Wolfgang Pauli – From Intellect To Intuition

“In some sort of crude sense which no vulgarity, no humour, no overstatement can quite extinguish, the physicists have known sin; and this is a knowledge which they cannot lose.”

J. Robert Oppenheimer

Wolfgang Pauli is mostly known as a genius, a prodigy in physics of the first half of the twentieth century. He was a man living a life full of opposites searching for unification through symmetry and harmony. His physics colleagues called him “the whip of God” and “the conscience of science.” Although he was always fair, he was most feared for his harsh criticism of colleagues. Of one paper he judged: “Not only is it not right, it’s not even wrong!” But Pauli had another side too: he had many archetypal dreams, a number of which were anonymously documented by C.G. Jung. Although many, but not all, of his private correspondence and papers have been made public and commented upon from a Jungian perspective, the question remains: “Who was Pauli, and what was driving him?”

Early years

Wolfgang Pauli was born 25th of April 1900 in Vienna in a wealthy, originally Jewish, family. In his youth he excelled in mathematics and physics and although he was cheerful and had lots of friends he would spend most of his time with his books. From 1918 to 1921 he studied theoretical physics with Sommerfeld, a very intuitive physicist at the Munich University, where at the age of 19 years he wrote a still famous paper on Einstein’s relativity theory.

Pauli’s godfather was Ernst Mach (1838-1916), a positivist and hyper rational figure. As a schoolboy Pauli regularly visited Mach’s house, which was packed with all kinds of experimental equipment. Mach would do some physics experiment, thus stirring the interest of Pauli. He strongly encouraged and developed the rational, logical attitude of the young Pauli, thereby assisted by Pauli’s father, a professor of chemistry. In Mach’s view there was no place for intuition: all had to be explained by facts and logic. Till the end of his life Pauli would be coloured by this attitude – and struggle with it.

In Munich Pauli met with Werner Heisenberg and they became interested in atomic physics. Invited by Niels Bohr, the founder of quantum theory, he worked a year in Copenhagen, where he developed his first ideas of what in 1925 was to become the “Pauli exclusion principle” – for which he would receive the Nobel prize in 1945. This exclusion principle is fundamental in the explanation of the structure of atoms throughout the periodic system. It is, however, one of those facts of physics which till today cannot be derived from first principles, which embarrassed Pauli till his death. Pauli is equally known for his prediction of the neutrino.

In 1928 Pauli became professor in theoretical physics at the Eidgenössische Technische Hochschule in Zürich.

Crisis years

In 1928-29 a number of dramatic events took place, resulting in a deep psychological crisis. Pauli has always been a strong drinker, which did not seem to hamper his scientific genius. His marriage with a bar singer-dancer became a complete disaster within one year. His mother committed suicide. Despite his
Jewish origins Pauli was baptised catholic. Now Pauli turned his back to the catholic church. His drinking came to the edge of violence and on advice of his father Pauli met with Jung, whom he consulted regularly till 1934. Especially Pauli’s dreams, which were full of symbolism from alchemy, were extensively discussed. Jung’s later publication Psychology and Alchemy would be based heavily on these dreams.

To a certain degree Pauli definitely had what we now would call psychic powers. His colleagues called it “the Pauli effect,” meaning that when Pauli entered a laboratory regularly some experimental equipment would break down in an inexplicable manner. Despite their friendship the experimental physicist Otto Stern even banned Pauli from entering his laboratory.

Quantum Physics

Until the end of the nineteenth century the world view was governed by classical physics and Newton’s laws, in which the world was like a clockwork, wound up by the Creator, and winding down in a determined manner. With the age of quantum physics came concepts like complementarity of Bohr – the wave-particle complementarity – and indeterminism and Heisenberg’s uncertainty relations. These uncertainties, as well as the concept of chance, are fundamental concepts of the theory, which is therefore incomplete. For this reason Einstein never really accepted quantum physics. Pauli, one of the architects of quantum physics and one of the few who really pondered its consequences, has struggled his whole life with this incompleteness.

