

A TRIPTYCH ARTICLE

Against the Instrumentalists

Verification, Its Limits, and the Reach of Reason

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1 The Case for the Instruments

A cesium fountain clock will lose about one second in a hundred million years. Two laboratories on opposite sides of the world, staffed by people who share no language, politics, or religion, will read the same interferometer the same way, and when their numbers disagree past the stated uncertainty, both teams treat the disagreement as a fact to be explained rather than an opinion to be tolerated. There is nothing else in human life quite like this. Courts, parliaments, and philosophy departments should all envy it.

Set beside that record the history of the questions instruments cannot touch. Whether the world had a beginning, whether the soul survives the body, whether anything necessary stands beneath the contingent things we see—these questions are ancient, and the disputes about them are ancient too. No electrometer has ever moved when an argument for the existence of God succeeded. The debates that measurement entered, measurement largely settled; the debates it could not enter appear, from a certain distance, never to have moved at all.

From this asymmetry a conclusion has repeatedly been drawn, and it deserves to be stated at full strength, because this essay exists to argue with it. The conclusion is not that empirical method is excellent, which no one here disputes. It is that empirical method is *exhaustive*: that what cannot in principle be brought before observation is not merely unsettled but unknowable, or not merely unknowable but not even a genuine question. Knowledge, on this view, has exactly one instrument panel, and whatever registers on no instrument belongs to poetry, psychology, or noise.

The pedigree of this position is distinguished. David Hume closed his *Enquiry Concerning Human Understanding* with the most famous book-burning order in philosophy:

When we run over libraries, persuaded of these principles, what havoc must we make? If we take in our hand any volume; of divinity or school metaphysics, for instance; let us ask, *Does it contain any abstract reasoning concerning quantity or number?* No. *Does it contain any experimental reasoning concerning matter of fact and existence?* No. Commit it then to the flames: For it can contain nothing but sophistry and illusion.¹

Note the shape of the verdict. The offending volume is not to be read and refuted; it is to be classified and destroyed. Two admissible kinds of content are named—relations of quantity, matters of experimental fact—and whatever fits neither is condemned without further hearing.

Auguste Comte gave the same verdict a philosophy of history. Each branch of knowledge, he announced, “passes successively through three different theoretical conditions: the Theological, or fictitious; the Metaphysical, or abstract; and the Scientific, or positive.”² Theology and metaphysics are not rivals to be answered but stages to be outgrown, as a man outgrows his childhood; the positive stage renounces “the vain search after Absolute notions, the origin and destination of the universe, and the causes of phenomena” and confines itself to laws, “their invariable relations of succession and resemblance.” On this account no argument against metaphysics is required, any more than an argument is required against being young.

The twentieth century sharpened the verdict into a criterion. The logical positivists of the Vienna Circle, and their most effective English advocate, A. J. Ayer, saw that calling metaphysics *false* concedes too much, since a false statement is still a statement. The stronger move was to deny that metaphysical sentences say anything at all. In *Language, Truth and Logic*, published in 1936 when he was twenty-five, Ayer laid down the rule: “The criterion which we use to test the genuineness of apparent statements of fact is the criterion of verifiability. We say that a sentence is factually significant to any given person, if, and only if, he knows how to verify the proposition which it purports to express.”³ Sentences that fail the test are not mistaken; they are “pseudo-propositions.” And Ayer did not leave the application to the reader’s imagination: “no statement which refers to a ‘reality’ transcending the limits of all possible sense-experience can possibly have any literal significance,” so that “the labours of those who have striven to describe such a reality have all been devoted to the production of nonsense.”

The consequence for religion was drawn with the same tidiness. Ayer’s position was not atheism, which he considered as meaningless as theism, since the atheist denies the very sentence the theist affirms and a denial of nonsense is nonsense too. “To say that ‘God exists’ is to make a metaphysical utterance which cannot be either true or false.”⁴ The believer is not wrong about the world. He has failed, while appearing to speak, to say anything about the world at all.

This family of positions needs a name, and the available technical labels—positivism, verificationism, scientism—each carry historical baggage this essay does not want to adjudicate. I will call its adherents *instrumentalists*: those who

convert the instruments of empirical science, and the observational tests they serve, from an excellent means of knowing into the sole criterion of what can be known or what is real.⁵ The definition matters. An instrumentalist in this sense need not be a working scientist, and most working scientists are not instrumentalists in this sense; the position is a philosophical thesis about knowledge, not a laboratory practice.

One more thing should be conceded before the argument begins, because it is true and because the position's adherents have earned it. Instrumentalism is almost always adopted as a discipline of honesty. Its attraction is not contempt for meaning but hatred of wishful thinking: the suspicion that where no test is possible, assertion expands to fill the available space, and that humanity has spent millennia mistaking the echo of its own hopes for the voice of reality. That suspicion is not contemptible. It is, in fact, a moral posture—a commitment about how one *ought* to form beliefs—and the irony of that fact will matter later. But a moral posture wrapped around a philosophical thesis must still submit the thesis to examination. The thesis is that only the empirically testable can be known. The examination will arrive, in due course, at an awkward question—how would one test *it*?—but the question lands with its full weight only on a position seen whole. The position deserves that. It has a history, a literature, and a record of self-correction that its casual modern heirs rarely know; and the history, it turns out, is not a neutral preface to the argument but the argument's first exhibit.

2 A Genealogy of the Criterion

Positions are examined; movements are also *lived*, and the living leaves a record. The exclusivist thesis is unusual among philosophical doctrines in that its career is itself part of the evidence about it: it was announced as a law of history, organized as a movement, engineered into a formal criterion, repaired under fire, and finally abandoned by its own heirs—all within about a century, and almost all of it in documents that can still be read. This section reads them. Nothing in it yet argues that the thesis is false; the argument comes after. What the genealogy establishes is something an examination needs first: what the position actually claimed, in its own strongest words, and what happened when its own adherents tried to make the claim precise.

2.1 Comte: The Law That Explained Its Rivals Away

Comte's opening move, quoted in the first section, was to announce a "great fundamental law" of intellectual history. It is worth watching how much work the announcement does. The three states are not presented as three schools among which one must argue; they are presented as ages. "The first is the necessary point of departure of the human understanding; and the third is its fixed and definitive state. The second is merely a state of transition."⁶ In the theological state the mind "supposes all phenomena to be produced by the immediate action of supernatural beings"; in the metaphysical, by "abstract forces, veritable entities (that is, personified abstractions)"; in the positive state it studies only laws of phenomena, "their invariable relations of succession and resemblance." The proof offered for the law is partly historical—every science, Comte says, shows marks of having passed through the earlier stages—and partly a charming appeal to biography: "each of us is aware, if he looks back upon his own history, that he was a theologian in his childhood, a metaphysician in his youth, and a natural philosopher in his manhood."⁷

Two features of the system deserve more attention than the slogan usually receives. The first is a concession buried in Comte's own argument for the law. Explaining why the mind *had* to begin theologically, he writes: "If it is true that every theory must be based upon observed facts, it is equally true that facts cannot be observed without the guidance of some theory. Without such guidance, our facts would be desultory and fruitless; we could not retain them: for the most part we could not even perceive them."⁸ Comte deploys the point to explain the past; he does not notice that it undermines the future he predicts, in which observation alone would sit as judge. If facts cannot even be *perceived* without theory, then the positive stage never possesses the theory-free ground the schema promises, and the renunciation of everything beyond "invariable relations" is itself one more theoretical stance, adopted and defensible—if at all—only by philosophical argument of exactly the kind the schema declares obsolete.

The second feature is the system's ambition, which was never merely descriptive. The positive philosophy, Comte announces, "offers the only solid basis for that Social Reorganization which must succeed the critical condition in which the most civilized nations are now living"; the crisis of the age "is shown by a rigid analysis to arise out of intellectual anarchy," and order will return when one of the three warring philosophies prevails—the positive, since it alone has been advancing.⁹ This is worth remembering whenever positivism presents itself as modesty about what can be known. The founding document is not modest. It proposes the government of opinion by a single doctrine,

promises that agreement on first principles will end revolutionary disorder, and assigns to a philosophy of science the office that theologies once held. The criterion of the knowable was born as an instrument of rule.

And it made testable predictions. Applying his method to astronomy, Comte drew the boundary of the knowable with complete confidence: of the planets “we can never know anything of their chemical or mineralogical structure; and, much less, that of organized beings living on their surface”; and as to the temperatures of the heavenly bodies, “I regard this order of facts as for ever excluded from our recognition.”¹⁰ The sequel is among the best-known reversals in the history of science: within a generation, the spectral analysis founded by Kirchhoff and Bunsen (1859–1861) was reading the chemical composition of the sun and stars in their light, and stellar temperatures followed.¹¹ The moral is not that Comte was careless; he was applying his criterion exactly. The moral is that a priori boundaries of the knowable, drawn with the full authority of a scientific philosophy, were falsified by science itself—and falsified, ironically, through Comte’s own favored sense of sight, by an inference from visible spectral lines to invisible constitution. Reality outran the rule; the instruments themselves refuted the philosophy of the instruments. A criterion that had misjudged what observation could reach within the sciences might reasonably have been suspected of misjudging what reason could reach beyond them. It was not; it was sharpened instead.

