is not fun, can not meet the needs of people.

Formal logic is the rules of rational thought, rules that are simple and useful but unreal, like the rules of chess. The understanding of any objective thing requires a process from simple to complex. The rules of formal logic, including the law of identity, the law of exclusion of middle and the law of non-contradiction, are all artificial logical structures. There is no such logical structure in the objective world, and the purpose of constructing such logical structure is to simplify thinking. The purpose of simplification is to make the sentences do not contain contradictions, and make it convenient for thinking processing, calculation and prediction.

For example, I want to know if the Chaobai River will flood this year. I shall first investigate the flooding information of Chaobai River in previous years and then conduct a statistical analysis. But the river is concrete and complex and changes every year, including the height and strength of river levees, the amount of silt at the bottom of the river, and the amount of aquatic plants. It even changes every day, you can't step into the same river twice. What should I do if I can't use the hydrological data from the last ten years to predict what the river will do this year? We must simplify and assume that all conditions remain the same, that is, the Chaobai River of the past ten years is equal to the Chaobai River of today. Under this premise, the possibility of flood disaster in this year's flood season is predicted, and a preliminary conclusion is obtained. Then, when there is time and conditions, it will be further studied step by step according to the height and strength of the embankment, the amount of silt at the bottom of the river, the amount of aquatic plants and other specific conditions. These in-depth studies should lead to more accurate and true conclusions, but the situation is often too complex to bear fruit. That's when that preliminary conclusion becomes very useful and important. I use the law of identity of formal logic when simplifying and abstracting, and I think this year's Chaobai River is the same river as that of previous years. This is a hypothesis that is simple and useful but not objectively true. The effect of this hypothesis is to reduce a real concrete thing to an abstract logical construction. I am studying a river that has been simplified, and I am dealing with this logical construction, the dealing is a game of thought within the subjective

world.

The relations of the objective world are complex, some of which conform to the rules of formal logic and some of which do not. These relationships are objective and real, but because they are very complex, we can not accurately understand them, can not carry out logical deduction and prediction, and can not get the conclusions we want. If you want to carry out logical deduction and prediction, you must simplify these real relationships, and then you can conclude, calculate, statistics and predict the phenomena of observation, measurement and testing, so that there is formal logic. So the characteristic of formal logic is simple and useful but not objectively true. This is an important theorem.

Theorem: Formal logic is simple and useful rules that are not objectively true.

Almost all the reasoning of science and technology uses formal logic, so all the conclusions of science and technology are not absolutely objective and accurate. We often fail because of using these conclusions in practice, but with the development of science and technology, the success rate will gradually increase. If formal logic is objective and true, then science and technology should be able to guarantee our practical success, but science and technology can never guarantee our success, only let us constantly improve the success rate.

Making objective things conform to formal logic is a completely artificial rule. Because only by following these rules can we derive useful conclusions. We need to use the law of identity, the law of exclusion of middle, and the law of non-contradiction every day, and deduce many simple and useful but untrue conclusions with formal logic every day. Because we use it every day and get used to it, we don't pay attention to it, we don't seem to have made any simplification, and it seems that all the reasoning is objective, true and accurate. The main task of philosophers is to discover these neglected things.

The simplification of complex content has long become our mindset, a priori thing, as if this mindset does not need testing. The priori means that there is no need for testing. Many people think that formal logic must be correct, a priori ability to acquire knowledge, this view is wrong, and any product of thought needs to be tested in practice to see if it is really valuable. The process of simplifying what is real and concrete is not that our understanding conforms to the objective world, but that the objective world conforms to our understanding. This is what Kant called the Copernican Revolution. But Kant did not explain the nature of formal logic with this revolution theory.

Pavlov-trained dog thought of food when it heard a bell, it thought yesterday's bell was the same as today's bell, and it didn't know that the bell that sounds the same might come from a different person, or the same person for a different purpose. If the bell is set to A, the animal will think that A always equals A. If this kind of thinking can make it eat enough every day, then it thinks it is the truth.

Man came from animals, and man's thinking came from animals' thinking. The way of thinking of animals is conditioned reflex, and the basic type of human thinking (the instinctive form of thinking) is also conditioned reflex. Since formal logic could solve most problems in life, this kind of conditioned reflex was reinforced and became a fixed thinking of people. Later, people found that some things did not conform to formal logic, and this way of thinking had to be modified, so dialectical logic was born. Objective relations contain contradictions. But formal logic is useful, it can reason, it can draw useful conclusions, so formal logic seems objective.

There are contradictions between objective things, which do not conform to formal logic. Therefore, dialectical logic negates the rules of formal logic and makes the sentences contain contradictions in order to conform to the characteristics of objective things.

Definition: Formal logic is the rules of rational relations between sentences that do not contain contradictions. Dialectical logic is the rules of rational relations that contains contradictions between sentences.