Quantum physics is difficult to truly understand. Bohr has once said: “If quantum mechanics hasn’t profoundly shocked you, you haven’t understood it yet.” There are many practical applications of quantum mechanics like the transistor, nuclear power, laser, micro-chips, television etc., which are so successful that nowadays often an attitude of “shut up and calculate” is taken, ignoring and avoiding the questions of the deeper meaning – which still are far from understood.

Pauli and Jung

Pauli and Jung became fascinated by the same thought: that there exists a deeper reality behind quantum physics, which has the character of the unconscious. If this were true, then physics and depth psychology should be able to meet each other somewhere and hence penetrate deeper into the secrets of matter. Jung wrote: “Sooner or later nuclear physics and the psychology of the unconscious will approach each other when both, independent of each other and from opposite directions, proceed into the realm of the extrasensory.”

In a year long correspondence Jung and Pauli mutually inspired each other. Pauli was interested in a new language, called “neutral language,” which would encompass phenomena from physics as well as images from archetypes. But he did not overcome the barrier of scientific establishment although he did publish a book on the work of Kepler and Fludd. On the other hand Jung, also hesitating a long time to publish his concept of synchronicity, was stimulated by the scientific approach of Pauli.

Coming from two totally different fields of research Pauli and Jung found each other in the concept of an
“Einheitliches Sein,” a “Unus Mundus,” which Jung defined as a transcendent unity beyond concepts of time and space. In Jungian terminology synchronicities, coincidences in an inner world and an outer world, find their basis in a psycho-physical reality. Pauli’s life was full of synchronicities, and Pauli saw it as his major task to work on a new description of reality. Pauli saw links with synchronicity in the a-causal nature of quantum physics: on the quantum level cause and effect, even time and space, lose their classical meaning.

The Other Side of Pauli

Pauli had a strong interest in numbers, especially 2, 4 and 137. Of course 1, 3 and 7 have fundamental and well known meanings in occultism. Yet for a physicist, the number 137 is approximately equal to a dimensionless constant of physics, the fine structure constant α introduced by Sommerfeld. Most physics constants are either very big or very small. The α, however, is of a human size and until his death Pauli tried to decipher its significance – Pauli died in a hospital room number 137. In Hebrew the number corresponding to the word ‘cabbala’ happens to be 137.

In all the dreams of Pauli there are 71 instances of the number 4, the number which stands for Wholeness, Completeness.

HPB tells us in Isis Unveiled: “For instance four was held sacred by the Pythagoreans. It is the perfect square. ...and the ineffable name of Him, which name otherwise, would remain unutterable, was replaced by this sacred number 4 the most binding and solemn oath with the ancient mystics — the Tetractys.”

In a dream with a Persian figure Pauli asks: “Are you my shadow?” The Persian replies: “I am between you and the light, hence you are my shadow. Not the other way around.” Pauli: “Are you studying physics?” The Persian: “Your language thereof is too difficult for me, but in my language you would not understand physics.” Don’t we see here the Soul speaking to its reflection, the personality? Pauli wanted to understand that language. He wanted to go beyond the search for an explanation by physics only, and engaged in a much wider search. Pauli could not accept to only know a fragment of reality: he wanted to know all of it, he was searching for completeness and unity.

Pauli once told H.B.G. Casimir in his autobiography: “We are living in curious times. Christianity has lost its grip on humanity. Other times should come. I think that I know, what will come. I know it quite certain. But I won’t tell anyone, because otherwise they will think that I am crazy.”