2.2 Vienna: A Movement with a Manifesto

The sharpening had a place, a date, and a pamphlet. In 1929 the Verein Ernst Mach in Vienna published a fifty-nine-page programmatic tract, *Wissenschaftliche Weltauffassung: Der Wiener Kreis* (“The Scientific Conception of the World: The Vienna Circle”), naming no author on its title page; its foreword is signed, for the society, by Hans Hahn, Otto Neurath, and Rudolf Carnap, and it was presented to Moritz Schlick, around whose seminar the Circle had formed.¹² The document is brief, confident, and remarkably candid about what the movement was and wanted. It is the nearest thing the exclusivist thesis possesses to a creed, and its sentences deserve exact quotation.

On the texture of reality: “In der Wissenschaft gibt es keine ‘Tiefen’; überall ist Oberfläche”—in science there are no “depths”; everywhere is surface. On mystery: “Die wissenschaftliche Weltauffassung kennt keine unlösbaren Rätsel”—the scientific world-conception knows no insoluble riddles; traditional philosophical problems are partly unmasked as pseudo-problems, partly converted into empirical questions. On method against the theist: when someone asserts “there is no God,” or that the ground of the world is the unconscious, “we do not say to him: ‘what you say is false’; rather, we ask him: ‘what do you mean by your statements?’”—and the interrogation is expected to sort his sentences into the empirically redeemable and the “völlig bedeutungsleer,” the completely empty of meaning.¹³ The metaphysician and the theologian, the manifesto explains, “glauben, sich selbst mißverstehend, mit ihren Sätzen etwas auszusagen, einen Sachverhalt darzustellen”—believe, misunderstanding themselves, that their sentences state something, represent a state of affairs—whereas analysis shows these sentences express only a *Lebensgefühl*, an attitude toward life, whose adequate medium is not theory but art, “zum Beispiel Lyrik oder Musik.” What such men produce is “nicht Theorie... sondern Dichtung oder Mythos”—not theory, but poetry or myth, mislabeled.

The manifesto is equally frank about its program. There is no philosophy as a fundamental or universal science above the empirical sciences; “es gibt keinen Weg zu inhaltlicher Erkenntnis neben dem der Erfahrung; es gibt kein Reich der Ideen, das über oder jenseits der Erfahrung stände”—no path to substantive knowledge besides experience, no realm of ideas above or beyond it. The workers of the scientific world-conception set themselves “mit Vertrauen”—with confidence—to the task of clearing away “den metaphysischen und theologischen Schutt der Jahrtausende,” the metaphysical and theological rubble of millennia. And the closing line joins the epistemology to a social hope in a single breath: “Die wissenschaftliche Weltauffassung dient dem Leben und das Leben nimmt sie auf”—the scientific world-conception serves life, and life receives it.¹⁴ Comte’s structure is intact beneath the modern logic: a boundary of the meaningful policed in the name of science, a philosophy of history in which the excluded discourse is debris left by an earlier age, and an explicit social mission. What Vienna added was the instrument the nineteenth century lacked: the new mathematical logic of Frege and Russell, which seemed to promise that the boundary could at last be drawn *formally*—not as a sage’s verdict but as a theorem-shaped rule anyone could apply. That promise is what the next two decades tested.

It should be said, because the essay will argue hard against these men’s doctrine: the Circle’s members were serious scientists and logicians, and their fate was not comfortable. Hahn died in 1934; Schlick was murdered on the university steps in 1936; the Verein Ernst Mach was dissolved for political reasons; within a few years emigration and exile had scattered the rest.¹⁵ The doctrine they carried into English-speaking philosophy was examined there with full rigor—by friends. That examination is the next part of the story.

2.3 Ayer: The Criterion Engineered

Language, Truth and Logic is the criterion's engineering document, and its opening page announces the ambition without preliminaries: "The traditional disputes of philosophers are, for the most part, as unwarranted as they are unfruitful."¹⁶ The preface divides all genuine propositions, "like Hume," into relations of ideas and matters of fact, and states the test: an empirical hypothesis need not be conclusively verifiable, but "some possible sense-experience should be relevant to the determination of its truth or falsehood." A putative proposition failing this and not being a tautology "is metaphysical, and... being metaphysical, it is neither true nor false but literally senseless."

The engineering interest of the book lies in what happens when Ayer tries to give the rule a precise form, because every load-bearing decision was forced on him by the sciences he meant to protect. Conclusive verifiability—the "strong" sense, in which a proposition is verifiable "if, and only if, its truth could be conclusively established in experience"—had to be rejected: universal laws of nature ("arsenic is poisonous"; "all men are mortal") cover infinitely many cases and can never be conclusively established, so a strong criterion "will prove too much," condemning the whole of science and history along with theology; indeed it is "self-stultifying as a criterion of significance," since on Ayer's own view no proposition beyond a tautology is more than a probable hypothesis.¹⁷ Conclusive *falsifiability* fared no better: a hypothesis can always be saved from refuting observations by blaming auxiliary assumptions, so definite confutation is as unattainable as definite proof—and Ayer's footnote names the proposal he is rejecting as that of "Karl Popper in his *Logik der Forschung*."¹⁸ So Ayer settled on the weak criterion: a statement is significant if, in conjunction with "certain other premises," experiential propositions can be deduced from it that do not follow from those premises alone. "This criterion seems liberal enough," he remarks. It was—fatally so, as he would be the one to admit.

2.4 Popper: The Alternative That Refused to Be an Ally

Karl Popper is often conscripted into this story as one more verificationist, and the conscription reverses his actual position, which he spent decades protesting. His problem, formed in the Vienna of the 1920s though he was never a member of the Circle, was not the positivists' problem. They sought a criterion of *meaning*: a line between sense and nonsense. He sought a criterion of *demarcation*: a line between empirical science and everything else—a line, as he put it, between theories like Einstein's, which forbid observable outcomes and so run risks, and theories that can absorb any observation whatever. From that contrast he drew his famous conclusions: "Every 'good' scientific theory is a prohibition: it forbids certain things to happen"; and "A theory which is not refutable by any conceivable event is nonscientific. Irrefutability is not a virtue of a theory (as people often think) but a vice."¹⁹

The distinction the instrumentalist needs to blur, Popper states with every resource of emphasis. Of the boundary he drew he says: it "was neither a problem of meaningfulness or significance, nor a problem of truth or acceptability. It was the problem of drawing a line... between the statements, or systems of statements, of the empirical sciences, and all other statements." Of the meaning question itself: "I personally was never interested in the so-called problem of meaning; on the contrary, it appeared to me a verbal problem, a typical pseudo-problem." Of the misreading: "Neither falsifiability nor testability were proposed by me as criteria of meaning." And—decisively for this essay's subject—of what falls outside science: "if a theory is found to be non-scientific, or 'metaphysical'... it is not thereby found to be unimportant, or insignificant, or 'meaningless', or 'nonsensical.'" Myths, he adds, may develop into testable science; "historically speaking all—or very nearly all—scientific theories originate from myths, and... a myth may contain important anticipations of scientific theories."²⁰

Note what this does to the instrumentalist's rhetorical economy. "Falsifiability" is the piece of philosophy of science most likely to be quoted at a believer, usually as though it were a hygiene rule descended from verificationism. In its author's hands it was the opposite of the verificationists' rule in the respect that matters most here: it demarcates without condemning. Popper judged the verifiability criterion a failure even as demarcation—"it excludes from science practically everything that is, in fact, characteristic of it (while failing in effect to exclude astrology)"—and he refused, in terms, to let the boundary of science double as a boundary of the meaningful or the knowable. The instrumentalist who retreats from Ayer to Popper has therefore not found a fallback position; he has surrendered the disputed territory. Under Popper's flag, the question of God may be non-science. It is not thereby nonsense, and the volume must still be read before anyone presumes to burn it.

2.5 The Retreat of 1946

Ten years after the first edition, Ayer reissued *Language, Truth and Logic* with a long new introduction that is one of the most instructive documents in twentieth-century philosophy—a fortification commander’s tour of his own breached walls, conducted with complete honesty. The opening concession has been quoted already: the book’s questions “are not in all respects so simple as it makes them appear.” The details are what matter.

