

Parallel Thinking Part 30: The Enigma of Consciousness III

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One of the most successful scientific ideas of the 20th century is Quantum mechanics, the theory of how matter and energy behave at atomic and sub-atomic levels. The concept began in 1900 when the

German theoretical physicist Max Planck (d. 1947) proposed that energy existed in individual units, called quanta. Planck's idea was then developed by other scientists, including Albert Einstein (d. 1955), Louis de Broglie (d. 1987) and Werner Heisenberg (d. 1976).

Yet for all the questions that Quantum mechanics has answered, it has also generated some extremely surprising results, which challenge the way we think about the physical world. One of the most famous experiments which highlights this involves firing atomic particles through a double slit onto a detector screen. In theory, particles can only travel through one of the two slits. Yet the pattern which builds up from the two slits suggests that these particles are interfering with one another, like the waves produced by dropping two stones into a still pond at the same time.

However, when scientists tried to uncover what was going on by detecting which of the slits each particle went through, the pattern changed and became two thin lines, corresponding to the two slits. In order to ensure that their detectors had not affected the results, they left them in place but switched them off. Astonishingly, the results returned to the original pattern. It became apparent that the act of observing atomic particles' behaviour actually changes what they do.

The most common explanation for this, known as the Copenhagen interpretation, was devised by Niels Bohr (d. 1962) and Werner Heisenberg (d. 1976). At the fundamental level of reality, the position and velocity of subatomic particles only

exists as a probability (producing the interference pattern). Once the particle has been observed, the set of probabilities immediately reduce to only one of the many possible values (producing two thin lines).

The Hungarian-American mathematician John von Neuman (d. 1957) noted that if the results are affected by the observer, a question arises: at what point is the observation being made? The detector, the eyes of the scientist and even the scientist's brain are merely physical systems. They are not 'doing' the observing. Only the scientist is actually observing the results. Who is the scientist? If it is not their eyes or their brain, what is it? Von Neuman concluded that the point of observation which alters the results must be the scientist's non-physical inner consciousness.

This startling result implies that human consciousness is not only a non-physical entity, it is somehow more fundamental than the physical world. If no one is observing reality, it appears to only exist in probability, not in certainty. As Max Planck himself put it, "I regard consciousness as fundamental. I regard matter [physical stuff] as derivative from consciousness". The next article will develop this idea further using Jewish sources.



Institute International de Physique Solvay, Fifth conference participants, 1927 in Leopold Park. With M. Planck, Marie Curie, second and third from left respectively, and Albert Einstein fifth from left.