

# ARISTOTLE *VERSUS* VAN TIL AND LUKASIEWICZ ON CONTRADICTION: ARE CONTRADICTIONS IRRATIONAL IN SCIENCE AND THEOLOGY?

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ABSTRACT: The Polish logician Jan Lukasiewicz and the American theologian Cornelius Van Til are famous for challenging Aristotle's Principle of Contradiction. Whereas apparent contradictions such as God and physical reality being both One and Not One (Many) are accepted in terms of an *idealism* held by Van Til, the Principle's violations in theology and science reflect a *realism* held by Lukasiewicz. Lukasiewicz is favored for explaining why the Principle's violation may be rational for a scientific and theological realism.

KEYWORDS: Aristotle, contradiction, Jan Lukasiewicz, Cornelius Van Til,  
science, theology

Two central 20<sup>th</sup>-century challenges to the Principle of Contradiction are those of the Polish logician Jan Lukasiewicz, that bear fruitfully on physics,<sup>1</sup> and those on metaphysics and the Trinity by the American theologian Cornelius Van Til. Whereas Van Til defended an orthodox Calvinism against a doctrinal abandonment of such things as the virgin birth of Christ by the Princeton Seminary where he taught in the 1920s,<sup>2</sup> Lukasiewicz was a devout Roman-Catholic logician who in 1910 defended a view of the limits of logic that are reminiscent of St. Augustine (for whom immutable rules of inference should be

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<sup>1</sup> Some violations of the Principle of Contradiction are consistent with scientific realism, revealing ignored faults with a realism of Sir Karl Popper, despite Popper's possible support at some level by Lukasiewicz, *e.g.* a "conjectural conception very close to Popper's..." See Fran Coniglione's "Filosofia e scienza in Jan Lukasiewicz," *Epistemologia* 17:1 (1994) 73-100.

<sup>2</sup> See John Frame's "Cornelius Van Til," *IVP Dictionary of Apologetics* at <http://maritain.nd.edu/jmc/ti99/pouivet.htm>, 7 Nov 2007.

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distinguished from truth about reality<sup>3</sup>); in spite of Lukasiewicz's relation to the Lvov-Warsaw School that stressed modern logic in Aristotelian argumentation against a rising anti-realist and anti-metaphysical irrationalism – political and positivistic.<sup>4</sup> Intriguingly, his suggestion that logical reasons do not provide the strongest motive for belief brings to mind Ludwig Wittgenstein, notwithstanding his early affiliation with the Vienna Circle, who suggested that we too often follow a rule *blindly*.<sup>5</sup>

Consider Lukasiewicz's doubts about blindly adhering to the Contradiction Principle after summarizing misgivings about the Principle by Van Til regarding the Trinity. This paper shall then seek to show, among other things, that the Trinity's possible violation of the Principle proceeds *pari passu* with its reasonable contravention for solutions to knotty epistemological problems in the philosophy of science.

### I. Van Til's Misgivings about its Application

After his youthful affiliation with the Christian Reformed Church, Van Til (1895-1987) moved from Holland to America where he attended Calvin College and, later, the Calvin Theological Seminary. He transferred to the Princeton Theological Seminary for his Th.M. in 1925 and gained his Ph.D. in 1927 at Princeton University where his dissertation compared Reformed Theology's notion of God with the "absolute of philosophical idealism."<sup>6</sup> When one renowned

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<sup>3</sup> St. Augustine, *On Christian Doctrine*, trans. D.W. Robertson, Jr. (New York: Macmillan Publishing Co., 1988), 72.

<sup>4</sup> I am indebted to Roger Pouivet for this insight. But some of his views *may* differ from mine on both Lukasiewicz, who I may construe more liberally (epistemologically), and W.V. Quine who is noted briefly below. See Pouivet's insightful "Faith, Reason, and Logic," *Jacques Maritain Center: Thomistic Institute* at <http://maritain.nd.edu/jmc/ti99/pouivet.htm>, 7 Nov 2007. He notes that the "Lvov-Warsaw School was the major influence within Polish philosophy between the two world wars... Among the distinguished philosophers of this school are Tadeusz Kotarbinski, who was closely studied by Peter Geach, and Alfred Tarski... [Also] Quine's sojourn in Warsaw during this period had a very strong influence on his thought and... through him the ideas of the Lvov-Warsaw School were subtly osmosed into a large part of so-called analytic philosophy."

<sup>5</sup> Pouivet, "Faith, Reason, and Logic," online without page/section numbers.

<sup>6</sup> Cornelius Van Til's *An Introduction to Systematic Theology* (Syllabus, 1961), 11, and *A Christian Theory of Knowledge* (NJ: Presbyterian & Reformed, 1969), 202, emphasis. From John Frame's "Van Til: The Theologian," Center for Reformed Theology & Apologetics, <http://www.reformed.org>, 20 Nov 2007, n. 108. The following accounts are from Van Til's works, referenced by Frame who notes that Van Til's contributions are "of virtually Copernican dimensions."

scholar notes that his “contribution to theology is of virtually Copernican dimensions,” we might infer that the dimensions are inspired by, if not loosely analogous to, the idealism of Kant’s Copernican Revolution in Philosophy: As this Philosophy held that our mind imposes categorial interpretations on reality wherein reality is not known in itself, our mind’s limited ability to know reality reflects Van Til’s idealism. And as the idealism advanced by Kant led to *Weltanschauung* Analyses with ‘truth’ being incoherently relative to rival worldviews (less Kant’s categories in the philosophy of science such as those of Thomas Kuhn and Paul Feyerabend),<sup>7</sup> we may anticipate comparable problems for theology and metaphysics – as well as for physics by implication – in Van Til’s idealism. This idealism, admits John M. Frame who favors it, begets difficulties in assessing Van Til’s understanding of logic.<sup>8</sup>

Though it is not always clear when ‘logic’ means formal logic, versus an idealist method of thought, “God is not subject to some source of (logical or other) possibility more ultimate than himself.”<sup>9</sup> Rather, God himself determines ultimate possibilities and both “vindicates and limits the competence of human logic” so that His revelation contains “no ‘real’ contradiction.”<sup>10</sup> Though contradictions in Scripture may be apparent, believers should know that there are no contradictions from God’s viewpoint. And this viewpoint cannot itself be inconsistent, says Van Til, because God is the very foundation of logic whereby “Logic itself does not determine what is possible or probable; only God does that.”<sup>11</sup> God’s determining the probable and possible results in distinguishing theistic from non-theistic secular thought.

#### A. Non-Theistic and Theistic Thought

Whereas the *non-theist’s self-centered mind* has a univocal or one-dimensional grasp of “analysis and synthesis, correspondence and coherence, objectivity and

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<sup>7</sup> *Weltanschauung* (Worldview) Analyses superseded Kant’s *a priori* categorial interpretations common to the human race by those of different races, genders, cultures etc. Cf. Frederick Suppe, ed., *The Structure of Scientific Theories* (Chicago: University of Illinois Press, 1977), 126, n. 258.

<sup>8</sup> Van Til’s *A Christian Theory of Knowledge*, 202 and *An Introduction to Systematic Theology*, 11. From Frame’s “Van Til: The Theologian,” fn. 108.

<sup>9</sup> Van Til’s *A Christian Theory of Knowledge*, 202 and *An Introduction to Systematic Theology*, 11. From Frame’s “Van Til: The Theologian,” fn. 108.