Pauli has always known that theoretical physics had to be embedded into something bigger, more complete. Increasingly Pauli felt split in his life. His dreams often had shown the direction in which he should move, yet he lacked the courage to change. Jung’s assistant, Maria von Franz, with whom he formed a Platonic relationship that had deep spiritual significance for Pauli, witnesses that he “would not surrender himself to the demands of the unconscious and suffer the consequences.” Pauli never accepted the treatment part of the depth psychology offered by Jung and von Franz: He very well understood the deep archetypal meaning of the interpretations of his dreams, but consistently failed to face the consequences.
thereof, neither did he apply them to his own life. In 1955 von Franz and Pauli stopped their correspondence.

**The Kepler Fludd controversy**

Pauli’s essay: “The Influence of Archetypal Ideas on the Scientific Theories of Kepler,” analyses in detail the conflict between Kepler and Fludd – the Rosicrucian alchemist of the turn of the 16th century, whom HPB called the grand master of the medieval “Fire” philosophers. Pauli sees here the start of a trend which continues till today, in which science loses its universal character and focusses more on separate details, with its consequences for our way of thinking and being. Incidentally the Prince of Whales traces the same historical development in a slightly different way in his book “Harmony.”

Johannes Kepler (1571-1630) is best known for his astronomical research, though astrology also had its place in Kepler’s conception. Pauli writes:

> With Kepler a separation emerged between physics, religion and social sciences. That separation found its summit in classical physics, in which even God has been made redundant. Science had isolated itself and had nothing to do any more with life. This one-sidedness is not good. We have to search again for the relation between exact science, religion and philosophy.

This rational, separative method was completely unacceptable to the more intuitive, mystical Robert Fludd (1574-1637), for whom the indivisible wholeness was of paramount importance. The discussion between Kepler and Fludd could become very heated. Nevertheless in both views God was of fundamental importance. Kepler, more influenced by Christianity, expressed this in terms of the Trinity, whereas Fludd consistently used the Quaternary – the tetraktys, for example.

Pauli writes:

> What is the nature of the bridge between the sense perceptions and the concepts? All logical thinkers have arrived at the conclusion that pure logic is fundamentally incapable of constructing such a link. It seems most satisfactory to introduce at this point the postulate of a cosmic order independent of our choice and distinct from the world of phenomena.

This refers of course to Plato. Kepler himself speaks of primary images as being “archetypal [archetypalis],” and Pauli develops a detailed correspondence with Jung’s archetypes. Pauli writes: “the view of the universe was not as yet split into a religious one and a scientific one.” Indeed subjects of physics, religion, mathematics and physiology are all found in one single book of Kepler.11

Thanks to detailed experimental observations of Tycho Brahe, Kepler discovered the laws governing the motion of the planets. Yet that was not what he was seeking:

> He was fascinated by the old Pythagorean idea of the music of the spheres (which, incidentally, also played
no small part in contemporary alchemy) and was trying to find in the movement of the planets the same proportions that appear in the harmonious sounds of tones and in the regular polyhedra...."Geometria est archetypus pulchritudinis mundi."\(^\text{12}\)

In Kepler’s view the planets are still living entities endowed with individual souls.

The image of the triune God is in the spherical surface: the Father’s in the centre, the Son in the outer surface and the Holy Ghost in the equality of relation between point and circumference.\(^\text{13}\)

For Kepler the Triad was fundamental and although he as written extensively on the tetraktys\(^\text{14}\) the number 4 had no symbolical value to him.

Pauli, gifted with a strong analytical mind, appreciates intuition too. He writes:

Fludd never distinguishes clearly between a real, material process and a symbolical representation....Fludd’s general standpoint is that true understanding of world harmony and thus also true astronomy are impossible without knowledge of the alchemical or Rosicrucian mysteries. Whatever is produced without knowledge of these mysteries is an arbitrary, subjective fiction. According to Kepler, on the other hand, only that which is capable of quantitative, mathematical proof belongs to objective science, the rest is personal.

While Kepler represents the modern view that the soul is a part of nature, Fludd even protests against the application of the concept “part” to the human soul, since the soul, being freed from the laws of the physical world, that is, in so far as it belongs to the light principle, is inseparable from the whole world-soul.