First, the strong/weak distinction of 1936 dissolves under his own hand: as he had represented them, he now admits, “these are not two genuine alternatives,” since on his own doctrine no proposition beyond a tautology is ever conclusively established, so the “strong” sense had no possible application.²¹ Second—and this is the sentence on which the technical collapse turns—he concedes that the weak criterion of 1936, the one advertised as “liberal enough,” in fact “allows meaning to any statement whatsoever.” His own counterexample: given any nonsense sentence *S*—his choice was “the Absolute is lazy”—and the auxiliary premise “if *S* then this is white,” the observation-statement “this is white” follows from the pair and not from the auxiliary alone; so *S* passes the test, “and this would hold good for any other piece of nonsense that one cared to put... in its place.” The footnote credits the objection to Isaiah Berlin.²² Ayer then rebuilt the criterion a second time, in the two-story form of “directly” and “indirectly” verifiable statements, with clauses restricting the auxiliary premises. Three years later Alonzo Church’s review proved, in half a page of the *Journal of Symbolic Logic*, that the rebuilt criterion again admitted (near enough) any statement whatever.²³

By mid-century the salvage operation had an auditor. Carl Hempel’s 1950 survey, identified in the previous section, walked the whole sequence—conclusive verifiability, conclusive falsifiability, the weak criteria, translatability into an empiricist language—and reported that each either condemned manifest science or condemned nothing; his conclusion was that cognitive significance admits of degrees and cannot be captured by any sharp criterion of the promised kind.²⁴ And Ayer’s own final position, stated in the 1946 introduction and examined at length in the next section, was that the principle should be regarded “not as an empirical hypothesis, but as a definition,” though “not... entirely arbitrary”—an offer whose costs will be counted where it is examined. Understatement is also a philosophical genre.

2.6 Quine: The End of Sentence-by-Sentence Meaning

The last blow came from inside the empiricist family and was aimed at the foundations rather than the formulations. W. V. Quine’s “Two Dogmas of Empiricism” (1951) attacked the two pillars on which any Ayer-style criterion must stand: the analytic/synthetic distinction—the neat split between truths of meaning and truths of fact that gave the criterion its first disjunct—and “reductionism,” the belief that each meaningful statement, taken singly, has its own fund of confirming experiences. Against the second, Quine set his celebrated holism: our statements “face the tribunal of sense experience not individually but only as a corporate body”; “the unit of empirical significance is the whole of science.” The totality of our knowledge, “from the most casual matters of geography and history to the profoundest laws of atomic physics or even of pure mathematics and logic,” is “a man-made fabric which impinges on experience only along the edges.” It follows that “any statement can be held true come what may, if we make drastic enough adjustments elsewhere in the system,” and, “by the same token, no statement is immune to revision.”²⁵

For the criterion, the consequence is terminal in a way the earlier objections were not. Berlin and Church showed that particular formulations leaked; Quine argued that there is nothing for a correct formulation to *be*, because individual sentences—save perhaps those at the observational periphery—do not have their own separable empirical content to test. If confirmation attaches to the web and not the thread, a thread-by-thread meaning test is not hard to state but wrong in kind. The philosophical world largely agreed, and the verification principle passed out of live doctrine—not refuted by its enemies, but dismantled by Berlin, Church, and Quine and pronounced upon by Hempel, empiricists all. What Quine’s web costs the *instrumentalist*, as distinct from the criterion, is examined where the essay confronts the holist reply directly, in the section on the laboratory; the short version is that a web in which metaphysics, mathematics, and physics differ in degree of entrenchment rather than in kind of meaning is a web in which the metaphysician is again a colleague to be argued with, not a patient to be diagnosed.

The genealogy is now complete, and one feature of it should be fixed before the analysis begins, because the analysis will explain it. Every fatal wound was self-inflicted, or inflicted by kin: Comte’s boundary of the knowable was broken by the sciences it claimed to describe; Ayer condemned the strong criterion himself; Berlin, Church, and Quine were empiricists; Hempel was a logical empiricist writing the movement’s audit from within; Popper, the outsider nearest at hand, rejected not the criterion’s answer but its question. The historical record shows *that* the criterion could not

be made to work. It does not yet show *why* no repair was ever going to succeed. For that, the criterion must be made to face the one sentence it was never designed to sort: itself.

3 The Criterion Meets Itself

Take the criterion as Ayer stated it: a sentence is literally significant only if the proposition it expresses is analytic—true in virtue of the meanings of its terms, like “all bachelors are unmarried”—or empirically verifiable. Now ask what kind of sentence *that* is.

The question is not a debater’s trick, and it is not new; it was pressed against the Circle from the beginning, and the movement’s most serious minds felt its force and answered it. The answers are of three kinds, and they deserve to be examined one at a time, with their rejoinders and with the price of each rejoinder counted honestly—because the self-application problem is not a single checkmate but a narrowing series of exchanges, at the end of which the criterion is still standing only if no one looks at what it is now standing *on*. This section conducts the series. Its conclusion, stated in advance so the reader can watch for cheating: on the first reading the criterion condemns itself; on the second it loses its authority; on the third it loses its generality; and there is no fourth.

3.1 First Formulation: The Criterion as Statement

Read the criterion at face value, as a statement about meaning—the way it was in fact received by two generations of readers, and the way its polemical use requires, since only a *truth* about meaning could license the verdict that the theologian, whatever he thinks he is doing, is in fact saying nothing. Then it must itself be analytic or empirically verifiable, on pain of falling to its own sword.

It is not a report of observation, and no experiment bears on it. No one has seen meaninglessness through an eyepiece, and no laboratory outcome would confirm or refute the claim that unverifiable sentences lack meaning. Nor is it an empirical generalization about how people use words, for if it were, it would be refuted daily: speakers of every language confidently use, understand, paraphrase, translate, and dispute sentences about God, the soul, and the ground of the world, and an empirical linguistics would have to record that such sentences function meaningfully in every speech community on earth. The criterion was never meant as a description of usage; it was meant as a verdict on usage. And it is not analytic in any ordinary sense: “meaningful” and “empirically verifiable” are not synonyms whose identity a competent speaker recognizes on reflection, as he recognizes that bachelors are unmarried—if they were, the criterion would have needed no book, no movement, and no enforcement, and its denial would sound like a contradiction rather than like the entire history of philosophy. So the criterion, read as a statement, is neither of the two things it permits statements to be. By its own test it is not false; it is meaningless—and a meaningless sentence cannot classify anything, let alone consign the classified to the flames. Hume’s bonfire needed a warrant, and a warrant is exactly what the criterion, so read, cannot be: not analytic without becoming trivial or false, not empirical without being refuted by the speech of mankind, and if neither, then by its own sentence not even a candidate for belief. It is difficult to name another doctrine in the history of philosophy that so precisely describes the conditions of its own destruction.

The rejoinder is immediate, and it is the historically actual one: *the criterion was never a statement*. It is a rule, a convention, a proposal about how the word “meaning” shall be used. Rules are not true or false, so they need not be analytic or verifiable, and the self-application problem dissolves. This is the move Ayer made in print, and it must be taken seriously—more seriously than the triumphant version of the self-application argument usually takes it. So: second formulation.

3.2 Second Formulation: The Criterion as Proposal

Ayer, pressed on the point, took this way out. The principle of verification, he wrote in 1946, is to be regarded “not as an empirical hypothesis, but as a definition,” though “it is not supposed to be entirely arbitrary”; it is faithful, he claimed, to the way scientific hypotheses and common-sense statements “are habitually understood.”²⁶ A definition is a proposal, and a proposal can be neither true nor false. Very well. But now count what the retreat costs, because each cost is severe and none is optional.

The first cost is the anathema. A proposal can be declined. If “meaning” is defined so that only the empirically testable has it, then the metaphysician loses the word and keeps everything the word used to name: his sentences still assert, still contradict one another, still invite belief and denial, still stand in inferential relations; only now some other term must be found for what they have. A stipulation can redraw a map; it cannot execute the inhabitants. The criterion was advertised as a discovery about language—something we had all somehow failed to notice about our own speech—and under examination it shrank to a resolution about how its adherents proposed to talk. Resolutions carry no anathemas. The whole polemical yield of the doctrine—*pseudo*-propositions, “literally senseless,” the flames—depended on the criterion’s being a truth the metaphysician was violating, and the rejoinder survives only by surrendering exactly that.

The second cost is the supporting argument. “Not entirely arbitrary,” Ayer says, and he must say it, since an arbitrary definition would concede the game openly. But then there are *reasons* for adopting this definition rather than another—its fidelity to scientific and everyday usage, the fruitfulness of the practice it recommends, the confusions it allegedly prevents. Consider what kind of reasons these are. They are not observations; no instrument reports that a definition is faithful or fruitful. They are not tautologies. They are philosophical judgments of appropriateness, exactly the genre of discourse the criterion exists to expel—so the proposal can be commended only in a currency the proposal declares counterfeit. And the particular reason Ayer gives is, on its face, false: religious and metaphysical language is part of ordinary usage, has been in every culture from which we have records, and sits inside the very common-sense discourse to which the definition claims fidelity. A definition of “fish” that excluded most of what fishermen have always caught would not be called faithful to usage; it would be called a different subject.

The third cost Ayer counted himself, with the honesty that distinguishes him: “I confess, however, that it now seems to me unlikely that any metaphysician would yield to a claim of this kind; and although I should still defend the use of the criterion of verifiability as a methodological principle, I realize that for the effective elimination of metaphysics it needs to be supported by detailed analyses of particular metaphysical arguments.”²⁷ Read it twice: *for the effective elimination of metaphysics it needs to be supported by detailed analyses of particular metaphysical arguments*. The blanket verdict is gone, on the movement’s own signature. What remains is a proposal, defensible only by philosophical argument, declinable without irrationality, and incapable of convicting anyone who declines it. The metaphysician does not need more than this; he needed only to get his case out of the fire and onto the docket.