<sup>10</sup> Van Til’s *The Defense of the Faith* (Philadelphia: Presbyterian & Reformed, 1955), 61f. and *A Christian Theory of Knowledge*, 38. From Frame’s “Van Til: The Theologian,” fn.111.

<sup>11</sup> Van Til’s *A Christian Theory of Knowledge*, 37 and *The Defense of the Faith*, 228. From Frame’s “Van Til: The Theologian,” fn. 117.

subjectivity, a priori and a posteriori, implication and... transcendental versus syllogistic reasoning,” says Van Til, the *theist’s God-centered mind* grasps “any or all of them analogically.”<sup>12</sup> While we are related analogically to God since we are like Him *inter alia* by being limitedly rational and unlike Him because He is rational in a supereminent (infinite) way, according to St. Thomas, the analogical reasoning held by Van Til means in part that we are like God in aspiring to reason logically but unlike Him in illogically thinking that He must conform to our norms of rationality. Rational norms are His creations and a created Principle of Contradiction can be violated *prima facie* in our minds but not necessarily in the mind of God. God determines what is in fact contradictory. While contradictory claims of science can be regarded *literally* as incoherent and be denied, apparent contradictions in the sacred domain of God’s revelations are construable only *figuratively* as being incoherent; the incoherence better depicted, perhaps, as a *mystery* that passes human understanding – an understanding proper to God that exceeds our noetic limits and is, consequently, outside all of our cognitive boundaries.

These boundaries resulted in Van Til comparing the Greek quandary of Reality as One and Not-One (Many) to God being One and Not-One (a Trinity). The Trinity is no more contradictory in the theist’s mind than the metaphysical anomaly posed by Heraclitus and Parmenides. Whereas Parmenides held that the Many observable things must be illusory because their change implies the impossibility of *being* coming to *be* when it already *is* and going out of being when there is nowhere to go, Heraclitus argued that an unchanging One is illusory because its inference from a *thingness* common to the many *things* results in the Many being both changing and unchanging. Surely a truth-claim that the Many are real may strictly be more certain epistemologically than an inferred reality of the One, as by analogy some logicians might say that the truth of the conjunction  $p \wedge q$  is stronger epistemologically than that of the inferred proposition  $p$  in terms of the inference rule of simplification  $p \wedge q // p$  even though  $p$  is entailed logically. At the same time a dilemma arose inasmuch as the One, besides being inferable from the Many, rendered coherent the approximate truths about many changing things in virtue of these things limitedly being forms or manifestations of the unchanging One.<sup>13</sup>

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<sup>12</sup> Cornelius Van Til, *A Survey of Christian Epistemology*, Vol. II of *In Defense of Biblical Christianity*, 2<sup>nd</sup> ed. of the Syllabus (Philadelphia: Presbyterian & Reformed Publishing Co., 1932), Ch. 1. See <http://www.reformed.org/master/index.html>, 20 Nov 2007.

<sup>13</sup> Thales held problematically that the changing Many were *literally* forms of an unchanging One, his one-and-many paradigm influencing Plato. Yet Plato held that the Many in the

That is, without a reality of the One as a principle of identity for the many observable things in change, any changing thing would already *not be* what it is claimed to *be* and there could be no inexact truths about anything that there in fact are. Thus although reality being One and Many is ostensibly contradictory, the alleged contradiction is analogous to the Trinity. By relating the “Trinity to the problem of the one and many,” states Ralph Smith, Van Til places “the Trinity at the foundation... of all thought about any and every subject.”<sup>14</sup> Though the realities of the One and Many are contradictory in terms of the non-theistic univocal mind, the contradiction is only apparent for the theistic analogical mind.<sup>15</sup> And although this mind would not evidently accept that all seeming contradictions are divinely underwritten because some can be resolved theologically, philosophically and scientifically, the theistic mind appreciates by the grace of God that various creations of mystery are analogues of a mysterious Creator.

But the Creator’s creations only *seeming* to be contradictory may be problematic for Van Til’s idealism. Idealism is a philosophy, so a question arises: Should philosophy inform religion or religion philosophy? On the one hand, idealism is disregarded by most orthodox Christian views that accept God’s revelation of Himself in the New Testament, without any philosophical caveats, as a Trinity. Genesis in the Old Testament presages this Trinitarian anomaly when God said, despite a Hebraic monotheism, “Let *us* make man in our image...” (1:26, emphasis). In virtue of this holy image, on the other hand, Van Til would presumably reject incompatible attributes being *properly* ascribed to either our selves or other creations (especially an ultimate analogous creation of the One and Many); a revealed goodness of the creations being related furtively in Genesis 1:31 to their not being unintelligible, and ideally to their being rational, and therefore also to their not violating the Contradiction Principle.

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Visible World *shared only limitedly* in a hierarchy of increasingly universal unchanging Forms, culminating in an ultimate Form (One), in an Invisible World. These two Worlds were criticized by Aristotle since unchanging Forms, say the Form Man, cannot be related coherently to changing particulars, say the particular man Socrates: the words ‘sharing in’ being poetical. And so without abandoning ‘forms’ as objects of knowledge, Aristotle argued for only one world of particulars that are unities of matter and form wherein the forms man or woman are fully in particular persons.

<sup>14</sup> R.A. Smith, “Van Til’s Insights on the Trinity,” <http://www.trinitarianism.com> (26Nov2007) 7.

<sup>15</sup> The ‘one and many’ contradiction is not deemed irrational by Karin Verelst (Math Department at Vrije Universiteit Brussel) and Robert Coecke (EPSRC Research Fellow in Quantum Computer Science) in “Early Greek Thought and Perspectives for the Interpretation of Quantum Mechanics” (*arXiv:physics/0611064* v1 2006): “abandoning the principle of contradiction implies the loss of *neither* the capacity to reason soundly *nor* the possibility to use mathematics [12, emphasis].”

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How can the Principle be inviolable logically and sacrosanct theologically, however, and still be reconciled with other traditional insights? What of St. Augustine's insight that we are immediately and incontrovertibly aware of our existence as both *one* and *not one* inseparable life ("being, knowledge, and will" that are logically distinct)?<sup>16</sup> The one and many of our own existence are, he says, "far from [a holiness of] the Trinity, but I suggest them as a subject for mental exercise..."<sup>17</sup>

#### B. A Realism that is Unlimited by Idealism

The exercise posed by Augustine, in terms of which the Trinity is analogous to our triune existence, lends itself phenomenologically and logically to a realism that is unlimited by idealism:<sup>18</sup> Since there can be no thought without a consciousness of it but there can be consciousness without thought – thought not being as fundamental as consciousness, reality need not conform to reason. There is no reason for the theistic scientist to dismiss violations of the Principle of Contradiction when contradictory notions are either revealed in Scripture or inferred from an experienced reality. And so in the spirit of physicist and theologian John Polkinghorne, the theist might say, "all forms of realism are divinely underwritten, for God will not mislead us..."<sup>19</sup>

Being misled from a theistic standpoint, in terms of Augustine's realism, may suggest prophetically that to reject the Trinity since it violates the Principle of Contradiction is to reject the reality of our own triune existence. And if this existence is understood as our *mind*, *body* and *free will*, the theist might infer that philosophers who impose the Principle on God will impose it also on both an external reality and themselves; resulting, for instance, in an idealism of Hegel

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<sup>16</sup> St. Augustine, *Confessions*, trans. R. Pine-Coffin (Middlesex, England: Penguin Books Ltd, 1984), 318.