In Fludd’s quaternary approach Pauli recognises his love for the number four:

It is significant for the psychological contrast between Kepler and Fludd that for Fludd the number four has symbolical character, which is not true of Kepler.

Pauli, knowing the two poles of intellect and intuition within himself, recognises them too in this controversy:

Fludd’s attitude seems to us somewhat easier to understand when it is viewed in the perspective of a more general differentiation between two types of mind, the one type considering the quantitative relations of the parts to be essential, the other the qualitative indivisibility of the whole. … The quarrel between Goethe and Newton concerning the theory of colours: Goethe had similar aversion to “parts” and always emphasised the disturbing influence of instruments on “natural” phenomena. We should like to advocate the point of view that these controversial attitudes are really illustrations of the psychological contrast between feeling type or intuitive type and thinking type. Goethe and Fludd represent the feeling type and the intuitive approach, Newton and Kepler the thinking type; even Plotinus should probably not be called a systematic thinker, in contrast to Aristotle and Plato.

Fludd’s work is rich in diagrams and figures, which often tell more than many words. Pauli recognises this:

Fludd’s “hierographic” figures do try to preserve a unity of the inner experience of the “observer” (as we should say today) and the external processes of nature, and thus a wholeness in its contemplation – a wholeness lost in the world of classical natural science. Modern quantum physics again stresses the
factor of the disturbance of phenomena through measurement, and modern psychology again utilises symbolical images as raw material in order to recognize processes in the collective ("objective") psyche.

Finally Pauli comes to a synthesis:

To us, unlike Kepler and Fludd, the only acceptable point of view appears to be the one that recognises both sides of reality – the quantitative and the qualitative, the physical and the psychical – as compatible with each other, and can embrace them simultaneously.

And he concludes: “Among scientists in particular, the universal desire for a greater unification of our world view is greatly intensified by the fact that, though we now have natural sciences, we no longer have a total scientific picture of the world. Since the discovery of the quantum of action, physics has gradually been forced to relinquish its proud claim to be able, in principle, to understand the whole world. This very circumstance, however, as a correction of earlier one-sidedness, could contain the germ of progress toward a unified conception of the entire cosmos of which the natural sciences are only a part.

Conclusion

In 1957 Pauli engaged in Zürich on an intensive cooperation with Werner Heisenberg to find a 'world-formula,' which we now would call “a theory of everything.” Yet, as may be clear from the analysis above, that theory would also include the psychological, i.e. the unseen world. When Pauli was visiting the USA Nobel laureate T.D. Lee invited him for a seminar to explain his new theory. There his colleagues criticised his work down to the ground. In the spring of 1958 Pauli agreed with the criticism and broke with Heisenberg, telling him to go further on his own. Pauli was more or less broken and he wrote: "Kleiner Mann, was nun?" A few months later he died of cancer.

Many physicists, especially those who knew him, consider Pauli to be of a level of genius comparable to Einstein or Bohr. Einstein and Bohr, both intuitive giants, could publish ideas for which a full proof was only given years, sometimes decades, later. Pauli never could: when Pauli published something, he gave the full and logical proof with it. Perhaps this is the reason why so many ordinary people never heard his name, and why his death went unnoticed by the New York Times in 1958.

Maybe Pauli believed he failed to unite the inner and outer worlds. His work and way of thinking will live on and inspire others. Perhaps the search for outer unity, in the world of ideas, should be replaced by a unity within, in one’s own life. Isn’t then the path of that search more important than its goal?

Notes and References

2 Pauli predicted the neutrino in 1930. It was experimentally confirmed 25 years later.
6 H.P. Blavatsky, Isis Unveiled, I, p9, 1877, J.W. Boulton.
11 J. Kepler, Ad Vitellionem paralipomena.
12 Geometry is the archetype of the beauty of the world.
15 Little man, what now?