3.3 Third Formulation: The Criterion Ascended

There is a subtler rejoinder, implicit in the Circle’s practice and explicit in its most technical work: the criterion, rightly understood, is not a sentence *of* the language it governs but a sentence *about* that language—a metalinguistic rule, stated one level up, in the idiom of logical syntax or semantics. “Every meaningful sentence of L is analytic or verifiable” is then no more a member of L than a rulebook is a move in the game it regulates, and asking whether the criterion passes its own test is dismissed as a confusion of levels, like asking whether the offside rule is offside.²⁸

The move is genuinely clever, and its logical hygiene should be granted: level distinctions are real, and some self-referential paradoxes are rightly dissolved by them. But watch what the ascent purchases and what it forfeits.

First, the problem climbs the ladder faster than the criterion can. The metalinguistic rule is itself a sentence—of the metalanguage. Either the criterion of significance applies to metalanguage sentences or it does not. If it does, the old trilemma reappears one story up: the rule about L is not a report of observation, not an empirical generalization (the usage of L-speakers refutes it there as before), and analytic only if it is a stipulation—which hands us back the second formulation with its costs unpaid. If instead the criterion does *not* apply to metalanguage sentences, then there exists a whole stratum of discourse—non-analytic, non-empirical, and yet meaningful, indeed important enough to legislate for science—that the criterion exempts from its own test. The empiricist principle “only the analytic or the verifiable is meaningful” has then been abandoned in general and retained only as a house rule for the ground floor; and a regress stands behind the exemption, since a criterion for the metalanguage would have to be stated in a meta-metalanguage, and so upward forever, the verdict of “meaningless” never acquiring categorical force at any level because every level’s rule is certified only by the next.

Second—and this is the decisive point for this essay’s subject—the exemption is not sellable to one customer only. If there can be meaningful discourse that is neither analytic nor empirically verifiable, provided it is discourse *about* the right sort of thing (the structure of a language, the norms of an inquiry), then meaningfulness beyond the analytic and the verifiable is possible, and the question which further discourse qualifies is open and substantive. The metaphysician has been arguing all along that his discourse is exactly of such a kind: not one more empirical report inside the world’s

inventory, but reasoning about what the existence of any empirical inventory presupposes—as the syntactician’s discourse is reasoning about what the practice of assertion presupposes. Perhaps that parallel can be resisted; but resisting it requires a principled account of why semantic ascent is legitimate and metaphysical ascent is not, and such an account would be a piece of philosophy, arguable and attackable, standing before precisely the tribunal the criterion was invented to abolish. The ascent rescues the criterion’s coherence by forfeiting its universality: after the ascent, the boundary of the meaningful is no longer “the analytic plus the verifiable,” but “the analytic, plus the verifiable, plus whatever discourse about presuppositions we find we cannot do without.” The last clause is a door, and it does not open onto the flames; it opens onto the rest of this essay.

The three formulations exhaust the live options, and the audit can be closed. As a statement, the criterion condemns itself. As a proposal, it survives, but disarmed: declinable, defensible only by the philosophy it outlaws, and—by its author’s own confession—incapable of eliminating anything. As a metarule, it survives, but provincial: coherent one level up only by exempting from its own test a kind of discourse whose very possibility refutes the doctrine’s universal form, and unable, without fresh philosophical argument, to deny the metaphysician the same ascent it claims for itself. In every case the result is the same, and it is worth stating carefully, because it is the hinge on which the essay turns from demolition to construction: *the question of what lies beyond the empirically testable cannot be closed by rule*. It can only be closed, if at all, by argument—and by argument in which both sides are allowed to speak their native language.

3.4 What the Collapse Licenses, and What It Does Not

Two features of the criterion’s fall—the historical fall chronicled in the genealogy, and the analytical fall just conducted—determine what may and may not be concluded from it, and both must be said as plainly against the essay’s own interest as for it.

First, the criterion was not refuted by theologians defending their territory. It was dismantled by logicians and philosophers of science, most of them unsympathetic to metaphysics, who simply could not make the rule sort sentences the way it was supposed to. The verification principle died of internal injuries, among friends. When the Catholic Church much later described positivism’s central claim as one that “critical epistemology has discredited,” it was reporting the coroner’s finding, not issuing it.²⁹

Second, the collapse of the criterion does not prove that any metaphysical sentence is true, or even that all metaphysical sentences are meaningful. A rule that fails to condemn a prisoner does not thereby acquit him. Some candidate metaphysics is surely confused; some sentences that look like assertions surely are not; and nothing prevents a critic from arguing, of any *particular* metaphysical sentence, that it fails some *defended* standard of intelligibility—that is what Ayer’s last concession invites, and it is honest work. What the collapse removes is something narrower and more important: the *blanket* verdict, the classification that spared the instrumentalist the labor of reading the volume before burning it. Hume’s librarian asked two questions of the book’s spine. After Berlin and Church and Quine, after the retreat to definition and the flight up the ladder, the book has to be opened, and each argument in it met the way arguments are met—by counterargument. For half a century, in departments where the positivist creed was taught as hygiene, a generation learned that the question of God had not been answered but *dissolved*, and that the dissolution was a result of modern logic. It was not. The dissolution failed by the standards of modern logic, and the question stands where it stood, unread and unanswered, waiting.

That is a purely negative result, and if the matter ended there, this essay would be an exercise in demolition. It does not end there. The criterion’s failure has a cause, and the cause is more instructive than the failure. The rule could not draw a boundary around knowledge at the edge of the empirically testable because knowledge never had that boundary—not even inside the laboratory the rule was built to flatter.

4 What the Laboratory Already Knows

Watch what a measurement actually involves, and count the things known in the course of it that no instrument reports.

Begin with the arithmetic. A physicist averages five readings; the average requires that five is what the readings number, that addition behaves tomorrow as it behaved today, and that division does not depend on the operator’s mood. No experiment established these truths, and none could overturn them: an apparent laboratory refutation of

arithmetic would be treated—rightly—as a miscount, a malfunction, or a joke. The same holds for logic. The whole evidential force of an experiment runs through inference: *if* the theory is true, *then* the meter reads thus; the meter does not read thus; therefore the theory is in trouble. That pattern—the logician’s *modus tollens*—is not a finding of any science. It is what makes findings possible. A mind that had to verify logic empirically could never get an empirical verification started, since the bearing of evidence on hypothesis *is* a logical relation.³⁰

Continue with the reach of the conclusions. Science does not want yesterday’s meter readings; it wants laws—claims about all bodies, all charges, every case, observed and unobserved, past and future. The inference from *tested here* to *holds everywhere* is called induction, and its warrant is famously not itself an observation. Hume, the patron of the flames, was also the man who showed that no experience can certify that unexperienced cases resemble experienced ones, since any argument from past success of induction to its future success is induction again.³¹ The working scientist is right to trust induction. But the trust is a piece of rational confidence that outruns every possible instrument reading, held by every experimentalist as a condition of experiment.

Continue with the observations themselves, for even they are not the criterion’s innocent atoms. What counts as a datum—which flicker is signal, which is noise, which run is discarded for a known fault—is decided under a theory, by a trained judgment the instrument cannot supply. The point is not a modern subtlety; the genealogy found it in Comte’s own founding chapter: “facts cannot be observed without the guidance of some theory... for the most part we could not even perceive them.”³² The father of positivism, explaining history, stated the premise that dissolves positivism’s picture of a self-certifying observational ground. Observation disciplines theory magnificently—but only from inside a practice that already knows more than observation delivers.

Continue with the sociology of evidence. Almost nothing any scientist knows was verified by that scientist. She knows the mass of the electron from tables, the reliability of the tables from the practice of the community, the results of the crucial experiments from reports written by the dead. Her own data from last year she knows by memory and by trusting records she has no independent means to check against the past itself. Testimony, memory, the existence of other minds competent to testify—this is the load-bearing structure of scientific knowledge, and none of it registers on any gauge. A consistent instrumentalist, permitted to believe only what he could bring before observation, would be reduced to the contents of his present visual field; he could not even believe in the previous page of his own lab notebook, since the past that wrote it is exactly the kind of thing no present observation can contain.

Continue, finally, with the norms. The entire enterprise runs on the conviction that data ought to be reported honestly, that a beautiful theory must yield to an ugly fact, that fabricating results is not merely imprudent but *wrong*. These are judgments about obligation, and obligation casts no shadow on a detector. On Ayer’s official account they are not judgments at all but expressions of feeling, so that “falsifying data is wrong” says no more than a groan says. No scientific institution could survive a week on that reading of its own rules, and none has ever tried. The instrumentalist’s laboratory is held together by moral knowledge his theory classifies as noise; his position is, in the exact sense, parasitic—alive only because the knowledge it denies keeps feeding it.