<sup>17</sup> Augustine, *Confessions*, 318.

<sup>18</sup> Phenomenology, following Husserl, Heidegger, Sartre and others has focused *inter alia* on our consciousness of reality to distinguish reality from our thought. Intriguingly, St. Augustine pioneered phenomenological explanations of how our thought and free will are related to consciousness: To be conscious of our behavior is to be implicitly conscious of our will to behave or not to behave in given ways; as to be conscious of our thought is to be implicitly conscious of our freedom to think or not think, including the self-refuting thought that all thoughts are caused (our knowing they are not caused being rooted in our immediate consciousness)! See, for example, my "St. Augustine's Epistemology: Ignored Aristotelian Themes and Their Intriguing Implications," *Laval Théologique et Philosophique* 50:1 (1994): 187-205.

<sup>19</sup> John C. Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker* (MN: Augsburg Fortress Press, 1994), 156.

that stresses only the *mind*, a thoroughgoing materialism of Marx that admits only of physical *bodies*, and an unfettered *free will* and will-to-power-to-truth held by Nietzsche that presaged an existentialist dictum that ‘truth’ is posterior to our existence – that ‘existence precedes essence’ wherein truth about reality is a function of, or determined by, willful *Übermenschen* (Supermen).

These philosophical winds of doctrine, theists can add, are warned against in Scripture and beg for other distinctions of realism from idealism. The idealism advanced by Van Til regards logically necessary truth as a function of God’s mind; what He determines. But insofar as the determination applies to less esoteric experience such as metaphysical issues of the One and Many, he prescribes a *limited rationalistic realism* for our minds. That is, while the mind of God excludes literal contradictions for both His revelations and select analogical anomalies in metaphysics, Van Til acknowledges more mundane contradictory claims about a secular reality that are not just apparent and that should be denied by the theistic mind. In other words, this mind can perceive a physical reality that both *is* as it *is* apart from our thought and cannot have logically incompatible attributes. Indeed, unless Van Til accepted such a *limited rationalistic realism*, he would not have been so gravely concerned to avoid contradictory revelations about reality.

Realists who are theists, without the idealism and rationalism, by contrast, can reason unreservedly from an experienced reality and revelations to their ideas. This holds even if the ideas ascribe incompatible properties to something, illustrated by Augustine when he infers inconsistent attributes of our existence from our conscious experience: To accept experiential contradictions is to accept revelations such as the Trinity and vice versa since the revelations and reality are conditions for the truth of our truth-claims. This epistemic approach is not only rational but also fruitful for explaining experienced incongruities that perennially typify the human condition. In addition to an experience of our existence being both one and many, for instance, our immediate awareness of ourselves reveals that we are both free and not free: *not free* insofar as we have bodies subject to deterministic laws of science and *free* insofar as to be conscious of our behavior is to be implicitly conscious of our freedom (free will) to behave in given ways.

For example, we are aware both of being caused to fall on a bus if it stops suddenly and of our will to not fall by grabbing a rail.<sup>20</sup> And this everyday example explains judicial systems where prosecutors blame defendants for freely chosen criminal behavior but the same behavior is held viably by the defense to be mitigated by scientifically understood ‘root causes,’ causes weighed by judge or

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<sup>20</sup> Cf. my “Paradoxes of Human Nature,” *Ethics & Politics/Etica & Politica* 9, 1 (2007): 181-186, <http://www.units.it/~etica>.

jury against freely-chosen behavior as evidenced by forethought. Also, these points are related to retributive and rehabilitative theories of punishment as well as to ideologies of conservatives and liberals. Liberals tend to stress psychobiological causes of our behavior; our behavior being largely grasped by conservatives in terms of a responsibility that presupposes free will. Thus a benefit of recognizing our being limitedly both free and not free, regarding typical behavior, is an implied prescription for moderation in today's political polarizations.

Must these practical considerations, from politics to human nature, be euphemistically treated as mysteries or unproblematic paradoxes?<sup>21</sup> Is it self-contradictory to assert that reality *need not* abide by the Contradiction Principle? The illogical is to impose the Principle on reality, to insist that reality reflect our reason. Thus it may be truer to say that theistic *idealists*, as much as atheistic univocal thinkers, may have that irrational thought due to a self-centered mind. And with this dramatic reversal there could be traditional concepts of sin in accord with the *realist* who may have a God-centered mind: The sin of pride need not be committed of expecting revelations, the reality created by God, and God Himself to conform entirely to human reason.

In the foregoing senses the unadulterated realism seems preferable, metaphysically and epistemologically. The realism is simpler, permits more straightforward inferences from both physical reality and Scripture, and is more cogent than Van Til's irregular mixture of realism and idealism in order to reject contradictory realities in some cases but accept them in other cases as merely apparent.

Indeed, would not seeming contradictions be assessed differently by different theistic interpretations in a way akin to interpretative *Weltanschauung* Analyses in the philosophy of science? In parodying the competing scientific worldviews there could be norms for "objectivity and subjectivity, a priori and a posteriori, implication and linear inference,"<sup>22</sup> to use Van Til's words, that are grasped analogically in inconsistent ways by theistic worldviews of *God-centered*

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<sup>21</sup> A mere paradox posed by Jean-Paul Sartre is that "one suffers... from not suffering enough" as when military recruits must suffer a senseless brutality to prevent a more brutal suffering on the battlefield. Or politicians may insist that an increasing buildup of weapons begets a decreasing risk of their use. See Sartre's *Being and Nothingness* (New York: Philosophical Library, 1956), 91. For the weapons paradox, see the U.S. Catholic Church's reference to that seeming illogicality in the *Catechism of the Catholic Church* (Citta del Vaticano: Libreria Editrice Vaticana, 1994), 557, # 2315.

<sup>22</sup> Cornelius Van Til, *A Survey of Christian Epistemology*, Vol. II of *In Defense of Biblical Christianity*, 2<sup>nd</sup> Ed. of the Syllabus (Phillipsburg, NJ: Presbyterian & Reformed Publishing Co., 1932), Ch. 1. See <http://www.reformed.org/master/index.html>, 20 Nov 2007.

*minds*. Though this *mind* in the best sense unquestionably characterized Van Til, there seems to be no question also that spiraling schisms since the Protestant Reformation undercuts the notion that these minds would agree about either norms or their applications to reality and revelation.

### C. Epistemic Objections to the Principle's Violations

One may object that not either the Trinity or our triune existence, among other well-known anomalies, actually violate the Principle of Contradiction. As classically expressed by Aristotle, for example, the Principle specifies that “the same attribute cannot at the same time belong and not belong to the same subject in the same respect.”<sup>23</sup> And Aristotle explicates this elsewhere in terms of the impossibility either for “anything at the same time to be and not to be”<sup>24</sup> or for it to “be at the same time true to say the same thing is a man and is not a man [a donkey, in an example used by St. Thomas Aquinas].”<sup>25</sup> But in addition to Søren Kierkegaard (if not traditional theology) stressing that Christ was fully both man and not man (God) – being the insoluble paradox that Kierkegaard intended only if the Principle of Contradiction is rationally inviolable,<sup>26</sup> many other contradictory positions are strikingly reminiscent of St. Thomas.

