Spring 1996

Wachter's World: Thomas C. Wachter (1942-1995)

Donald W. Viney
Pittsburg State University, dviney@pittstate.edu

LOGOS-SOPHIA

Philosophical Journal of the PSU Philosophical Society

Spring 1996 • Volume 8

Wachter's World

Thomas C. Wachter
(1942-1995)

Donald Wayne Viney, Professor of Philosophy

One may gather the vital statistics of Tom Wachter's life from his obituary notice. However, these tell little about the man that Tom was, the things that filled his days with meaning. As Jorge Borges says, "Events far-reaching enough to people all space, whose end is nonetheless tolled when one man dies, may cause us wonder" (*Dreamtigers*, University of Texas Press, 1964, p. 39). Although Tom and I called each other friend, there is more about him that I do not know than that I know. But what I know of him is worth knowing and sharing—hence, I consider it of more than mere sentimental interest to set down these thoughts.

When Tom came to my office in 1989 to introduce himself, I suppose that he was looking for someone else in Southeast Kansas who shared his passion for philosophy. He had a B.A. in philosophy from Regis College in Denver and a degree in mathematics from the University of Colorado. He also studied at Trinity University in San Antonio, Texas and did graduate studies in philosophy at Boston College. He had lived in Frontenac, Kansas since 1987. Little did either of us know the ramifications that our first encounter would have for both of our lives.

About the time I met Tom, a discussion group called Books and Breakfast was being formed by Gary McGrath (a mathematics professor) and Paul Zagorski (a professor of political science) which I was invited to join. B and B—as we called it—met on a weekly basis to discuss a book of our choosing and to share breakfast. As I became aware of Tom's considerable knowledge of philosophy, I introduced him to the group. Until the time of his death, he would be a valued contributor to the group. Members of B and B came to appreciate his incisive intellect, his disarming wit, and his gift for presenting difficult concepts in the simplest fashion. The group also looked forward to the cream puffs that Tom's aunt, Ann Wachter, often provided!

Tom once compared his passion for philosophy to an infectious disease for which there is no antidote. The metaphor may have appealed to him for more personal reasons, for he was afflicted, during the last decade of his life, with diabetes and chronic pancreatitis. However, it may be more accurate to turn the metaphor inside-out, for as Susan Loar, Tom's sister, remarked to me, philosophy was Tom's way of dealing with his health problems. Even as he lay dying of cancer, his eyes lit up at the mention of Aristotle. At Tom's suggestion, the members of B and B were reading Thomas Aquinas's commentary on Aristotle's *De Anima* (On the Soul)—including Aristotle's book itself—and he was looking forward to entering the fray once again.

Tom once characterized the members of B and B as interested in intelligent discussion and open to changing their minds (reported in Pittsburg's newspaper, *Morning Sun*, Dec. 26, 1991, p. 9). These qualities were evident in Tom; his ever-active mind was at once stubborn and open, and his own passion for learning was contagious. Once morning he argued forcefully against Marilyn Vos Savant's solution to a puzzle which appeared in her weekly column. However, later in the day I received a telephone call. "I'm wrong," Tom announced, "and I can prove it!" And prove it he did, elegantly and simply.

One may catch a glimpse of how his mind worked by considering his proof. The puzzle is this: A prize is hidden in one of three boxes. You choose a box. Rather than being allowed to look inside the box you chose, one of the empty boxes is opened. You are then given the chance to change your original selection. The question is whether you are more likely to get the prize if you change your selection than if you remain with your original choice. The answer is that remaining with your original selection gives you a 1/3 chance of getting the prize, but changing your selection gives you a 2/3 chance of winning.

Tom's proof begins by stating the conditions of the puzzle:

1. There are three boxes, one contains the prize, call it P, two are empty, call them E1 and E2.
2. The contestant, C, makes an arbitrary selection of a box.
3. One of the empty boxes (either E1 or E2) is opened.
4. C is then asked if he wishes to change his selection.

Point to prove: If C changes his selection then the probability that the *game*—not his second choice—will reward him with a prize is 2/3.

Proof: Any of three boxes, P, E1 or E2 may be initially selected.

Case 1: if P is selected, then either E1 or E2 is opened and the remaining box is empty. If C changes his selection, then he chooses an empty box.

Case 2: if E1 is selected, then E2 must be opened (by 3). P is the remaining box. If C changes his selection, then he gets the prize.