And at the center of all of it sits the thing the instruments cannot be: the one who reads them. A needle against a scale is not information; it is brass and ink until a mind takes it *as* standing for a quantity, under a theory, within a calibration, toward a conclusion. Every measurement terminates in an act of understanding and judgment that is not itself a measurement. This is not mysticism about consciousness; it is the plainest description of what happens when anyone reads a dial. The instrument extends the senses magnificently. It does not extend one inch beyond the senses toward the judgment that makes sense of them.

Now assemble the inventory. Inside the most disciplined empirical practice humanity has built, we find knowledge of mathematics and logic, which no observation establishes; rational warrant for induction, which outruns all observation; knowledge by testimony and memory of a past and of other minds that no observation contains; moral knowledge of the norms of inquiry; and the knower’s own understanding, presupposed by every reading and reported by none. None of this is exotic. All of it is knowledge, if anything is—the instrumentalist himself stakes his practice on every item. The thesis that only the instrument-testable can be known is therefore not a modest generalization from science; it is a description that fits no science, no scientist, and no single hour of scientific work that has ever been performed.

What follows is not that anything goes. The right conclusion is more precise, and it is the hinge of this essay: knowledge is *proportioned to its objects*. Quantities are known by measuring because quantity is the sort of thing measurement fits. Theorems are known by proof, particulars of the past by testimony and record, obligations by practical reason, minds by their expression in speech and act—and in each case the method answers to the kind of thing being known, and is answerable to it, testable in its own register, correctable by its own failures. This plurality

is the opposite of relativism: it is rigor, distributed. The demand that every object submit to the method proper to quantity is not rigor but a category mistake enforced with a confident face.

One question, then, can no longer be dismissed on procedural grounds. Sensible, measurable, contingent things exist; the sciences know them with growing precision. Whether such things point beyond themselves—whether the existence of the measurable has a ground that is not itself one more measurable thing—is a question about reality, askable in earnest, condemned by no coherent criterion. It must be judged the way every serious question is judged: by the arguments. To those arguments, and to the tradition that spent two thousand years refining them, the essay now turns.

5 From Effects to Their Ground

The word “metaphysics” now needs rescuing from its caricature, because the caricature is what the instrumentalist refuted. In the caricature, the metaphysician closes his eyes to experience, consults a private faculty, and returns with news about a hidden world—assertion without discipline, precisely the wishful thinking the positivist hygiene was designed to kill. Whatever deserves that description deserves its fate. But the central tradition of Western metaphysics, and certainly the Catholic philosophical tradition, never worked that way, and said so with a bluntness that ought to embarrass the caricature.

5.1 Demonstration from Effects

Thomas Aquinas states the tradition’s starting point in words an empiricist could sign: “Our natural knowledge begins from sense. Hence our natural knowledge can go as far as it can be led by sensible things.”³³ No innate blueprint of God, no private channel: the mind’s material is what the senses deliver—the same stones, stars, and meter readings the sciences study. The question is only how far sensible things can *lead*. And Aquinas’s claim, argued rather than announced, is that they lead beyond themselves, because they present themselves as effects. His statement of the method is almost aggressively sober: “from every effect the existence of its proper cause can be demonstrated, so long as its effects are better known to us... Hence the existence of God, in so far as it is not self-evident to us, can be demonstrated from those of His effects which are known to us.”³⁴ Not seen in a vision; not felt in the heart—*demonstrated*, the cold syllogistic word, from effects, the empiricist’s own material.

The distinction buried in that passage repays a moment’s care, because it is the tradition’s own answer to a fair instrumentalist complaint. Demonstration *propter quid* proceeds from a cause’s nature to its properties: knowing what a triangle is, one deduces what must hold of it. Nothing of the sort is claimed for God, since His nature is precisely what we do not grasp. Demonstration *quia* runs the other way, from an effect in hand to the reality of its cause—the direction of the detective, the archaeologist, and, often enough, the physicist, who posited the neutrino from the books’ failure to balance long before any detector clicked. The instrumentalist who objects that God is not observable has, so far, said nothing against the argument; unobservability of the cause is the normal condition of *quia* reasoning, which exists exactly because causes so often outrun the evidence that certifies them. What would tell against the argument is a failure in the inference itself—a premise untrue of the sensible world, a step that does not follow. That is where the tradition invites attack, and where serious attack has always come.

5.2 The Preambles of Faith

Before weighing what such reasoning could show, mark where the tradition itself filed it, because the filing refutes a common picture of faith. In the same article, answering the objection that God’s existence is an article of faith and therefore cannot be demonstrated, Aquinas writes: “Deum esse, et alia huiusmodi quae per rationem naturalem nota possunt esse de Deo... non sunt articuli fidei, sed praeambula ad articulos”—the existence of God, and like truths knowable by natural reason, are not articles of faith but *preambles* to the articles; “for faith presupposes natural knowledge, even as grace presupposes nature, and perfection supposes something that can be perfected.”³⁵ The architecture matters. Revealed mysteries—Trinity, Incarnation—are held by faith and are not claimed to be demonstrable; the existence of God is claimed to be demonstrable and is therefore, strictly, not an article of faith at all but part of reason’s forecourt to it. The tradition thus divides its own house exactly where the instrumentalist assumes it cannot: between what argument can carry and what only trust in a revealer could. A faith that despised

reason would have annexed God's existence to mystery and been done with arguing. This faith instead staked out a territory where it agreed to be met on reason's terms.

And the same reply closes with a sentence of striking epistemic realism: "Nevertheless, there is nothing to prevent a man, who cannot grasp a proof, accepting, as a matter of faith, something which in itself is capable of being scientifically known and demonstrated."³⁶ Most people, most of the time, do not hold their justified convictions by personally completed demonstration—a fact as true in science, where the layman rightly believes what he cannot derive, as in religion. Aquinas says so plainly, seven centuries before the sociology of knowledge. The demonstrability of a truth and the route by which a given mind actually holds it are different questions; the tradition kept them distinct from the start.

5.3 What Kind of Reasoning This Is

What kind of reasoning, then, is the demonstration *quia* from creatures? Not physics, and not in competition with physics. Physical explanation characteristically runs from state to state: the present configuration of a system is explained by an earlier configuration plus laws. Metaphysical inquiry asks a question that survives every such explanation, however complete: why is there a system in any configuration, and why do laws govern anything, rather than nothing at all? The contingent thing before me—this oak, this instrument, this galaxy—does not exist by necessity; it began, it depends, it could fail to be. Trace its dependence to prior things and the question does not shrink; it accumulates, because a chain of borrowers explains no loan. Either the regress of dependent things terminates in something that does not borrow its existence—something whose nature is not *to be conditioned* but *to be*—or the existence of the whole ensemble hangs on nothing. That, compressed past all its needed refinements, is the shape of the classical argumentation: not a laboratory report, but not an emotion either. It is inference from the manifest character of sensible things—their dependence, their contingency, their borrowed actuality—to what their existence requires. Whether it succeeds is a question of philosophical argument, and the arguments have been attacked and defended at the highest level of technical seriousness for centuries. What the arguments are *not* is meaningless; that verdict required a criterion, and the criterion is dead.³⁷

5.4 The Objections Aquinas Chose for Himself

A tradition's seriousness can be read in the objections it selects to face. Before answering the question "whether God exists," Aquinas states the case against—and the two objections he chose, writing in the 1260s, are the two that still carry the modern debate. The first is evil: if one of two contraries were infinite, the other would be wholly destroyed; but "God" names infinite goodness; "If, therefore, God existed, there would be no evil discoverable; but there is evil in the world. Therefore God does not exist." The second is parsimony, and it deserves quotation in full, because a reader who met it unattributed would date it to the nineteenth century at the earliest: "it is superfluous to suppose that what can be accounted for by a few principles has been produced by many. But it seems that everything we see in the world can be accounted for by other principles, supposing God did not exist. For all natural things can be reduced to one principle which is nature; and all voluntary things can be reduced to one principle which is human reason, or will. Therefore there is no need to suppose God's existence."³⁸ That is the naturalist's razor—nature suffices for the natural, human reason for the voluntary, so the God-hypothesis is idle—stated by a Dominican friar against himself, at full strength, seven hundred years before it was rediscovered as a modern insight.

The essay's scope excludes the five ways that follow, and excludes equally Aquinas's replies; nothing here asks the reader to think the exchange settled. What the page establishes is procedural, and it is the exact procedural point on which the instrumentalist and the tradition part company. Aquinas's method obliges him to state the strongest contrary case before his own, answer it argument by argument, and leave the whole exchange on the record for seven centuries of critics. Hume's librarian, by contrast, asks two questions of the spine and reaches for the fire; the Vienna manifesto does not answer the theologian but reclassifies him as an artist who has mistaken his medium. One of these procedures is a tribunal; the other is a triage. Whatever one concludes about God, there should be no dispute about which procedure deserves the name of reason.