Regarding God’s creative omnipotence, Thomas asserts that everything is “absolutely possible” in regard “to the idea of ‘*being*’ except ‘*non-being*’.”<sup>27</sup> To say that Christ was man and not man (God), or that I am aware of my self as both being and not being one inseparable self (mind, body and will), or that reality is both One and Not-One (Many), or that God is both one and not one Being (a Trinity) would be contradictory insofar as they mean that a given *being*  $\psi$  has the attributes  $\phi$  and non- $\phi$ . Yet this contradiction does not mean either that  $\psi$  (*being*) is non- $\psi$  (*non-being*) or that the attribute  $\phi$  both has and does not have *being*, the evident point made by Thomas.

Clearly, Thomas entertained viable violations of the Principle, despite some ambiguity (*Summa* I, 25, 3 and I, 45, 2) when he echoed Christ’s answer that

<sup>23</sup> Aristotle, *Metaphysics*, Bk. IV, Ch. 3, 1005<sup>b</sup>, 19-20.

<sup>24</sup> Aristotle, *Metaphysics*, Bk. IV, Ch. 3, 1006<sup>a</sup>, 2-3.

<sup>25</sup> Aristotle, *Metaphysics*, Bk. IV, Ch. 3, 1006<sup>b</sup>, 32-34, and St. Thomas Aquinas, *Summa Theologica* I, 25, 3.

<sup>26</sup> Cf. Søren Kierkegaard, *Philosophical Fragments*, 62 (SV1 IV, 227). From Jyrki Kivelä’s “Kierkegaard on Miracles,” *Søren Kierkegaard Newsletter* 43, Feb 2002. Kivelä says, God being paradoxically human is “not *an*, but the object of faith.” For the paradox being a contradiction, see L. R. Horn’s “Contradiction,” *The Stanford Encyclopedia of Philosophy* (2006), ed. Edward N. Zalta, <http://plato.stanford.edu/archives/fall2006/entries/contradiction>.

<sup>27</sup> St. Thomas Aquinas, *Summa Theologica* I, 25, 3 (emphasis).

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“With God all things are possible” (Mark 10: 25-27) in reply to the impossibility of a camel passing through a needle’s eye. Christ’s answer reflects Thomas’ assertion “Not only is it possible that anything should be created by God, but it is necessary to say that all things were created by God...” in reply to the objection that He is not omnipotent since He could not make “the whole to be less than its part” and “affirmation and negation [to be] true at the same time.”<sup>28</sup> So to say that one is aware of one’s self as both one and not one life (body, mind and will) or that Christ was fully man and not man (God) is not to say that something is being and non-being. Non-being is akin to *nothing* and being to *something*. Yet the above violate the Principle since a subject has logically incompatible predicates: not potentially, but actually at the same time and in the same respect.

#### D. Is it Heresy to Contravene the Contradiction Principle?

Do the Principle’s contraventions amount to heresy in traditional Christianity, influencing logic and the philosophy of science? Many theologians may say that the violations do exactly that because they radically divorce reason from faith: An irrational leap of faith must be made, one may say, if God flouts our most sacred of all principles. But a central point herein is the reasonableness of reasoning *from* an experienced reality, a reality that believers believe was created by God, *to* our ideas and not vainly impose our ideas, even ideas of logic, on reality. And if it is senseless to demand that physical reality abide by the Contradiction Principle, then it is nonsensical *a fortiori* for religious believers to insist that the Principle be obeyed by God. Indeed, if God is ultimate Reality, this realism appears well suited to the compatibleness of reason and faith.

Faith can be reasonable without reason sustaining it, theists can say, in virtue of one’s palpable experiences of Love (agape), sin and guilt. The existential point has been made perennially that one *feels guilt* when one behaves wrongly, *not irrational* in terms of a rationalistic ethics that is principally concerned to abide by the Laws of Thought. And theists can note that sin and Love refer to religious, not philosophical, notions that are inexplicable without a loving personal God who alone can forgive sins. The theist can add that although sin is a *mystery*, unfathomable to logic, an alleged logical impossibility of the Trinity need not be euphemized by either the word ‘mystery’ or Van Til’s analogical thought to make God more agreeable to human thought.

Van Til’s efforts to mollify rational believers by qualifying his critique of the Principle of Contradiction, by postulating that its violation is merely apparent

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<sup>28</sup> Aquinas, *Summa Theologica* I, 45, 2.

in certain revelations and analogous metaphysical problems, appear to support Lukasiewicz's point about an inordinate influence of 'the Philosopher' Aristotle; despite an Aristotelian-Thomistic tradition that augmented philosophically his devout Roman Catholicism. Having exalted the Principle "as the highest law of thinking and being" in terms of "a stubborn polemic, in which indignation and contempt is vibrating," Aristotle, he said, "persecuted all those who would not accept this law (I skip over their names)."<sup>29</sup>

## II. The Logical Misgivings of Lukasiewicz

This harsh criticism of Aristotle and the Contradiction Principle beg for some perspective. Suggesting that Pope John Paul II may have properly ignored the Polish Thomists when other Thomists were praised in his encyclical *Fides et Ratio*,<sup>30</sup> Roger Pouivet credits Lukasiewicz with countering a confusion of the Polish Thomists over faith's relation to reason. In largely reducing reason to a rigor of formalized logic, they muddled a tradition that extended down through St. Thomas: Logic did not account for either acts of belief (*consideratio*) or belief's free acceptance (*assentire*).<sup>31</sup> Assenting freely and free will are, indeed, necessary conditions for religious belief; believing revelation requiring also the supernatural gift of grace (Thomas' *Summa* (II-IIae 5, 2)).<sup>32</sup>

Yet we may reasonably suppose that to have the grace to believe revelations is to have the grace to believe not only in a revealed Trinity, even if it violates the Contradiction Principle, but also in the Principle's possible violations in metaphysics and physics. Given the modern revolution in physics with its assumed rationality amidst a mounting cascade of epistemic problems, one might empathize with Lukasiewicz's seeming harshness. And one might suppose that his cynicism would have been more appreciated by philosophers of science, even more in Poland by the Polish Thomists.

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<sup>29</sup> Those who Aristotle persecuted include some living Sophists in Aristotle's time and maybe to Heraclitus posthumously. See Owen LeBlanc's "Lukasiewicz, Aristotle, and Contradiction," *Papers on Lukasiewicz*, <http://www.fmag.unict.it/~polphil/Polphil/Lukas/LeBlanc.html>, 29 Nov 2007, Section 1.3. The passage is from the 2<sup>nd</sup> draft's first page of Lukasiewicz's English translation of *O Zasadzie Sprzeczności u Arystotelesa: Studium Krytyczne* (Kraków: Polska Akademia Umiejętności, 1910; rev. and ed. by J. Wolenski, Warsaw: Państwowe Wydawnictwo Naukowe, 1987– German trans: Lukasiewicz [1993]); titled *On the Principle of Contradiction in Aristotle: A Critical Study*, the translation starting on 6 April 1955.

<sup>30</sup> The non-Polish Thomists include Jacques Maritain and Etienne Gilson.

<sup>31</sup> Pouivet, "Faith, Reason, and Logic."

<sup>32</sup> Pouivet, "Faith, Reason, and Logic."