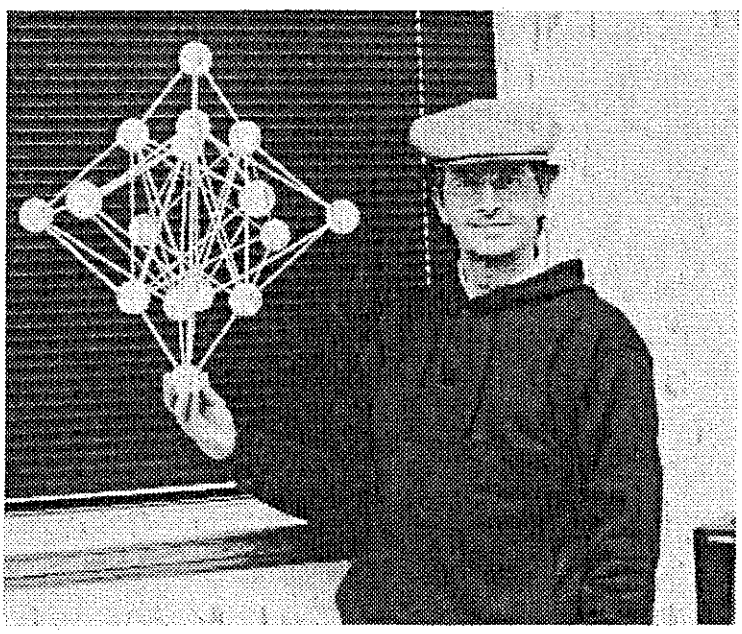
Case 3: if E2 is selected, then E1 must be opened (by 3). P is the remaining box. If C changes his selection, then he gets the prize.

Consequently, when C changes his selection, he wins with two of the three possible cases (cases 2 and 3).

Tom put his pedagogical skills to work in the classroom. He taught philosophy on a part-time basis at Regis, Trinity, and finally at Pittsburg State where he taught Basic Philosophy in both the Spring 1992 and the Spring 1994 semesters. A student upon whom he had an important influence was David Greeley who studied under him at Pittsburg State. Tom took a special interest in David's education by coaching and tutoring him long after the course in which David was enrolled was concluded. David is presently doing graduate work in philosophy at the University of Massachusetts at Amherst.

Tom published no philosophical papers, although this was not for lack of publishable ideas. I argued with Tom on many topics, from epistemology to metaphysics, and I learned a great deal from him. We rarely saw eye to eye on anything philosophical, although I remember two points of significant agreement. Once while we were traveling to a philosophy conference he told me that he believed that the human mind can understand the infinite. It seemed to me that he expressed himself in the manner of a person in a confessional. Thus, he was surprised to learn that I agreed with him completely. Trans-finite mathematics reveals at least part of the structure of the infinite. One could add that the really tough questions involve the nature of mind, free will, the nature of God, etc. In typical fashion Tom proceeded to explain to me the reason that $1 = .9\overline{9999}$ (any decimal subtracted from 1 is less than $.9\overline{9999}$ but any decimal added to $.9\overline{9999}$ is more than 1).

We also agreed that philosophy is not simply a parade of theories, but that it makes real progress, often by finding dead ends. Sometimes the most important advances in philosophy



Tom Wachter with the logic crystal, December 11, 1992.

are discovering what is false rather than discovering what is true. The most recent example of progress is the failure of logical positivism. I came to these conclusions under the influence of Charles Hartshorne. Although Tom met Hartshorne while he attended school in Texas, I am certain that he came to these ideas by another avenue.

The most important things I took from my friendship with Tom, as far as philosophy is concerned, was an appreciation of the structure and beauty of logic and the value of cooperative effort in philosophy. Once, Tom tutored a student enrolled in my Introduction to Logic, and I asked him what he was teaching the fellow. He casually replied that he reduced sentential logic to a single page. I was incredulous until Tom explained his methods and ideas. Before long, we were working daily on his simplified presentation. One day he called and said, "Don, we can build this thing." Although initially I did not understand what he was talking about, I soon realized that he had hit on something novel—a three-dimensional model of sentential logic, loosely analogous to chemist's models of molecules. I accompanied him to Wal-Mart where we bought Styrofoam balls and wooden dowels. He later constructed the model—called the logic crystal—out of these simple materials.

One way to think of the crystal is to imagine that all declarative sentences, in the simplest logic, can be shown to represent one of sixteen truth functions (a four line truth table with a string of Ts and/or Fs).