5.5 The Limits Written into the Claim

Notice next how little the tradition claims, because the modesty is structural, not tactical. From effects, Aquinas insists, the mind cannot be led to see *what God is*: “the sensible effects of God do not equal the power of God as their cause,” so that from them “the whole power of God cannot be known; nor therefore can His essence be seen.” What can be known is narrower and harder: “we can be led from them so far as to know of God ‘whether He exists,’ and to know of Him what must necessarily belong to Him, as the first cause of all things, exceeding all things caused by Him”—that all creatures stand to Him as caused to cause; that He is none of the things He causes; and that creatures fall short of Him not through any defect in Him but because He exceeds them all.³⁹ This is a knowledge made mostly of negations and relations—a silhouette, not a portrait. The tradition that is accused of overreaching wrote the limits of its own reach into its founding texts.

It is worth pausing on how exactly this answers the instrumentalist’s deepest instinct. His fear, remember, was assertion without discipline. But here is a discipline: premises drawn from public, sensible reality; inference by explicit steps, each attackable; the opposition’s best case printed first; conclusions bounded with almost legal care, claiming existence and relation while renouncing inner description. One may dispute a premise—many have—and the dispute will be philosophy, conducted with reasons. What one may not do, after the collapse of the criterion, is refuse the tribunal: to classify the argument as noise because its conclusion is not the sort of thing a detector could register. Of course it is not. The argument’s entire point is that the detector, and every detectable thing, is an effect; a ground of all detectable things would be exactly what no detector could contain. To demand that the first cause show up as one more item inside the world’s inventory is not rigor about God; it is a misunderstanding of what was ever being claimed.

The senses, then, are not despised in this tradition; they are trusted further than the empiricist trusts them—trusted to bear the weight of an inference that runs through them to what they cannot picture. The measurable world is not the rival of metaphysical reason but its raw material and its springboard. That conviction did not originate with Aquinas, and it is far older than the medieval schools. Before it was a philosophy it was a scriptural claim—a claim, remarkably, about what human reason can do at its best and what it is culpable for failing to do. The essay has argued on philosophy’s ground to this point. It now reports, as the next witness, what the Catholic tradition has actually taught—because the teaching turns out to be the last thing an instrumentalist would predict a church to say.

6 What the Church Stakes on Reason

A reasonable person schooled on the instrumentalist picture expects religion to relate to reason roughly as a debtor relates to an auditor: evasively. Faith, on that picture, is what you assert when you cannot show; a church, of all institutions, should be the last to bind itself publicly to the competence of unaided human reason. It is therefore worth watching, with some care, what the Catholic Church has actually committed itself to—not in apologetic pamphlets but in Scripture read as her own, and in the most solemn register her teaching possesses.

6.1 A Rebuke Inside the Bible

The claim appears first inside the Bible itself, and it appears as a *rebuttal*. The Book of Wisdom, written within a century or so of Christ, surveys the nature-worship of the Gentile world: “all men are vain, in whom there is not the knowledge of God: and who by these good things that are seen, could not understand him that is.” The complaint is not that pagans reasoned about the world but that they stopped reasoning too soon, resting in fire, wind, stars, or sun: “For by the greatness of the beauty, and of the creature, the creator of them may be seen, so as to be known thereby.” And then the sentence that could serve as this essay’s epigraph, aimed at the natural philosophers of the author’s day: “For if they were able to know so much as to make a judgment of the world: how did they not more easily find out the Lord thereof?”⁴⁰ The verse grants the scientists of antiquity their competence—they could gauge the world—and indicts them precisely for the inference they declined to complete. Ability to measure was never the issue. The issue was stopping at the measurable.

Paul, plainly aware of this tradition, universalizes it in the opening argument of Romans: “the invisible things of him, from the creation of the world, are clearly seen, being understood by the things that are made; his eternal power also, and divinity: so that they are inexcusable.”⁴¹ *Understood by the things that are made*: knowledge of the invisible,

routed through the visible—the exact structure Aquinas would later defend with syllogisms, asserted here as the reason idolatry is “inexcusable.” Scripture’s quarrel with paganism is not that it looked at nature too closely but that it did not look *through* nature far enough.

6.2 The Definition of 1870

Eighteen centuries later, the First Vatican Council raised this scriptural conviction to the rank of solemn dogma—and the timing deserves attention. The year was 1870; Comte’s positivism was ascendant, the Vienna manifesto lay two generations ahead, and the intellectual pressure on Christianity was precisely the instrumentalist pressure this essay has examined. A church in retreat would have hedged. Instead, the council defined: “Eadem Sancta Mater Ecclesia tenet et docet, Deum, rerum omnium principium et finem, naturali humanae rationis lumine e rebus creatis certo cognosci posse”—in the rendering the Church’s own Catechism now gives, “God, the first principle and last end of all things, can be known with certainty from the created world by the natural light of human reason”—and the council cites Romans 1:20 as its warrant.⁴² And it attached a canon: whoever says that the one true God *cannot* be known with certainty by the natural light of reason from the things that are made stands condemned.

Stop and take the measure of that. The anathema does not fall on the atheist here; it falls on the *fideist*—the believer who, despairing of arguments, would rest faith on feeling and dismiss reason’s approach to God as impossible. The Catholic Church’s dogmatic response to the century of positivism was to bind her own children, under solemn censure, to the competence of natural reason. She placed herself, permanently and irrevocably, on reason’s side of the quarrel—against the instrumentalist who shrinks reason to the measurable, and equally against the pious skeptic who agrees with the instrumentalist about reason and merely adds a leap. It is difficult to imagine an institutional act less like the caricature of faith as the enemy of thought.

The same council’s canons map the rest of the terrain this essay has crossed. Among the canons on God the materialist thesis is met head-on: “Si quis praeter materiam nihil esse affirmare non erubuerit; anathema sit”—if anyone is not ashamed to affirm that nothing exists besides matter, let him be anathema.⁴³ Note the shape: not a plea that materialism is impious, but a formal condemnation of a metaphysical thesis—which is to say, the Church treats “nothing exists besides matter” as a proposition with truth conditions, capable of being asserted, denied, and gotten wrong. On this one point the council and this essay’s second section agree against Ayer from opposite directions: the sentence is not noise. The instrumentalist’s classification, which would spare the materialist and the theist alike by silencing both, is rejected in the act of condemning the one and defining against the other.

The definition is also carefully bounded, and the boundaries matter as much as the claim. It asserts a *capacity*—*cognosci posse*, can be known—not that any particular philosophical proof is dogma, not that every mind actually completes the ascent, not that natural knowledge suffices for salvation. The object of the capacity is likewise exact: God as “principium et finem,” the beginning and end of all things—the ground already discussed, not the Trinity, not the Incarnation, which the same constitution reserves to revelation as mysteries strictly beyond reason’s reach. The definition, in other words, dogmatizes precisely the *preambula fidei* structure the previous section found in Aquinas: a forecourt reason can traverse, and an interior only revelation opens.⁴⁴ The same constitution immediately adds that God chose also to reveal Himself, and the Catechism explains why both are needed: in the concrete conditions of human life, the mind is “hampered in the attaining of such truths, not only by the impact of the senses and the imagination, but also by disordered appetites”; man therefore “stands in need of being enlightened by God’s revelation” even about truths reason could in principle reach, so that they may be known “with ease, with firm certainty and with no admixture of error.”⁴⁵ Revelation, in this account, is not a substitute for reason but a mercy to reason as it actually exists—burdened, hurried, and biased. It is Aquinas’s closing sentence from the preambles, promulgated: what is demonstrable in itself may still, for most people in most conditions, be received on better authority than their own unfinished arguments.

6.3 The Two Orders and Their Peace

Nor does the tradition fear a collision between the two orders it distinguishes. The fourth chapter of the same constitution begins by teaching that there is a “duplicem... ordinem cognitionis, non solum principio, sed obiecto etiam distinctum”—a twofold order of knowledge, distinct not only in principle but in object: in the one we know by natural reason, in the other by divine faith.⁴⁶ Distinction is not hostility: “nulla tamen umquam inter fidem et rationem vera dissensio esse potest”—between faith and reason there can never be true disagreement—since the same

God is the author of both; apparent conflicts arise when dogma is misstated or when “*opinionum commenta*,” the inventions of opinion, parade as conclusions of reason.⁴⁷ And the council goes further than non-aggression, to alliance: “*Neque solum fides et ratio inter se dissidere nunquam possunt, sed opem quoque sibi mutuam ferunt*”—not only can faith and reason never disagree; they render each other mutual aid—right reason demonstrating the foundations of faith and, illumined by its light, cultivating the science of divine things, while faith frees and guards reason from errors and furnishes it with manifold knowledge.⁴⁸ A church whose dogmatic constitution assigns to *reason* the office of demonstrating the foundations of faith has wagered more on argument than most philosophy departments would now dare.