It is beyond my scope to delve historically into these Thomists whose rigorous view of reason is outlined concisely by Pouivet. Without accepting his criticism that they fostered a parody of religious belief since they sought logical proofs of God,<sup>33</sup> this God being one of Natural Theology (implicit in the Theology of a Supernatural God via Scripture such as Job where God is a Causal Creator),<sup>34</sup> readers who seek further exegesis can peruse his erudite essay. Suffice it to say that the Thomists included famous logicians such as Jan Salamucha, Boleslaw Sobocinski, Josef Bochenski and Jan Drewnowski who founded the Cracow Circle in 1936 at the 3<sup>rd</sup> Polish Conference in Cracow. Though the Cracow Circle was influenced by a logical analysis and anti-psychologism of the earlier Lvov-Warsaw School with the membership of Lukasiewicz, he raised the question of why laws of logic must be followed blindly. “Logical analysis,” says Pouivet, “doesn’t answer this.” Such rules “have not been proven logically” but rather “are basic, entrenched instruments of our thought.”<sup>35</sup> However, “Lukasiewicz recognized that logical reasons do not provide the strongest motive for believing something...” – something of the kind being indicated by Wittgenstein “when he declared that we follow a rule blindly.”<sup>36</sup>

#### A. Did the Later Wittgenstein Echo the Earlier Lukasiewicz?

While Wittgenstein viewed religious belief “as based on qualities of character... he did not himself possess,” he “revered the writings of St. Augustine” and held Kierkegaard in “awe... as a ‘really religious’ man.”<sup>37</sup> These personal qualities bear on belief in religion, science and logic alike since Kierkegaard and Augustine were impatient with logical proofs and claims about irrefutable logical principles. A rigid belief in them is addressed in Wittgenstein’s *On Certainty* in a way reminiscent of Lukasiewicz’s earlier qualms about logic supporting belief. Thus Wittgenstein says, “I believe that every human being has two human parents; but Catholics believe that Jesus only had a human mother.”<sup>38</sup> And they believe that

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<sup>33</sup> Pouivet, “Faith, Reason, and Logic.”

<sup>34</sup> *Modal logic* replaced a *truth-functional logic* for the proofs. The proofs, for John Paul II, are “the point of departure for... Kant” who rejected the approach “of the Bible and of Saint Thomas Aquinas,” per *Crossing the Threshold of Hope*, ed. by V. Messori (New York: Alfred Knopf, 1994), 34.

<sup>35</sup> Pouivet, “Faith, Reason, and Logic.”

<sup>36</sup> Pouivet, “Faith, Reason, and Logic.”

<sup>37</sup> Norman Malcolm, *Ludwig Wittgenstein: A Memoir*, 2<sup>nd</sup> ed. with Wittgenstein’s Letters to Malcolm (New York: Oxford University Press, 1984), 59, 60.

<sup>38</sup> Ludwig Wittgenstein, *On Certainty*, eds. G.E.M. Anscombe and G.H. von Wright, trans. Denis Paul and G.E.M. Anscombe (New York: Harper Torchbooks, 1969), 32e, #239.

wine becomes the blood of Christ: “if [G.E.] Moore said ‘I know that this is wine and not blood,’ Catholics would contradict him.”<sup>39</sup>

Does the contradictory doctrine of Catholics contravene the Contradiction Principle? Cannot the Eucharist be both wine and not wine, with Christ’s presence not excluding the presence of wine,<sup>40</sup> as much as traditional Christians may understand Jesus as being both man and not-man in virtue of his father being the Holy Spirit and his mother human? Is not the disbelief in Jesus having only one biological parent, queries Wittgenstein, based on never knowing anyone not to have had two biological parents and on the sexual nature of persons? “But then,” he asks, “is that really a proof?”<sup>41</sup> His querying further about the ‘proof’ being akin to a scientific hypothesis that is repeatedly confirmed by disbelievers, but which is no surer than confirming that yet another person has two parents, brings to mind Lukasiewicz. He might compare belief in a hypothesis to belief in the principle that specifies that something cannot have incompatible attributes.

If the principle and hypothesis were true, then it would *follow logically* that there are not the attributes and that persons have two human parents. But the reverse reasoning is actually proper: There in fact always being the parents and never the attributes would, for Lukasiewicz, be both a *reason for* the sentences being true and *real cause* of why they are true.<sup>42</sup> This reasoning comes closer to reflecting a genuine realism regarding ‘truth’ whose truth-condition is an experienced reality, not reality having norms of reason imposed on it *a priori* – notwithstanding in science that there may be other modes of reasoning to true hypotheses or theories congruent with realism, such as abduction, although the belief in their absolute and exclusive truth would still be unwarranted.

## B. Conflicting Rules of Reason, Reason Conflicting with Rules

How may reason conflict with its rules? Bearing on theories construed as propositions, a rule of propositional logic holds that a false conjunct falsifies a conjunctive proposition. But one may ordinarily reason, or reason commonsensically, that  $(p \wedge q)$  with one false conjunct and  $(r \wedge s)$  with two are not equally false. What of universal claims whose falsity is denied since, while they address reality, they are

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<sup>39</sup> Wittgenstein, *On Certainty*, 32e, #239.

<sup>40</sup> Christ’s real presence does not exclude “other types of presence as if they could not be ‘real’ too,” but is still “a *substantial* presence by which Christ [is] entirely present.” *Catechism of the Catholic Church* (Citta del Vaticano: Libreria Editrice Vaticana, 1994), 346, #1374.

<sup>41</sup> Wittgenstein, *On Certainty*, 32e, #240.

<sup>42</sup> Logic, for Aristotle, studies the *cause* of truth. ‘Truth’ thereby brings to mind this point by Owen LeBlanc, “Lukasiewicz, Aristotle, and Contradiction,” *Papers on Lukasiewicz*, Section 5.

deemed indubitably true? Would their truth not be empirically contingent and logically uncertain? If they were certain logically, then they would be trivial. Their not being trivial or true analytically seems as obvious as being unable to certify their truth inductively by sense experience since all things are not experienced and even if they were, how would this be known? In short, are rules about the nature of trivial and empirically contingent reasoning outweighed by other rules that bear on reasoning such as the Contradiction Principle? Should this Principle or any rule be abided by blindly? If so, what are the reasons for doing that?

Indeed, notes LeBlanc, after probing “relations between the principle of contradiction and other laws, Lukasiewicz observes that [the principle] is not in fact very useful as a logical tool, and consequently he calls into question its status as the most fundamental of all principles.”<sup>43</sup> Do these questions about principles and rules evoke a skeptical regress, similar to that which concerned Aristotle in his *Posterior Analytics* (Bk. 1, Ch. 3), where either rules or beliefs would be justified by others and they yet by others that *ex hypothesi* are merely further beliefs and rules that beg for justification?

Contrary to this futile justification, Lukasiewicz presaged Wittgenstein who explains how “I could say... ‘I have two hands is an irreversible belief’” if it expresses a refusal of metaphysical retorts to be a disproof.<sup>44</sup> Does this sort of disproof exhaust criticism of the Principle of Contradiction? As the belief in one’s having two hands is as certain as any evidence adduced to support the belief such as looking at them (since Cartesian doubts about dreaming, for example, would be metaphysical), the Principle may seem equally inviolable without appealing to perceived objects. An uncertainty about the objects, however, can differ in terms of metaphysical doubts being *disingenuous* and *genuine* doubts having factual reasons for challenging the belief: A belief in the Principle may either be effectively questioned or permit plausible counter evidence, if not allow for a patent disproof. Lukasiewicz noted also that although a contradictory object would have an imperceptible negation, a negation could still be inferred.<sup>45</sup>

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<sup>43</sup> LeBlanc, “Lukasiewicz, Aristotle, and Contradiction,” Section 9.