The objective world is composed of Wu, Shi, Dao, Li and relations. Wu is material, Shi is event, the movement and change of substances and relations. Li is Plato's idea, the commonness of material, and Dao is the law, the commonness of events and relations.[2] Compared with formal logic, dialectical logic is closer to Dao. In the subjective world there are Xin, Xing, Qing, Yi and

thought products. Xin is thought, Xing is nature, interests and needs, Qing is mood, emotion and vision, Yi is manner, will and decision. Formal logic is not law, it is rules, and a rule is a decision.

4. Dialectical Logic

4.1 Dialectical Logic Comes from Rethink

There are commonalities between objective concrete things. In language, commonalities can be expressed in terms of concepts. For example, the white of a white horse's fur and the white of the limestone particles are considered the same thing, and we stipulate that the white as a concept must conform to the law of identity.

The objective and real things are very complex, and when making logical rules, people could only pay attention to some attributes of the objective things and ignore others. After the rules of formal logic were formulated, problems were found in use. In order to solve these problems, dialectical logic emerged. There is no absolutely pure white in the world, at first we feel that the white of the white horse is the same as the white of the limestone, and later the difference between them may be slowly found. Another example is that all water can extinguish fire, but some water can be drunk and some water cannot be drunk. From the property of fire extinguishing, pure water and rainwater are the same, from the drinkable property are not the same. According to formal logic, water as a concept should be the same everywhere, but dialectical logic holds that the concept contains differences. People's understanding of objective things has a continuous developing process.

A piece of paper has two sides, I set the top A and the bottom minus A. If he top plane can be extended indefinitely, every part of it is A. But the top and bottom sides of the Mobius strip are connected, so top can be equal to bottom, so A can be equal to minus A. And the inside of a Klein bottle can equal the outside. At the poles of the Earth, south can equal north. You can step into the same river twice, at the same time you can't step into the same river twice.

The initial understanding of things conforms to the law of identity of formal logic, and the in-depth understanding of things produces difference, which conforms to dialectical logic. From this point of view, dialectical logic is more in line with objective reality. But dialectical logic can not be used for logical reasoning, it does not meet the needs of people. Therefore, the value of formal logic is greater, and this value makes formal logic have great vitality.

Much of Hegel's dialectics is actually epistemology, not logic. Most of the content in Engels' Dialectics of Nature is actually the world view, not dialectics, but the application of dialectics. Marx's Historical Materialism includes two parts: meta-ethics and historical view, and it is not dialectics.

So what is dialectic or dialectical logic? Logic which differs from formal logic is called dialectical logic if we think it correct, and sophistry if we think it incorrect. The so-called logical, is able to achieve logical unity, no self-contradiction, in line with a set of established logical rules. Formal logic has a relatively mature set of logical rules. Dialectical logic contains self-contradiction and does not conform to the rules of formal logic, but it is the commonality of many things, which is the relationship we have to admit. Sophistry is also dialectic, but it is incorrect dialectic. Whether dialectics are correct mainly depends on whether they are beneficial to people, whether they are beneficial to the development of science, and whether they can lead to valuable conclusions. Sophistry and stealing concept cannot lead to valuable conclusions.

Philosophy accepts dialectics and science rejects dialectics, which is one of the main differences between science and philosophy. Philosophy accepts reality, science rejects reality, so philosophy is greater than science, and science cannot replace philosophy.

4.2 Blind Negation of Dialectical Logic

Because formal logic is simple and useful but not objective and true, formal logic can't be refused, but it can't be completely credited. Formal logic is the basis of science, science and technology cannot be separated from formal logic. It can be said that formal logic is responsible for

most of the achievements of modern civilization. But at the same time, we should not think that formal logic is completely objective and true because of its great merit, and we should not forget that the use of formal logic is conditional. Real and concrete things often do not conform to the law of identity, the law of exclusion of middle, and the law of non-contradiction. The ultimate criterion for testing truth is not logic, but practice. Formal logic is useful but not objective, dialectical logic is objective but not useful. Mr. Wu Zonghuang at Baoding, China, who founded "the theory of subject-object relations", said: "Dialectical logic is fruitless flower." Neither formal logic nor dialectical logic can be abandoned, but many people often go to extremes.

Nowadays, many people believe that real and concrete things must conform to the law of identity, the law of exclusion of middle and the law of non-contradiction. Many scientists regard formal logic as the common law of all things. Some scholars, seeing the use of formal logic, regard these relations as a priori and purely rational, while rejecting dialectics entirely. In a textbook of formal logic, it is clearly stipulated that "Correct thinking should be clear and without contradiction, and the laws of identity, the law of exclusion of middle and the law of non-contradiction embody this requirement. The laws of identity, the law of exclusion of middle, and the law of non-contradiction apply most generally to all concepts, propositions, reasoning, and arguments." They do not know that formal logic is the abstraction of relations in the objective concrete world, and that this abstraction is to a large extent a distortion.