Modern teaching has, if anything, sharpened the point against the position this essay has been examining. John Paul II’s encyclical on faith and reason names the adversary outright: scientism, “the philosophical notion which refuses to admit the validity of forms of knowledge other than those of the positive sciences,” which “relegates religious, theological, ethical and aesthetic knowledge to the realm of mere fantasy”—and observes, as this essay observed, that its positivist ancestor’s central claim is one that “critical epistemology has discredited.” What the same encyclical asks of philosophy is exactly what the argument of the preceding sections cleared room for: “a philosophy of genuinely metaphysical range, capable, that is, of transcending empirical data in order to attain something absolute, ultimate and foundational in its search for truth.”⁴⁹

The convergence should be stated with epistemic care, because this essay has promised such care throughout. Sections above argued, on purely philosophical ground, that the exclusivist criterion destroys itself and that reason’s reach extends beyond the measurable; nothing in those arguments borrowed authority from Scripture or councils. What this section adds is a fact about the Catholic tradition: that it teaches, at the level of solemn definition, what the philosophical argument independently concluded—that reason, beginning from created things, can reach their ground. The agreement of the two lines is not offered as proof of either. But a reader who has been told all his life that faith and reason pull in opposite directions is entitled to notice where the parties actually stand. On the capacity of reason, the Church turns out to be the maximalist, and the instrumentalist the man of little faith.

7 The Scientistic Residue

A doctrine can die in the journals and thrive at the lectern. Within professional philosophy, the verification principle has no living defenders in its classical form; the collapse chronicled above is textbook history, rehearsed in the standard reference literature by writers with no theological stake in it.⁵⁰ But the criterion’s *posture*—the reflex that treats the boundary of the sciences as the boundary of the knowable—survived the criterion’s arguments, and it survives today mostly in the register where arguments are least demanded: the confident aside, the opening chapter, the interview. This section examines that residue. It must be done carefully, because the residue is genuinely heterogeneous, and nothing would be easier, or emptier, than to lump every scientist’s impatience with philosophy into a strawman and burn it—which is the librarian’s method, and this essay has renounced it. So: exact quotations, named authors, distinguished grades.

The first grade is the *obituary for philosophy*. A famous physics popularization of 2010 opens by listing the great questions—how the universe behaves, what the nature of reality is, where it all came from—and disposes of their traditional custodian in two sentences: “Traditionally these are questions for philosophy, but philosophy is dead. Philosophy has not kept up with modern developments in science, particularly physics.”⁵¹ The sentence has been quoted, with varying degrees of glee and despair, ever since; what matters for this essay is its logical genre. “Philosophy is dead” is not a result in physics. No equation entails it; no instrument reads it; it is a general claim about the state and worth of a discipline, defended (where defended at all) by considerations about what kinds of question have proven tractable—that is, it is philosophy, of the speculative and sweeping kind, performed in the act of pronouncing philosophy dead. The book then proceeds, as it must, to do more of it: adjudicating between realism and antirealism about scientific theories, proposing a “model-dependent realism,” drawing conclusions about why there is something rather than nothing. None of this is a scandal; it is inevitable, and that is the point. The questions do not vanish when the department is declared closed; they are simply answered without the discipline the department existed to impose. The self-application problem, which the positivists met in formal dress, reappears here in casual clothes: the sentence that ends philosophy is itself philosophy, and so refutes itself in the uttering.

The second grade is the *judgment of uselessness*, and it deserves gentler handling, because in its honest form it is not instrumentalism at all. When Lawrence Krauss wrote, in the aftermath of a controversy over his book on cosmology, that “philosophical speculations about physics and the nature of science are not particularly useful, and have had

little or no impact upon progress in my field,” he was making a claim about the causal history of physics—a claim a historian could assess—and not, on its face, a claim about the boundaries of knowledge or meaning.⁵² Taken so, it may even be true, in whole or in part, and no thesis of this essay is touched: the proportioning of methods to objects implies exactly that a physicist qua physicist can usually proceed without metaphysics, as a metaphysician qua metaphysician can proceed without a spectrometer. The residue appears only when usefulness-to-physics is silently promoted into the measure of a discipline’s legitimacy—when “little impact upon progress in my field” is allowed to imply “no valid field of its own.” That promotion is the proportioning error in one step: it assumes that the only work worth doing is the work physics does, which is the very question at issue. To his credit, Krauss himself marked the boundary in the same piece: “To those philosophers I may have unjustly offended by seemingly blanket statements about the field, I apologize.” The apology is instructive precisely because it distinguishes, under pressure, the defensible historical claim from the indefensible blanket one—a distinction the residue, left to itself, habitually blurs.

The third grade is the *revived thesis itself*, and here the essay owes its opponent the acknowledgment that at least one contemporary writer states it with complete candor and accepts its costs. Alex Rosenberg’s guide for atheists answers “What is the nature of reality?” with “What physics says it is,” and rests everything on a single epistemological claim: “the methods of science are the only reliable ways to secure knowledge of anything.”⁵³ This is the instrumentalist thesis, updated: not Ayer’s semantic version—Rosenberg does not say the theologian’s sentences are meaningless—but an epistemic monopoly claim, and the honest question is whether the retreat from meaning to reliability escapes the old wound. It does not; it relocates it. Ask of the italicized sentence what was asked of Ayer’s criterion: how is *it* known? It is not a result of any science: no experiment, in physics or psychology, could certify that no method outside science ever reliably secures knowledge—the claim quantifies over all possible methods and all domains of knowledge, which no empirical inquiry surveys. If it is known at all, it is known by philosophical reflection on the sciences’ track record and their rivals’ failures—reflection of exactly the kind the sentence declares unreliable. The thesis is not self-contradictory, as the meaning-version arguably was; it is self-*excepting*: it can be held only by tacitly exempting the holding of it from its own standard. And the exemption, once granted, concedes the whole game—for if one piece of non-scientific reasoning (this one) can be reliable enough to stake a worldview on, the question which *other* pieces qualify is open, and must be settled by the tribunal, argument by argument. The reader has been here before. It is the second formulation’s ladder, leaning against a newer wall.

What should a fair observer conclude? Not that scientists are bad philosophers—some are excellent ones—and not that the residue is a conspiracy; it is a habit, transmitted the way habits are, by prestige and repetition rather than by argument. The conclusion is narrower. When the Church’s teaching office described scientism as a live “philosophical notion,” not a museum piece, and worried that it consigns whole orders of knowledge “to the realm of mere fantasy,” it was describing something real in contemporary discourse, documented above in the words of its own proponents.⁵⁴ And the residue matters more than its intellectual weight would suggest, because it is self-insulating: a reader taught that philosophy is dead will not study the arguments that would tell him whether it is; a reader taught that only science secures knowledge will classify every challenge to that sentence as non-science and dismiss it unheard. The criterion at least argued. The residue merely assumes—and what is merely assumed can be merely declined, once a reader sees that the assumption is neither a finding of science nor a truth of logic but the unexamined survivor of a doctrine whose examination is complete, and completed by its friends.

8 The Sciences Given Back

Nothing in this essay has been an argument against science, and it is worth ending by saying exactly why—because the instrumentalist’s most durable rhetorical asset is the suggestion that to question his philosophy is to menace the laboratory.

The suggestion has things backwards. The empirical sciences do not assert instrumentalism; they do not need it; they were built, most of them, by people who would have found it unintelligible. What the sciences require is much more modest and much more secure: that nature is intelligible, that observation disciplines theory, that quantity yields to measurement, that honest method converges. Every one of those commitments survives this essay untouched—several of them, as the third section argued, turn out to be *stronger* than instrumentalism can account for, since they rest on logical, inductive, and moral knowledge that no instrument delivers. Relieving science of the exclusivist philosophy bolted onto it removes no result, retracts no method, and dims no achievement. It removes only a claim that was

never a scientific claim at all: the philosophical thesis that the method's writ runs to the whole of reality. Chemistry loses nothing when it stops being asked to serve as a theory of meaning.

And the Catholic tradition, whatever its sins in particular episodes, is on record—in its most binding voice—as wanting science whole rather than diminished. The same constitution that defined reason's reach toward God declares of the human disciplines that the Church “*nec sane ipsa vetat, ne huiusmodi disciplinae in suo quaeque ambitu proprii utantur principiis et propria methodo*”—by no means forbids that these disciplines, each in its own sphere, use their own principles and their own method—and calls this their “*iustam libertatem*,” their just liberty.⁵⁵ Methodological autonomy for the sciences, each in its own sphere, is thus not a concession the Church has been forced to in modernity; it is written into the very document that anathematized the fideist. A church that solemnly defines the competence of natural reason has no standing to fear reason's disciplined exercise on nature, and the definition of 1870 forecloses the fideism that would try. The believer who sneers at measurement betrays *Dei Filius* as surely as the positivist who worships it; both have accepted the same false premise, that the measurable and the real are rivals for the same throne. They are not rivals. On the tradition's account the measurable world is creation—the very thing through which, Wisdom and Paul and Aquinas and the council all insist, the invisible God is reached. Every improvement in our knowledge of the effects is, in principle, an enrichment of the premise from which the ascent begins. That is why the sciences sit more securely inside this tradition than inside instrumentalism, which can honor them only by first misdescribing them.