<sup>44</sup> Cf. Wittgenstein, *On Certainty*, 33e, #245.

<sup>45</sup> Lukasiewicz stated, “it is generally impossible to suppose that we might meet a contradiction in perception; the negation... is not at all perceptible... contradictions could only be inferred.” See Lukasiewicz, “O zasadzie sprzeczności u Arystotelesa (Über den Satz des Widerspruchs bei Aristoteles)”, *Bulletin International de l'Académie des Sciences de Cracovie. Classe de Philosophie et d'Histoire* (1910), 15-38 (engl. trans.: Lukasiewicz [1971,1979]; French trans.: Lukasiewicz [1991]). Originally in Venanzio Raspa, “Lukasiewicz on the Principle of Contradiction,” *Journal of Philosophical Research* 24 (1999): 57-112. From Venanzio Raspa “Lukasiewicz on the Principle of Contradiction,” *Papers on Lukasiewicz*, <http://www.fmag>.

Inferences cast doubt on believing the Principle of Contradiction such as either light being both a wave and non-wave or all phenomena permitting inferences to logically inconsistent theories, discussed below, contrast to one's everyday belief in having two hands against which metaphysical doubts are raised rather than physical evidence. Here, Wittgenstein's distinction of resolvable *genuine doubts* by 'looking' from *metaphysical doubts* that are senseless (because anything adduced as evidence is also doubted),<sup>46</sup> bears on inferences noted by Lukasiewicz that render sensible a doubt about the Principle. In a single stroke, it is evidently the case both that there is no vicious regress of belief and that a belief in the Principle is dubiously founded when Wittgenstein notes, "At the foundation of well-founded belief lies belief that is not founded."<sup>47</sup>

Can the Principle be well founded if contradictions seem unavoidable to even present-day scientific realists?<sup>48</sup> These realists remind one of Lukasiewicz who said that while negations in phenomena are not seen, "contradictions could... be inferred."<sup>49</sup> Inferences would be *a posteriori*, not *a priori*, and be problematic only if a rationality of science is confused with a genuine scientific realism. This realism is often believed in a dogmatic sense to be rational. *The Rationality of Science* by W. H. Newton-Smith, for instance, is an admirable defense of realism.

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unict.it/~polphil/polphil/Lukas/RaspaLukas.html, 22 Dec 2007, online without page/section numbers.

<sup>46</sup> Doubt about the wine being blood contrasts to doubts about having two hands. Though replies by believers "I know that..." are senseless in both cases insofar as there is no way to back up the words, for Wittgenstein, doubt about the hands is senseless without any caveat since the doubt is rooted in the mundane or ordinary and there is no ordinary way to assuage it. But doubt about the blood involves a lack of faith and faith is not senseless in the sense that it would *not* be needed if God merely did what is empirically improbable; explaining why he was impatient "with attempts to give religion a *rational* foundation." See Norman Malcolm, *Ludwig Wittgenstein: A Memoir*, 2<sup>nd</sup> ed. with Wittgenstein's letters to Malcolm (New York: Oxford University Press, 1984) 59.

<sup>47</sup> Wittgenstein, *On Certainty*, 33e #253.

<sup>48</sup> These realists should recall University of Hamburg philosopher Edward Conze who, in 1935, listed a litany of thinkers in different times and cultures who denied the Principle such as Nicholas of Cusa, Hegel, Bostroem, Bradley, India's Madhyamikas (Nâgârjuna), China's Taoists, Levy-Bruhl who indicated its accepted violations by so-called 'primitive minds' and Svend Ranulf who established its contravention by Eleatic thought. Can these deviators, he asks, be dismissed "with an impatient wave of the hand?" See Conze's "The Objective Validity of the Principle of Contradiction," *Philosophy* 10, 38 (1935): 205-218.

<sup>49</sup> Lukasiewicz, "O zasadzie sprzeczności u Arystotelesa (Über den Satz des Widerspruchs bei Aristoteles)", *Bulletin International de l'Académie des Sciences de Cracovie. Classe de Philosophie et d'Histoire* (1910): 15-38. From Raspa, "Lukasiewicz on the Principle of Contradiction," online without page/section numbers.

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But the nature of realism would be clarified and his case strengthened if a rationality of inferring contradictions were recognized.<sup>50</sup> The recognition bears on feasible solutions to other dilemmas such as an Underdetermination-of-Theory-by-Data (UTD) Thesis, discussed later. In being reminiscent of rival geometries, the Thesis allows for logically possible inferences to empirically equivalent theories that are not only inconsistent but also contradictory. And the possible contradiction is exacerbated by well-known anomalies in quantum physics such as light being both a wave and non-wave in terms of de Broglie's particle-wave equation.

Precisely, if modern formalized physics is a paradigm knowledge-yielding enterprise, but allows theories and theoretic entities to violate rules of reason, by permitting *inter alia* either contradiction or logical inconsistency, then it is easy to see why many philosophers of science may think that objective knowledge is precluded for the *less rigorous* human sciences, politics and ethics. A seriousness of this implication and value of Lukasiewicz's insights evoke an old adage: If formalized physics 'sneezes,' all other cognitive studies 'catch pneumonia' – to use metaphors for the knotty epistemological dilemmas. Thus the dilemmas posed by evident violations of the Principle of Contradiction beg for solutions that are nothing less than urgent. That this urgency bore on the logical issues at hand is illustrated by Lukasiewicz's criticism of Aristotle's excessive influence on provoking obstinate commitments to the Principle in the face of certain esoteric scientific advances in particular and intellectual developments in general.

### C. Non-Euclidean Challenges to Scientific Rationality

Some of these general developments, bearing on inferences to contradictory theories and theoretic entities, include non-Euclidean Geometry. Venanzio Raspa of the Università di Urbino notes that in 1918 at a farewell lecture at Warsaw University, Lukasiewicz announced his pioneering work on a three-valued logic and declared also that he had "published a book on the principle of contradiction in Aristotle's work."<sup>51</sup> His book on this work held that as Euclidean Geometry was wrongly thought to be axiomatically true, but resulted in non-Euclidean Geometry by

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<sup>50</sup> W.H. Newton-Smith, *The Rationality of Science* (London: Routledge & Kegan Paul, 2007), 41-43, suggesting that rival theories  $T_1$  and  $\sim T_1$  be integrated into a more global theory  $T_2$ . But why could not  $\sim T_2$  obtain, admitting of another more global theory and it of a rival theory and so on?

