The Laws of Logic and the Inference Rules

The rules of inference play an important role in the Russellian logic. For instance, Bertrand Russell argues in his *Principia Mathematic* that “Anything implied by a true premiss is true Pp. This is the rule which *justifies* inference.” Ludwig Wittgenstein, in contrast, is of the opposite view that there are no such things as the rules of inference. The view is illustrated by Wittgenstein’s significant distinction between *say* and *show*, which is a main theme throughout his *Tractatus Logico-Philosophicus.* According to Wittgenstein, a proposition *shows* what follows and does not follow it. In other words, if one understands a proposition, then he or she will *simultaneously* understand all propositions that follow it. For instance, if one understands the proposition “All humans are mortal,” then *from this proposition itself*, he or she will understand the proposition “Socrates is mortal,” without knowing anything about the so-called rule of *universal instantiation*:

For the latter proposition is *shown* by the former proposition, from the sense presented by the former proposition. Logical inference is a truth-preserving *relation* between two propositions, without appealing to external rules of inference. It is simply and solely *shown* and *justified* by the two propositions that are involved rather than by the so-called rules of inference. For what follows from a proposition is determined by the internal structures of the signs in the proposition, which mirror the internal structures of the corresponding objects in the world. Wittgenstein holds that the rules of inference in the Russellian logic is no more than superfluous and senseless second-hand afterthoughts that abstract and summarize what is happening. They are not needed in logical inference and express nothing about states of affairs in the world.

Another major divergence of Wittgenstein’s theory on logic from Russell’s is the laws of logic. In the Russellian logic, the laws of logic, such as the law of excluded middle and the law of non-contradiction , are used to express the *eternal*, *necessary*, *subsisting* truths which are located in the third realm. Wittgenstein dissents from Russell by holding that the laws of logic say nothing about the world and that they are senseless. Wittgenstein categorizes the truth-functions of a specific number of truth-arguments into three kinds: the tautology (always true), the contradiction (always false), and significant truth-functions (sometimes true and sometimes false). The laws of logic, such as , are tautologies, and are hence unconditionally true, that is, they are indifferent to the facts and hence to the world. Since the reality is what is the case, then the laws of logic are not pictures of the reality, and therefore express nothing (significant) about the world; i.e. they are nonsensical. In other words, the laws of logic are *analytical*, in the sense that their truths can be determined directly from their descriptions without mention being made of the meaning of their signs. For instance, if denotes the proposition “the flower is red,” then says “the flower is red or not red,” which is always true regardless of whether the flower is red in reality. As Wittgenstein argues in 4.4611 of the *Tractatus*, the laws of logic, and tautologies in general, are merely part of the symbolism.

However, that the laws of logic are senseless does not mean that they are noises. Indeed, the laws of logic *delimits* the logical space of the world, that is, the whole scope of all possible state of affairs. Therefore, they determine the boundary of what could be in the world, but say nothing about what is in the world. What is in the world, then, is said by significant propositions that express possible states of affairs, each of which occupies a place in the logical space demarcated by the laws of logic. Since thoughts are isomorphic to possible facts in the world according to Wittgenstein’s three-level hierarchy, then the laws of logic *are* limits and lines of demarcation of the thought within which we have significant thoughts, and beyond which we have contradictions.