Zhang Dongsun said, "Materialist dialectics is a far-fetched and confusing thing and completely wrong." He also said that the positive, negative and unity of dialectics are completely useless in science. "The scientific method, since ancient times, is still only the so-called method of observation, induction, measurement, assay, statistics, etc., and has never used dialectics." [2]

Dialectical logic does not conform to the law of identity, the law of exclusion of middle and the law of non-contradiction. If these three rules are universally applicable, then dialectical logic has no place to be ashamed. All theories are tools of man, and man needs all kinds of tools, as long as they are useful and can bring benefits. Formal logic is not only useful, but allows the natural sciences to flourish. So formal logic is a very useful tool, and a great tool. But just formal logic is great does not mean that all logical relations must conform to formal logic. What is more, we should not blindly deny dialectical logic.

Guan Min also said that in traditional Chinese culture, attention is paid to dialectical thinking, and the thinking habit of formal logic is lacking, so it is decadent and backward. [2] It is unreasonable for Guan Min to attribute China's backwardness entirely to dialectical logic. After the Renaissance, Western science advanced rapidly, and China fell further and further behind. This is a fact, but this does not mean that dialectical logic must lead to backwardness and decay, and the fact that China's 5,000 years of glorious civilization can not be denied. Hegel and the ancient Greek philosophers also studied dialectical logic and did not slow down the development of Western civilization.

4.3 Blind negation of formal logic

At the other extreme is the blind negation of formal logic. Hegel mocked formal logic, "The law of identity is then expressed as 'everything is identical with itself'; Or 'A is A', negative: 'A cannot be both A and non-A at the same time.' Such propositions are not really laws of thought, but only laws of abstract intelligence. The form of this proposition is itself in contradiction. For a proposition must make the distinction between subject and predicate, but this proposition does not do what its form requires of it." "It would be ridiculous if people were to speak according to this law which pretends to be the truth." "Do not think of identity simply as abstract identity, as identity that excludes all differences. This is what distinguishes all bad philosophy from the only philosophy worthy of being called philosophy."[3-4]

Hegel saw that formal logic was not objective, but he did not understand the value of formal logic. In his *Philosophical Notes*, Lenin several times excerpted Hegel's criticism of the identity of the abstract and the concrete, expressing his approval. In *Popular Philosophy*, Ai Siqi bluntly declared: "We have long since declared the death of formal logic theory." "The thought of formal

logic theory, though it cannot be said that it is not thought, is only thought of the lower order; Now that we have a higher logic of motion, we do not need formal logic theory." [2]

It is a very important philosophical discovery that Hegel saw the difference between concrete identity and abstract identity. Hegel's mistake is that he forgot that abstract identity is not a metaphysical claim, but the reasoning principle of most theories of natural science. His denial of abstract identity is against all scientific theories, and it cannot be said that all scientific theories are ridiculous. Formal logic is the distortion of the objective world and the colored glasses of human beings, but scientific research cannot do without this colored glasses, so we must accept both formal logic and dialectical logic. It is wrong to blindly negate formal logic or dialectical logic. Many useful things are not real, they are subjective. For example, concepts, probabilities, possibilities are tools, and so is formal logic. Formal logic has value, but the application of formal logic has conditions and scope, out of the scope is wrong.

This narrow and one-sided view as Hegel has ever been rampant and reached its peak. Since the 1920s, there has been a trend in the Soviet Union to negate formal logic with the dialectic "A is A and not A". Middle schools and colleges were ordered to cancel logic classes, and dialectics was regarded as the only scientific logic, and formal logic must be criticized when teaching dialectics. In the 1930s, the Soviet Union's political attack on the Debolin school led to a total rejection of formal logic.

A group of Chinese who were heavily influenced by the Soviet Union also began to criticize logic in the latter years of the 1920s. Although the criticism has been loud, it has not shaken the status of logic in the curriculum of Chinese universities and middle schools. In the Cultural Revolution, logic suffered another heavy blow. Ni Dingfu, deputy director of the Institute of Philosophy at the Chinese Academy of Social Sciences, recalled: "Logic science is one of the hardest hit areas. Logic research institutes and logic teaching and research departments (groups) in universities have been abolished, logic classes in schools have been abolished, and professional teams have been disbanded. "[2]These lessons are worth remembering.

Guan Min said, a group of ducks besieged the "ugly duckling"; The duck is dialectics, and the "ugly duckling" is formal logic, which was besieged by the fans of dialectics. Finally, the "ugly duckling" creates the computer and the Internet through modern mathematical logic, completely overcoming the siege of the dialectics ducks, and formal logic finally becomes the "white swan" in the field of human spirit and culture! The achievements of logical science in the 20th century far exceed the achievements of the previous two thousand years combined.[2]

It is true that formal logic has become a white swan by creating computers and the Internet through mathematical logic, but this does not mean that formal logic has thus triumphed over dialectics.

5. Conclusions

Logic is the rule of rational thinking. Logic is not the law of objective things. Logical judgment is not necessarily the truth. In the beginning stage of cognition, we must simplify and abstract complex objects, and use formal logic when simplifying and abstracting. Making objective things obey the rules of formal logic is entirely artificial. Because only by following these rules can we derive useful conclusions. The purpose of simplification is to make the sentences do not contain contradictions, easy to thinking and calculation. The actual objective things contain contradictions and do not conform to formal logic. So dialectical logic negates the rules of formal logic.

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