<sup>51</sup> See "Tresc wykładu pożegnającego prof. Jana Łukasiewicza, wigłoszonego w auli Uniwersytetu Warszawskiego dnia 7 marca 1918 r.," *Pro Arte et Studio* 11 (1918): 3-4 (aka "Farewell Lecture by Professor Jan Łukasiewicz, Delivered in the Warsaw University Lecture Hall on March 7, 1918"). From Raspa, "Łukasiewicz on the Principle of Contradiction," online without page numbers.

an attempted *reductio ad absurdum*, Lukasiewicz “strove to demonstrate that the principle is not so self-evident as it is believed to be” by seeking to “construct non-Aristotelian logic...”<sup>52</sup> And although he conceded that efforts to develop this logic had failed (perhaps precipitously), his comparison of self-evident geometric truth to the truth of Aristotle’s Principle would not be lost on one prominent logician who noted that although the self-evident truth of Euclidean axioms was “long believed,” it was “not believed quite whole-heartedly”:

While there was no doubt about the *truth* of Axiom 12 [parallel postulate]... its *self-evidence* was denied, which was deemed sufficient reason to relegate it... to the less dignified status of a mere theorem... The most fruitful attempt [to prove it a theorem] was that of the Italian mathematician Gerolamo Saccheri (1667-1733) who *replaced* the parallel postulate by alternative, contrary assumptions, and then sought to derive a contradiction... [But] instead of proving the parallel postulate, Saccheri (unknowingly) did something more important: he was the first to set up and develop a system of non-Euclidean geometry.<sup>53</sup>

Non-Euclidean geometry was developed later by Lobachevsky and Riemann, among others, and came to be accepted as being truer of real space in terms of Einstein’s physics than the Euclidean geometry supposed by Newton. Yet physicist Paul Marmet notes that Einstein’s space and time distortions are unneeded for various classical phenomena. These phenomena include the perihelion advance of Mercury because it is entirely explicable by Newton and mass-energy conservation.<sup>54</sup> And with respect to this classical domain of phenomena that do not approach the speed of light, there is also an evident epistemic impossibility of Newton’s theory being wholly false when it makes *systematically* true predictions. Unless the predicted phenomena were reflected with an approximate truth by the theory, the theory’s predictions would be inexplicable. And if this reasoning holds for Einstein’s theory, with its relevance to near speed-of-light phenomena, a case can be made also for a truth of the inconsistent geometries that underlie the theories: Real space may have attributes of being both Euclidean and non-Euclidean.

Though non-Euclidean geometry underlies a relativistic physics that may generally apply to all that classical physics does, a greater simplicity of the latter physics may make it epistemologically preferable to the physics of Einstein via Occam’s razor in the classical domain. These different domains do not exclude the

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<sup>52</sup> Raspa, “Lukasiewicz on the Principle of Contradiction,” online without page numbers.

<sup>53</sup> Irving Copi, *Symbolic Logic*, 3<sup>rd</sup> ed. (London: Collier-Macmillan, 1972), 182, 183.

<sup>54</sup> Paul Marmet, “A Logical and Understandable Explanation to the Advance of the Perihelion of Mercury,” presented to the Society for Scientific Exploration at Albuquerque 3-5 June 1999, <http://www.newtonphysics.on.ca/MERCURY/Mercury>.

problem of inconsistent geometries that are compounded by a unitary-invariant geometry (Fubini-Study metric) for quantum mechanics,<sup>55</sup> for example, but rather exacerbate the dilemma. For there may be *one* reality with *many* incompatible attributes that include the different domains and natures of geometric space, bringing to mind in addition to physics the metaphysical problem of the *One* and *Many* that was addressed theologically by Van Til.

Is Van Til supported surreptitiously by an objection that the geometric conflict is only apparent since the theories are semantically equivalent by an approach of W.V. Quine? His “semantic ascent,” says Dallas Willard, purportedly eludes the theories’ ontological implications by talk about “non-linguistic [ontological] matters” ascending to “entities, events, or structures that are constituents of language.”<sup>56</sup> We supposedly ascend “to a common part of two fundamentally disparate conceptual schemes,” from say “whether miles *exist* to... uses of the word ‘mile’” whereby differing theories are not supposed. But we most often actually ascend, says Willard, “from philosophically contested points about what exists to... contested points about the nature and function of names.” Thus he asks, “Are not Wittgenstein and Carnap, John Wisdom and Gustav Bergmann only by courtesy or confusion said to have been talking about the same thing?” and answers, “insofar as in our meta-language we are still ‘speaking of objects,’ Quine would be the very first to deny that semantic ascent will free us from ontological presumption.”<sup>57</sup>

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<sup>55</sup> See Dorje Brody and Lane Hughston, “Geometric Quantum Mechanics,” *Journal of Geometric Physics* 38 (2001): 19-53, where “the manifold of pure quantum states is a complex projective space endowed with the unitary-invariant geometry of Fubini and Study.”

<sup>56</sup> The quotes in this paragraph are from Willard’s “Why Semantic Ascent Fails,” *Metaphilosophy* 14, 3/4 (1983): 276-290, from <http://www.dwillard.org/articles/artview>, emphasis, 27 Dec 2011.

<sup>57</sup> Presumptions may concern two evident contradictions to Euclidean geometry: 1) ‘positively’ curved space in terms of spherical/elliptical geometry and 2) ‘negatively’ curved space in terms of hyperbolic/Lobachevskian geometry. Though the parallel postulate concerns straight lines so that a genuine non-Euclidean geometry may not seem to be achieved, K.L. Ross distinguishes ‘extrinsic’ curvature from one that is ‘intrinsic.’ “A space can possess ‘intrinsic’ curvature, yet contain lines (‘geodesics’) that will be straight according to any... measurement intrinsic to that space. A geodesic is ‘straight’ in relation to its own manifold. Euclidean straightness thus characterizes the geodesic of a three dimensional space with no intrinsic curvature...” See Ross’ “The Ontology and Cosmology of Non-Euclidean Geometry,” <http://www.friesian.com/curved-1.htm>, 2011.

## D. Inconsistent Theories and Theoretical Entities: The UTD Thesis

If we recall that Euclidean geometry's axiomatic truth was insisted on as inflexibly as that of the Contradiction Principle, the Principle's relevance to rival geometries and geometric truth having as its truth-condition the way reality really *is* (at least approximately) render reasonable Lukasiewicz's approach. In holding that contradictions can be inferred from phenomena by instrument-aided or naked-eye observation, his approach both reveals an authentic scientific rationality of reasoning from reality without imposing on it any norms of reason and anticipates knotty epistemic problems as well as their novel solutions. Consider a solution to light being both a wave and non-wave, for instance, after noting a Lukasiewiczian response to one of the most formidable challenges to a rationality of science: the Underdetermination-of-Theory-by-Data (UTD) Thesis.

The strongest version of this Thesis specifies the logical possibility for any set of data to admit of contradictory but empirically equivalent theories that can equally explicate, manipulate and predict phenomena in a given domain, say Newton's where Planck's constant is small and bodies do not approach the speed of light, or one applicable to light speed such as Einstein's. In being equivalent, realists could evidently not say which is true: an Einsteinian theory  $T_E$  or non-Einsteinian  $\sim T_E$ , a Newtonian theory  $T_N$  or non-Newtonian  $\sim T_N$ . Theories could be systematically underdetermined by a straightforward translation procedure that permits any data addressed by, say,  $T_N$  to be transposed into  $\sim T_N$ 's account.<sup>58</sup> This would entail an empirical equivalence of  $\sim T_N$  and  $T_N$  of all known, as well as of all logically possible results. These results notwithstanding, contradictory theories could be construed as conjunctive propositions, to which 'truth' is ascribable, if the laws ( $L$ ) of a given theory  $T_o$  are read as either  $(L_1 \wedge L_2)$  or  $[(L_1 \wedge L_2) \wedge L_3]$  and  $\sim T_o$  as  $\sim(L_1 \wedge L_2)$  or  $\sim[(L_1 \wedge L_2) \wedge L_3]$  depending on the number of laws.

