Some History of Logic

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Figure: Kurt Gödel

- The lives of great thinkers are sometimes overshadowed by their achievements-and there is perhaps no better illustration of this phenomenon than the life and work of Godel.
- Influence of wars and other mathematicians on him.

Abstract Summary

- One way of saying it is that Godel transcended his times. It took twenty years for the field to catch up with him, though the war also contributed to the delay.

- Godel was influenced by the ideas of others. He had many unpublished works. If he had published this material without reservation, others would have studied it and that in turn would have induced him to do more great work.

Godel's Childhood

- Godel was born in Brno, Austro-Hungarian empire on April 28, 1906.
- His father, Rudolf Godel, was engaged in the textile industry.
- His mother, Marianne Godel, who had studied in France, was versatile, gentle and kind.
- His grandfather Joseph Godel was a famous singer at the time and was a member of a band for many years.
- "frequent bouts of ill health" ;depression.

Godel's Childhood

- 1912—1916, Gödel attended the Evangelische Volksschule, a Lutheran school in Brünn.
- 1916—1924. Godel attended secondary school in Deutsches Stats-Realgymnasium.
- According to his classmate Klepetal, "Godel thought he had always been an Austrian, living in exile in Czechoslovakia".
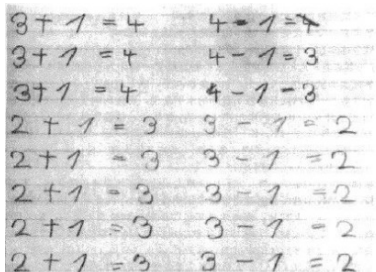

Figure: Gödel's work

The University Period

- 1924. Godel studied physics at the University of Vienna.

- 1925. Godel claimed in his later years that he had been a mathematical Platonist or conceptual realist since 1925, and the general philosophy, contrary to positivism, was "rationalist, idealistic and optimistic".

- 1926. He switched his major to mathematics and joined in the Vienna Circle.

Vienna Circle

Figure: Vienna Circle

Vienna Circle

- The Vienna Circle is an academic group that originated in Vienna in the 1920s.
- The members paid attention to the development of natural sciences at that time, and tried to explore philosophy and scientific methodology on this basis.
- Tractatus Logico-Philosophicus by Wittgenstein
- First, they reject metaphysics and consider experience as the only reliable source of knowledge; Second, only by using the method of logical analysis can finally solve the problem of traditional philosophy.
- Until Hahn's death in 1934 and Schlick's assassination in 1936, the Vienna Circle was finally dissolved.

The University Period

- Godel had always disagreed with their basic views of denying objective reality and holding that metaphysical propositions are meaningless propositions.

- He wrote to his mother in 1946: "I am not, in fact, an active member of the Schlick group. I in many ways directly disagree with its main ideas."

Carnap

Figure: Rudolf Carnap

Carnap

- Carnap was born in Germany in 1891.

- In college, Carnap studied mathematics, physics, and philosophy, and was a student of Frege, the mathematician and philosopher who was the founder of analytical philosophy, which was later inherited and developed by Russell and Wittgenstein.

- Godel did not like Wittgenstein's work and never went into it, merely "skimmed through it". Moreover, he argues that Wittgenstein's views on mathematical philosophy had no influence on his work, and Vienna Circle's interest in mathematical philosophy did not come from Wittgenstein.

Carnap

- Wittgenstein's 1967 Bemerkungen Uber die Grundlagen der Mathematik (a commentary on the foundations of mathematics)

- Carnap wrote in the 1961 foreword to the second edition of his Der Logische Aufbau Der Welt (the logical framework of the world) : "Since Frege (I study in Jena was under his guidance, but it was not until after the death of his has been recognized as an outstanding logicians) and through the study of Russell works, the influence of I realized mathematics for fundamental importance to the construction of the knowledge system, but also recognize the mathematics of pure logic, the nature of the form, It is this property that makes mathematics independent of the contingency of the real world. These insights became the basis of my book."
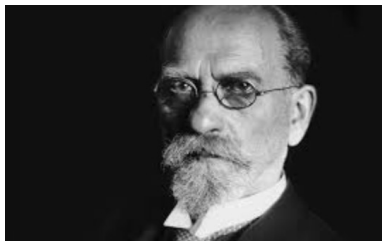
Husserl

Figure: Edmund Husserl

Husserl

- Edmund Gustav Albrecht Husserl (April 8, 1859 – April 27, 1938) was a famous Austrian writer and philosopher of the 20th century.

- Husserl's phenomenology had become prominent at the time and was being discussed within academic circles.

- Some scholars called Husserl "the unknown master of young Carnap" through analysis and research.

- Husserl's phenomenological realism may provide a theoretical framework for systematic interpretation of his understanding of the essence of mathematics.