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
F	F	F	F	F	F	F	F	T	T	T	T	T	T	T	T
F	F	F	F	T	T	T	T	F	F	F	F	T	T	T	T
F	F	T	T	F	F	T	T	F	F	T	T	F	F	T	T
F	T	F	T	F	T	F	T	F	T	F	T	F	T	F	T

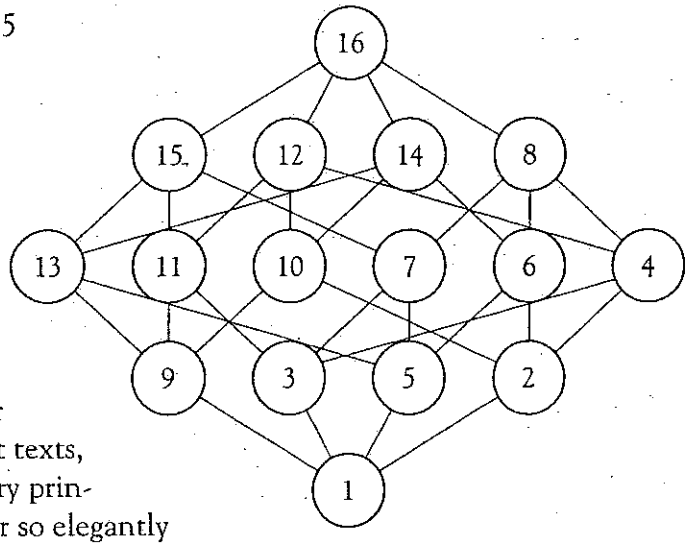
Those who know a little elementary logic will recognize table 1 as the table for contradictions and table 16 as the table for tautologies. The remaining fourteen tables are what the various forms of so-called contingent propositions represent. A fundamental question of logic is, given any two propositions (call them α and β), does α imply β? In terms of the sixteen functions, the question can be rephrased: Which of the tables imply which? The answer is surprisingly simple: Place any two tables, α and β, side by side; α implies β if and only if there is no line that reads TF. Thus, table 7 implies table 8 because no line reads TF; but table 8 does not imply table 7 because the last line reads TF.

This is the way that Tom had reduced logic to a single page. Another step is needed in order to construct the crystal. One must map all of the possible implication relations among the sixteen tables. One way to do this is by constructing a 16 X 16 grid

with the tables lined up on two sides. Each of the 256 squares in the grid is a candidate for being an implication; but only 81 are genuine implications. Among the truths of logic revealed by the grid are the following: Every proposition implies itself; a contradiction implies any other proposition; and a tautology is implied by any proposition.

The most elegant way to represent the 81 implications is to construct the crystal. The diagram with 16 nodes is the crystal flattened out into two-dimensions.

Each node represents a table, and the lines connecting the nodes represent implications. The lines connecting the nodes are to be understood as "flowing" only one way. Thus, the diagram can be read either from top to bottom or from bottom to top, but not both at once—the diagram presented here is to be read from bottom to top. Self-implication (which accounts for sixteen implications) is left implicit. Also implicit are transitive relations. Thus, node 5 implies node 7 and node 7 implies node 8, hence node 5 implies node 8, but no line directly connects 5 and 8. One simply follows the lines of implication from 5 to 7 to 8 to learn that node 5 implies node 8 (transitive implications account for another 33 implications). The remaining 32 implications are represented by the lines connecting the nodes.



I have taught elementary logic for many years and from many different texts, but I have never seen the elementary principles of logic expressed so clearly or so elegantly as one finds in the crystal. I have used the crystal in my classes ever since. Eventually I was inspired to write an introductory text in logic, *Logic for Nonvulcans*, in which the crystal forms an integral part. In addition, I wrote a paper describing the crystal and its pedagogical uses, "Logic Crystallized" (which at this writing is under consideration by the journal *Teaching Philosophy*). There is a lot of Tom in those writings, although he would definitely not agree with everything I put in those works. I spoke above of the ramifications of my first meeting with Tom. The crystal, the book, and the paper are three of those ramifications.

Tom was the primary creative force behind the discovery of the crystal. Likewise, he played the dominant role in our development of a three-valued logic. We agreed that a multivalent logic should preserve, as much as possible, the standard bivalent truths. In

most trivalent systems the so-called "laws of thought"—the principles of noncontradiction (it is not the case that p and not-p), identity (if p then p), and excluded middle (either p or not-p)—are not tautologies, as they are in bivalent logic. In our system, noncontradiction and identity are tautologies, but excluded middle is not. It makes sense that the principle of excluded middle should not be a tautology in a trivalent system since the principle is merely a restatement of bivalence.

As Tom clearly saw, the key is in defining negation, for there are three meanings of negation (let T = true, F = false, and N = neither true nor false):

1. *Strong sense—negation changes T to F and F to T.*
2. *Weak sense—negation changes the value of the variable.*
3. *Semantic sense—negation means "it is false that."*

Our system, unlike other trivalent systems, adheres to all of these meanings of negation. Thus, if p is T then not-p is F; if p is F then not-p is T; and if p is N, then not-p is F (cf. N. Rescher, *Many-Valued Logic*, McGraw Hill, 1969, p. 123). Hence, in our trivalent system, a negated proposition must be T or F. We discovered that one of the virtues of our system is that there is a trivalent equivalent to excluded middle. Whereas "p or not-p" is not a tautology, "p or not-p or not-not-p" is a tautology. Another ramification.