But the contradiction is possible and reflects a Lukasiewiczian realism: Reality is the truth-condition for 'truth,' not a truth of the Principle for how reality must be. Reality need not conform to the Principle and it should not be imposed on reality. Exactly, de Broglie's particle-wave equation wherein light as a wave mandates understanding light as a particle agrees with a UTD Thesis, even if the equation involves inferences to theoretical entities (construable nonetheless

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<sup>58</sup> Cf. John Worrall, "Scientific Realism & Scientific Change," *Philosophical Quarterly* 32 (1982): 201-231, referring to Henri Poincaré's example of empirically-equivalent *contradictory* theories (223). A weaker *logically inconsistent* under-determination is illustrated by a theory  $T$  joined to a purely theoretical statement ( $s$ ) with no extra empirical consequences for  $T \& s$  and  $T \& \sim s$  (222).

by possibly contradictory equations).<sup>59</sup> When it is stated in the *Proceedings of the New York Academy of Sciences* that we must still conclude that light *is* and *is not* a particle (wave), theoretical constructs are not appealed to apart from evidence.<sup>60</sup> Evidence is not ignored as feared by Sir Karl Popper.<sup>61</sup> Popper confused a top-down relativistic reasoning *from* incompatible theoretical constructs *to* phenomena, which permits contradictory truth-claims *a priori*, with bottom-up inferences *from* experimental setups *to* the constructs that allows for those claims *a posteriori*.<sup>62</sup>

Nor is this point restricted to light. P.K. Stanford proposes a New Induction, an ‘inductive rationale’ to explain typical alternatives to our best theories that are “equally well confirmed by the evidence” even if we cannot “conceive of them at the time.”<sup>63</sup> The history of science suffers from an ability to conceive only of a few theories that are well confirmed. The rest routinely revealed alternatives that came to be “well-confirmed by the previously available evidence...”<sup>64</sup> Happily, evidence for this weaker Underdeterminism is said to be fallible, given his mere induction, so that many champions of the Thesis will be disappointed! The disappointed would be various antirealists with vested interests in an absence of objective truth: social constructionists, deconstructionists and multiculturalists who have endeavored to institutionalize an epistemic relativism.

Though not seeking to support relativism but rather meta-scientific pursuits of truth, John Worrall worries about a logically compelling case against realism. And although he augments Stanford’s optimistic fallibility by remarking that some seemingly inconsistent theories were reconciled, say integrating data of the

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<sup>59</sup> The particle-wave equation is  $\lambda = h/p = h/mv$  where  $\lambda$  is wavelength,  $h$  is Planck’s constant and  $p = mv$  = the magnitude of a moving particle’s momentum.

<sup>60</sup> Saul Youssef, “Is Quantum Mechanics An Exotic Probability Theory?” in *Fundamental Problems in Quantum Theory: A Conference Held in Honor of Professor John A. Wheeler*, eds. D.M Greenberger and A. Zeilinger (New York: Annals of the New York Academy of Sciences, 1995), 904.

<sup>61</sup> Karl Popper, *Quantum Theory and the Schism in Physics* (Lanham: Rowman & Littlefield, 1982), 142.

<sup>62</sup> The Greek sophist Protagoras held that “Man is the measure of what *is*.” I argued elsewhere that he sometimes seems to reason *from* reality *to* contradictory ideas, a *bottom-up* reasoning that evidences, not an irrational relativism, but rather a relativistic realism that presages Lukasiewicz!

<sup>63</sup> See P. K. Stanford, “Refusing the Devil’s Bargain: What Kind of Underdetermination Should We Take Seriously?” *Philosophy of Science* 68, 3, Supplement: Proceedings of the 2000 Biennial Meeting of the Philosophy of Science Association. Part I (Sep. 2001): S1-S12.

<sup>64</sup> Stanford, “Refusing the Devil’s Bargain,” S9.

classical wave theory of light into the corpuscular-theoretic framework,<sup>65</sup> he notes that the stronger UTD Thesis is not subject to fallibility or reconciliation.<sup>66</sup> No reconciliation is possible, as noted earlier, if there is a systematic underdeterminism of theories by a straightforward translation procedure that permits any data addressed by theory  $T_o$  to be transposed into  $\sim T_o$ 's account. This entails an empirical equivalence of  $\sim T_o$  and  $T_o$  not only of known results but also of all logically possible results, excluding an inductive optimism via an historical record that offers only fallible evidence of an "under-determination predicament."<sup>67</sup>

This predicament, that is, cannot be diminished in terms of the history of science and most scientific realists would say it is fatal. The alleged fatality may seem to beg for a logical resolution, a hope of rationalistic realists. The real solution, however, involves realizing that realism does not depend on reality conforming to reason but rather on reason depending on an experienced reality. Evidence that is rooted in this reality in terms of experimental setups or otherwise may or may not result in underdetermined theories. But even if theories were inferred that are inconsistent by a 'new induction,' the induction is based on an experienced reality and not on an epistemic relativism in which the theories are accepted *a priori* for interpreting reality without evidence.

Evidence of contradictory but empirically equivalent theories is, in fact, no threat to a rational scientific realism. For the realism regards 'truth' as reflecting how reality really *is* apart from either rational or non-rational norms imposed on it, this parodying relativism! Relativism was unacceptable to Lukasiewicz. In critiquing the Contradiction Principle, he "decidedly places himself in the stream of European logical realism [wherein what is *ontologically* involved in assessing logical truths may restrain their applicability<sup>68</sup>]."<sup>69</sup> And in virtue of this

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<sup>65</sup> Despite Worrall's allowance for a weak UTD Thesis, Youssef's aforesaid point (*limited* to two-slit experiments) is now extended to light *at all times* having both wave and particle aspects. See Shahriar S. Afshar, Eduardo Flores, Keith F. McDonald, and Ernst Knoesel, "Paradox in Wave-Particle Duality," *Foundations of Physics* 37, 2 (2007): 295-305.

<sup>66</sup> Worrall, "Scientific Realism & Scientific Change," 223 (paraphrase). Stanford's *inductive optimism* to support realism ignores the *deductive pessimism* of Worrall. And Worrall's appeal to equivalent results of observation is not, as some say, undercut by observation's theory-ladenness: See Newton-Smith on 'low-level observation terms' in *The Rationality of Science*, 28, and my case for non-conceptual observation in "Physics and Phenomenology," *New Horizons in the Philosophy of Science*, ed. David Lamb (Farnham, UK: Ashgate Publishing, 1992), 66-86.

<sup>67</sup> Stanford, "Refusing the Devil's Bargain," S11.

<sup>68</sup> See E.S.G. Lombardo's review of *The Positivist and the Ontologist: Bergmann, Carnap and Logical Realism*, by Herbert Hochberg (GA: Rodopi Press, 2001), in *Mind* 112 (2003): 724-28.

<sup>69</sup> Raspa, "Lukasiewicz on the Principle of Contradiction," online without page numbers.

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applicability being doubted by St. Augustine because the Trinity reflected our triune existence, an existence experienced incontrovertibly and phenomenologically as being both *one* and *not one* inseparable life, Lukasiewicz's allowance for contravening the Principle is not only *not* at odds with a central foundation of traditional theology but also allows logically for the Principle's violations in science as well. In sum, his position as gleaned from his own works and the works of those who knew him best indicates that the violations agree superbly with a scientific and theological realism.