- Husserl's theory of essential intuitionism that clearly grasps conceptual meaning may provide a theoretical basis for the rationality of his conceptual realism. At the same time, "philosophy as a strict science" advocated by Husserl is also the important goal of the rationalist philosophy pursued by Godel.

Carnap

- Godel was not regarded as "opposition hidden in Positivism", or as the only possible mathematical Platonism or mathematical realist in Vienna Circle.

- Carnap, in his 1926 qualification paper, "The Logical Construction of the World," Carnap quoted Husserl's Mathesis der Erlebnisse (Mathematical model of Experience) in a positive sense. Carnap's attitude towards Husserl is in obvious contrast to Schlick.

- "new Positivism", a tendency to combine logicalism with empiricism.

Carnap

- logical analysis and even mathematical operations to syntactic analysis; extends formalization to the whole level of language and discusses "logical syntax of language".

- Carnap understood mathematical and logical axioms as an invention rather than a discovery of human intelligence, that is, as humanist or species relativism. On this point, he and Godel were opposites from the beginning.

- The Logical Structure of the World

Hahn

Figure: Hans Hahn

Hahn

- In his own assessment, Hahn, who would become his doctoral dissertation advisor, "had a very strong influence" on him.

- Hahn opened several logic courses and presided over logic discussion classes at the University of Vienna, and wrote a series of mathematical philosophy papers.

- It was Hahn who urged Schlick to come to Vienna to accept the chair of "Philosophy of Science with inductive Logic" set up for Hahn's teacher Maher.

- A comprehensive understanding of Hahn's stance on logical Positivism can be found in his Philosophical Essays, published in 1980 with a preface written by Carl Menger.

Menger

- Menger in 1924 under the guidance of Hahn doctorate to Amsterdam to continue after the topological dimension theory in the direction of research work.

- "One of the registered students was a delicate, strangely quiet young man called Godel. Later, I saw him again in the Schlick group. However, I never saw him speak in the group or participate in the discussion. He only used slight head movements to indicate his attitude: agree or disagree. ... "He was unusually strict and concise in his delivery of questions, both orally and in writing."

- Menger then imitated the Vienna Circle and in 1928 began to organize a group of brilliant young mathematicians to host the influential "Mathematical Colloquia".

Others

- As Feigel later recalled, they "met frequently, talked together on foot through the Vienna parks, and of course had endless discussions in cafes about logic, mathematics, epistemology and the philosophy of science – sometimes arguing late into the night."

- Natkin went into business after receiving his doctorate, but they both maintained a long correspondence with Godel.

Others

- In 1928, Hilbert and Ackerman published a Compendia of Theoretical Logic.
- An unsolved problem – the completeness of predicate calculus in a narrow sense is clearly presented.
- In the summer of 1930, Godel began working on the Hilbert Plan. He wanted to prove the incompatibility of analysis.
- Hilbert gave a famous speech at the conference entitled "Logic and the Knowledge of Nature", in which he declared optimistically that "we must know, and we shall know".
- Godel announced his first incompleteness theorem. It was the beginning of his life's work. Soon after, he proved the second incomplete theorem. This result was undoubtedly a great blow to the Hilbert project.

After Incompleteness Theorems

- 1932, The Intuitionist Calculus of Statements
- 1933, Godel then became a private dozens. he went to Princeton University. He became good friends with Einstein.
- 1934, Godel gave lectures at the institute of advanced study in Princeton titled On Undecidable Propositions of Formal Mathematical Systems of which notes were published later on taken by Stephen Kleene, an American mathematician notable as being one of the founders of recursion theory. He suffered a nervous breakdown upon his return to Austria and spent several months in a psychiatric hospital to treat the depression that followed his breakdown.
- 1936, Godel had another nervous breakdown. As a result of the assassination, Godel became delusional and spent several more months in a psychiatric ward. He also developed paranoid symptoms after the incident, one of which was the fear of being poisoned.
- 1937, Godel returned to teaching at the University of Vienna.

After Incompleteness Theorems

- 1938, Visiting Princeton again and publishing this work titling it Consistency of the Axiom of Choice and of the Generalized Continuum Hypothesis With the Axioms of Set Theory. Marring Adele Nimbursky, a woman he had already known for 10 plus years.

- 1939, Godel submitted an application to be paid. There were a dozen private lecturers at the University of Vienna, but Godel had no salary.

- 1948, Godel was taking the naturalization test to become an American citizen. But he had found a logical loophole in the Constitution that could turn the United States into a dictatorship.

- Morgenstern reassured Godel that the possibility he had found was highly hypothetical and highly circumstantial, and specifically told him not to mention it in front of the judge.

