The Artificial Intelligence Debate
False Starts, Real Foundations

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Natural and Artificial Intelligence

IN THIS ESSAY we will not attempt to decide whether artificial intelligence is the same as natural intelligence. Instead we will examine some of the issues and terms that must be clarified before that question can be resolved. We will discuss how the question about the relationship between natural and artificial intelligence can be formulated.

One of the first things that must be clarified is the ambiguous word *artificial*. This adjective can be used in two senses, and it is important to determine which one applies in the term *artificial intelligence*. The word *artificial* is used in one sense when it is applied, say, to flowers, and in another sense when it is applied to light. In both cases something is called artificial because it is fabricated. But in the first usage artificial means that the thing seems to be, but really is not, what it looks like. The artificial is the merely apparent; it just shows how something else looks. Artificial flowers are only paper, not flowers at all; anyone who takes them to be flowers is mistaken. But artificial light is light and it does illuminate. It is fabricated as a substitute for natural light, but once fabricated it is what it seems to be. In this sense the artificial is not the merely apparent, not simply an imitation of something else. The appearance of the thing reveals what it is, not how something else looks.

The movement of an automobile is another example of something that is artificial in the second sense of the word. An automobile

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moves artificially; it moves only because human beings have constructed it to move and have made it go by the release of stored energy. But it really does move—it does not only seem to be moving. In contrast, the artificial wood paneling in the car only seems to be wood; it burns, bends, breaks, and decays as plastic, not wood. It also smells, sounds, and feels like plastic, not wood. It seems to be wood only to vision and only from a certain angle and in certain kinds of light.

In which sense do we use the word *artificial* when we speak of artificial intelligence? Critics of artificial intelligence, those who disparage the idea and say it has been overblown and oversold, would claim that the term is used in the first sense, to mean the merely apparent. They would say that artificial intelligence is really nothing but complex mechanical structures and electrical processes that present an illusion (to the gullible) of some sort of thinking. Supporters of the idea of artificial intelligence, those who claim that the term names something genuine and not merely apparent, would say that the word *artificial* is used in the second of the senses we have distinguished. Obviously, they would say, thinking machines are artifacts; obviously they are run by human beings; but once made and set in motion, the machines do think. Their thinking may be different from that of human beings in some ways, just as the movement of a car is different from that of a rabbit and the flight of an airplane is different from that of a bird, but it is a kind of genuine thinking, just as there is genuine motion in the car and genuine flight in the plane.

Suppose we were to claim that artificial intelligence is a genuine, though constructed, intelligence. Must we then prove the truth of that claim? Are we obliged to show that the machines really think, that they do not only seem to possess intelligence? Perhaps not; no one has to prove the fact that artificial light illuminates and that airplanes really fly. We just see that they do. If thinking machines display the activity of thinking, why should we not admit that they truly are intelligent?

The problem is that thinking is not as visible and palpable as are illumination, motion, and flight; it is not as easy to say whether thinking is present or not. Even when we talk with another human being, we cannot always be sure if that person is speaking and acting thoughtfully or merely reciting by rote, behaving automatically. And

there are cases in which machines only seem to think but really do not: the electronic calculator can do remarkable things, but only someone who is deceived by it—someone like the person who takes artificial flowers for real ones—would say that the calculator possesses its own intelligence. The calculator may reveal the intelligence of those who built and programmed it, but it does not originate its own thinking.

How is artificial intelligence different from the calculator? How is it different from numeric computing? What does it do that we can call its own machine thinking, its own activity that cannot be dissolved into the thinking of the people who made and programmed the machine? If we are to claim that the thinking machine, though an artifact, does exhibit intelligence, we must clarify what we mean by the "thinking" it is said to execute. This may not be a proof, but it is an explanation, and some such justification seems to be required to support our claim that machines think.

Alan Turing set down the principle that if a machine behaves intelligently, we must credit it with intelligence.[1] The behavior is the key. But the Turing test cannot stand by itself as the criterion for the intelligence of machines. Machine thinking will always reproduce only part of natural thinking; it may be limited, for instance, to the responses that are produced on a screen. In this respect our experience of the machine's thinking is like talking to someone on the telephone, not like being with that person and seeing him act, speak, and respond to new situations. How do we know that our partial view of the machine's intelligence is not like that angle of vision from which artificial flowers look real to us? How can we know that we are not being deceived if we are caught in the perspective from which a merely apparent intelligence looks very much like real intelligence? Some sort of argument has to be added to the Turing test to show that artificial intelligence is artificial in the second sense of the word and not in the first—that although it is constructed and partial, it is still genuine and not merely apparent. We need to say more about intelligence to show whether it really is there or not, and we need to clarify the difference between its natural and artificial forms.