The syntax of a three-valued logic is one thing, developing a semantics—telling what it might mean—is something else again. Tom joked that since I was the metaphysician, I should be the one to provide our trivalent system with an interpretation. I never did. However, we both discovered that the excursion into multivalent logics shed new light on traditional logic. For example, in traditional logic, the expressions "never false" and "always true" are equivalent. In a trivalent system, on the other hand, the equivalence fails. A proposition that is never false may indeed be always true, but it may also be neither true nor false in all cases or true in some cases and neither true nor false in other cases.

Tom's joke about my being the metaphysician indicates that he saw his own brand of philosophy as having a decidedly anti-metaphysical slant. For example, he accepted W.V.O. Quine's criticisms of modal logic. In Tom's view, concepts like necessity and impossibility are at best misleading ways of talking about tautologies, contradictions, or theorems. The modal logicians had, in Tom's view, hopelessly confused what logicians call object language and metalanguage. Such confusions are material for jokes or clever sayings, but not for serious philosophy (the French say, "*Il n'y a pas de l'haine dans 'l'amour'*"—literally, "there is no hate in 'love'"—the word for love, "amour," has no letter "n" in it; but "n" rhymes with the word for hate, "haine."). Tom accepted Quine's dictum that necessity is in the way we talk about things, not in the things we talk about. Tom also argued that there is no such thing as induction. What passes for inductive

argument, he believed, reduces to possibilities mapped in an abstract space (like the three door puzzle). On these issues, Tom and I found ourselves at loggerheads, arguing to a stalemate. He found my ontology too lavish; I found his too austere.

When the B and B group read A.N. Whitehead's *Science and the Modern World*, Tom argued that a metaphysician is someone who makes the following suppositions:

1. There is a "fixed" totality of mind-independent objects.
2. There is a uniquely correct view of how things are.
3. Some form of the correspondence theory of truth is correct.

It is ironic that Tom proposed these criteria even as we were discussing Whitehead, for Whitehead, who may be this century's greatest metaphysical mind, would deny (1), find (2) to be nothing more than an ideal to be sought, and view (3) as a half-truth. Tom once expressed an interest in reading Whitehead more thoroughly, for he knew that my sympathies are with Whitehead's views. Be that as it may, Tom believed that each of these propositions is dubious at best, but it was the last one that seemed to bother him the most. Following Tarski, he believed that to escape the liar paradox one must define truth relative to some language; hence, truth is always "true in L," where L is the object language and "true in" is metalinguistic.

Knowing the truth was always the goal of Tom's intellectual activities. At one time in his life, he told me, he played a lot of chess, but he came to view it as a "monumental waste of time." It was, after all, a mere game of the intellect. He did find value in the creative aspects of the mind. His knowledge of music theory, for example, was impressive and in the last year of his life, he studied quantum logic and information theory. But always, his first loves were the *questiones disputatae* of philosophy. He could be blunt and aggressive in debate, a style of arguing that he said he learned from his Jesuit teachers at Regis. Nevertheless, there was no meanness in him that I could detect, and he figured that the falsehoods were not likely to survive his rigorous cross-examinations. Like Socrates, it was with falsehood that he contended, not with people.

In the final analysis, it was the mind itself that fascinated Tom and that he found so enigmatic. He was dissatisfied with the usual list of theories of the mind that one finds—dualism, panpsychism, behaviorism, functionalism. He forced me to be more clear about my own acceptance of panpsychism and to formulate it in two propositons: To be a substance is to be an experiencing thing; and, to be an experiencing thing is to be a substance. Tom contended, against this, that, in being self-aware, we are not aware of ourselves as being a substance. Tom was also fond of quoting Putnam's statement that "meanings are not in the head," and he found Searle's critiques of artificial intelligence more convincing than Dennett's evasions—Tom laughed approvingly at Ned Block's

claim that a more accurate title for Dennett's *Consciousness Explained* would have been "consciousness ignored." However, none of these denials uncover the secret of what the mind is.

Tom seems to have believed that the mind is an activity that is a mystery to itself. For it reaches out, by means of some of its most sophisticated creations, and rigorously *proves* via Kurt Gödel that truths are in excess of theorems. It further *surmises*, with the help of Church and Turing, that there is no recipe for rationality, no functions which say without qualification, "This is rational to believe and this is not." Finally, it *acknowledges* at once its own limitations and its greatness. The source of logic is also the source of geometry, mathematics, music, literature, poetry, and philosophy—creative imagination, the mind. On the other hand, I think he would have denied that the creative activity of the mind is incompatible with the discovery of truth. We discover truths through the systems of thought that we create. In this, Tom was a kind of neo-Kantian (Kant was a philosopher he much admired). I learned all these things from Tom, whose mind was a model of the human capacity for creative reason.