After Incompleteness Theorems

- Early the next morning, the trio drove to the federal courthouse in New Jersey. The judge said directly to Godel: Up to now you have always had German nationality. Godel immediately corrected him by saying he was Austrian. The judge continued: "After all, that country was under a criminal despotism... Fortunately, this is not possible in the United States. "When the word" despotism "is conjured, Godel immediately retorts loudly," No, on the contrary, I know how it can happen. And I can prove it!"

- Fortunately, Godel eventually became an American citizen. Godel then took a job at Princeton University, much to the delight of his friend Einstein.

Critique of Carnap

- Willard Gibbs Lecture, "Some Basic Theorems on the Foundations of Mathematics and their Implications ";

- 1953/59 manuscript: "Is Mathematics Syntax of Language?" Speech prepared for The General Meeting of The American

- Philosophical Society in 1961: The Modern Development of The Foundations of Mathematics in The Light of Philosophy.

- Three manuscripts express Godel's sharp departure from the Viennese philosophical position not only in mathematical foundations but also in general philosophical views.

Critique of Carnap

- 1953, Godel was asked again to contribute to the Library of Living Philosophers Carnap volume. Shelp suggested that Godel write a 25-40 page essay entitled "Carnap and the Ontology of Mathematics," but Godel proposed only a short essay entitled "A Critique of Nominalist Views on the Nature of Mathematics."

- From 1953 to 1959, "Is Mathematics the Syntax of Language?"

Critique of Carnap

- First, when the manuscript was finished, Carnap had already passed the time to reply to the author. If Carnap's reply was not published, it would be unfair to everyone and difficult to explain to the world.

- The second, "I have completed several versions of the subject, but I am not satisfied with any of them. According to my own willingness to make strict assertions or give strong arguments is not difficult, but I found this topic and one of the basic issues of philosophy: concepts and their relationships is closely related to the objective reality of, want to clarify it difficult than I thought it would be thoroughly, and to the widely held prejudice, published only finished half of the work will do more harm than good."

Critique of Carnap

- "unlike empirical propositions, the truth of mathematical propositions depends on the meaning of the concepts contained in them."

- Godel's critical argument is based on three arguments: (1) the incompleteness of mathematics; (2) the unerasability of mathematical content and mathematical intuition; (3) a certain analogy between mathematics and the natural sciences.

- Godel admitted that although he pointed out that mathematics was not the grammar of language, he failed to show what mathematics was. In 1951 he said he had deliberately separate "things in the world" and the concept of "world", 1953/9 was also argued that "the facts" and the separation of the concept of "content", but in his realism of the whole concept of interpretation of these problems is not satisfactory.

Old Age

- In his later years, Godel did not go to church, but he read the Bible in bed every Sunday night. And believe in the afterlife.
- In 1977, Adele was hospitalized for six months and had two strokes that required major surgery. As we mentioned earlier, Godel was afraid of being poisoned, so he only ate food that Adele had tasted. So while Adele was in hospital, Godel refused to eat and eventually died of starvation. He died in a chair in his Princeton hospital room, weighing only 65 pounds.

Passed Away

- Since Godel's death in 1978, many articles have been written in his honor. Wang Hao's latest biography adds some interesting content. This biography is the only one that was completed before Godel's death and confirmed and corrected by Godel himself

- Godel's scholarly legacy includes correspondence, drafts, notebooks, unpublished manuscripts, his library, and all forms of loose-leaf notes and memos. These were donated to the Institute for Advanced Study in Princeton by his widow after his death. Godel himself made no decision about what to do with his manuscripts, although correspondence in his remains indicates that the Library of Congress asked Godel for his papers.

Post-credit Scene

- Do you remember the logical loophole in the U.S. Constitution that Godel discovered and Morgenstern described as "very hypothetical"?

- In 1952, American economist Arrow put forward the so-called "impossibility theorem" in economics, which rigorously proved that there was no gap between Western democracy and autocracy.

Post-credit Scene

- Remember I said a lot of biographies don't reliable?

- Russell recalled his Princeton days in his autobiography: At Princeton, I got to know Einstein very well. I used to go to his house once a week and talk to him and Godel and Pauli. These conversations were a little disappointing to me, because all three of them were Jews, exiles, cosmopolitan men, but I found them to have a German bias against metaphysics. For all our efforts, we could never find a common premise on which to argue.

- This passage caught the attention of Burton Feldman, so he has written a book, Einstein's Genius Club.

Post-credit Scene

- Godel: As for this reference to me, I have to clarify, first of all, that I am not actually Jewish (although I don't think the question matters); Second, this passage would give the impression that I had many discussions with Russell, which I didn't (I remember only having one); Third, as for my "pure" Platonism, it is no more "pure" than Russell's own Platonism.

- As Catherine Williams notes in her introduction to the book, Godel did not appear at Einstein's house as often as Russell suggested, but he did appear more than once. But anyway, between the winter of 1943 and the spring of 1944, these four talented scientists were living at the Institute for Advanced Study in Princeton.

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