What, then, is the reader entitled to take away? Not that God's existence has been demonstrated in these pages; it has not been attempted, and honesty about that boundary has been a discipline of the whole essay. The demonstrations exist, they are serious, and they must be weighed as arguments—which is precisely the labor the instrumentalist criterion promised to spare us and could not. Nor is the takeaway that every metaphysical sentence deserves respect; the collapse of a bad filter is not the vindication of everything it caught. The takeaway is a restored question. The claim that only the measurable is real was itself unmeasurable; the claim that only verifiable statements are meaningful was itself unverifiable; the claim that only science reliably secures knowledge was not itself a piece of science; the creed of the instruments, in every formulation its history produced, could not survive being pointed at itself. What stands after its collapse is what stood before it: a contingent world that does not explain itself, a mind whose reach demonstrably exceeds its gauges, and the oldest question in philosophy, no longer dismissible by rule—asked now, as it was asked of the ancient star-gazers, with the same quiet pressure: *if you were able to know so much as to make a judgment of the world, how did you not more easily find out the Lord thereof?*

The instruments are good. They were never the judges. Read the dial, honor the reading, and then—because you are the kind of being that can—ask what the existence of dials, readings, and readers requires. That question is not a failure of intellectual nerve. It is intellectual nerve, resumed.

Notes

¹David Hume, *An Enquiry Concerning Human Understanding*, sect. XII, part III, final paragraph (E 12.34; SBN 165). Wording checked 2026-07-24 against the critical text at davidhume.org. The *Enquiry* was first published in 1748; the text is in the public domain.

²Auguste Comte, *Cours de philosophie positive* (1830–1842), opening chapter, as condensed and translated by Harriet Martineau, *The Positive Philosophy of Auguste Comte* (London: George Bell & Sons, 1896), vol. 1, pp. 1–2. Wording checked 2026-07-24 in a scan of the 1896 Bell printing. Martineau’s condensation, which Comte himself endorsed, is in the public domain.

³A. J. Ayer, *Language, Truth and Logic* (London: Victor Gollancz, 1936), ch. 1, “The Elimination of Metaphysics.” Wording checked 2026-07-24 in a scan of the Pelican reprint. Sentences with no empirical cash value may retain *emotional* significance, Ayer allows, but not *literal* significance. Brief quotations from this copyrighted work appear here under ordinary fair-quotation practice.

⁴Ayer, *Language, Truth and Logic*, ch. 6, “Critique of Ethics and Theology.” Ayer is explicit that his view is neither atheism nor agnosticism: the agnostic treats “God exists” as a genuine but undecidable proposition, whereas Ayer denies it is a proposition at all. The same chapter dissolves moral judgments into expressions of feeling—a consequence worth noticing, since it shows how much besides theology the criterion condemns.

⁵The term is coined for this essay and is defined only as stated. It is *not* the doctrine called instrumentalism in the philosophy of science—the view, associated with Duhem and others, that scientific theories are calculating devices for organizing observations rather than descriptions of unobservable reality. That doctrine concerns the interpretation of science and is untouched by this essay. Nor is the target empiricism as such, the thesis that our natural knowledge originates in experience (a thesis this essay will defend in its Thomistic form), nor the methodological naturalism by which the empirical sciences rightly confine themselves to natural causes within their own work. The target is the *exclusivist* conversion of empirical method into the universal test of meaning, knowledge, or reality.

⁶Comte, in Martineau’s condensation, *The Positive Philosophy of Auguste Comte*, vol. 1 (London: George Bell & Sons, 1896), Introduction, ch. I, p. 2. Wording checked 2026-07-25 in the same Internet Archive scan of the 1896 Bell printing used throughout (public domain). Obvious OCR artifacts in the scan are silently normalized to the printed reading only where the reading is unambiguous.

⁷Martineau, vol. 1, pp. 2–3, checked 2026-07-25 as above. The biographical argument is offered by Comte as “an indirect evidence” of the general law. Its force may be measured by trying it in reverse: an age that reasons from its own maturity to the falsity of its childhood convictions has assumed, not shown, that the development was an education rather than a forgetting.

⁸Martineau, vol. 1, p. 4, checked 2026-07-25. Comte’s point is genetic—primitive man needed theology as scaffolding to escape “a vicious circle” between theory and observation—but the epistemological premise he states is general, and it is the premise this essay’s third section will need: observation is never a self-sufficient tribunal, because what counts as a fact is already the work of a theorizing mind.

⁹Martineau, vol. 1, pp. 15–17, checked 2026-07-25. The chapter is explicit that “all social mechanism rests upon Opinions” and that the disorder of the age is the coexistence of “three incompatible philosophies”; stability requires the triumph of one. The task of “reorganizing society” is said to be “too mighty” for either theology or metaphysics.

¹⁰Martineau, vol. 1, Book II (Astronomy), ch. I, pp. 148–149, checked 2026-07-25 in the same scan. Comte’s stated rule was that whatever knowledge depends on senses other than sight “we must at once exclude from our expectations”; stellar chemistry and temperature fell, he judged, on the far side of the line.

¹¹Reported as the standard history of spectroscopy: Kirchhoff’s identification of solar absorption lines with terrestrial elements (1859) and the Kirchhoff–Bunsen spectral analyses of 1859–61 founded solar and stellar chemistry. No dedicated witness was collated for this common historical fact; it is load-bearing here only as an illustration, and the illustration’s force survives any refinement of the dates.

¹²*Wissenschaftliche Weltauffassung: Der Wiener Kreis* (Vienna: Artur Wolf Verlag, 1929; Veröffentlichungen des Vereines Ernst Mach). Publication facts and all quoted wording checked 2026-07-25 at the transcription maintained by the Collected Works of Rudolf Carnap editorial project, phil.cmu.edu (the transcription notes “Das Werk hat keine offiziell genannten Verfasser”—the work has no officially named authors—and prints the foreword over the names Hahn, Neurath, Carnap). The German text, first published in 1929, is in the public domain in the United States; translations of it here are working glosses by this essay, and the German governs. The standard scholarly attribution of the drafting to Neurath with Hahn and Carnap is as reported in Thomas Uebel, “The Vienna Circle,” *Stanford Encyclopedia of Philosophy* (substantive revision 7 May 2024), checked 2026-07-25.

¹³Manifesto, part II (“Die wissenschaftliche Weltauffassung”), checked 2026-07-25 as above; glosses by this essay. Note the exact anticipation of Ayer’s tactic seven years later: the position’s force lies wholly in replacing the question of truth by the question of meaning, and its examples of condemned sentences include, side by side, the atheist’s denial and the theist’s assertion.

¹⁴Manifesto, part IV (“Rückblick und Ausblick”) and closing sentence, checked 2026-07-25; glosses by this essay. The same closing pages read the growth of metaphysical and theological “inclinations” sociologically, as an artifact of class struggle and disappointed masses, and predict that a production process ever more shaped by the machine “leaves ever less room for metaphysical ideas”—a prediction whose fortunes the reader may assess independently.

¹⁵Reported from Uebel, “The Vienna Circle,” *Stanford Encyclopedia of Philosophy* (rev. 2024), checked 2026-07-25, which tabulates the deaths, emigrations, and the 1936 murder of Schlick. The dispersal belongs to the history of European catastrophe, not to the argument of this essay; it is recorded here because the movement’s afterlife—logical empiricism as the dominant philosophy of science of the mid-century English-speaking world—was conducted by émigrés, and because candor about an opponent’s history is part of taking the opponent seriously.

¹⁶Ayer, *Language, Truth and Logic*, ch. 1, opening sentence; checked 2026-07-25 in the same Internet Archive scan of the Pelican reprint identified earlier. In the preface Ayer locates himself exactly: his views “derive from the doctrines of Bertrand Russell and Wittgenstein, which are themselves the logical outcome of the empiricism of Berkeley and David Hume,” and the philosophers with whom he is “in the closest agreement” are “the ‘Viennese circle’”; among them he owes most to Carnap. The lineage from the flames passage through Vienna to the criterion is thus not this essay’s construction but Ayer’s own genealogy of himself.

¹⁷Ayer, *Language, Truth and Logic*, ch. 1, the strong/weak discussion; wording checked 2026-07-25 in the same scan. Ayer notes that some positivists (he cites Schlick and Waismann) had accepted the “heroic course” of calling laws of nature nonsense—“albeit an essentially important type of nonsense”—and replies dryly that “important” is “simply an attempt to hedge.”

¹⁸Ayer, *Language, Truth and Logic*, ch. 1, with the footnote citing Popper’s *Logik der Forschung*; checked 2026-07-25 in the same scan. The passage matters doubly: it documents that the falsifiability idea was on the table from the beginning, and it documents why the positivists could not use it for their purpose—which was a boundary of *meaning*, not of science. What Popper actually proposed is the subject of the next subsection.

¹⁹Karl Popper, “Science: Conjectures and Refutations,” the 1953 lecture printed as ch. 1 of *Conjectures and Refutations: The Growth of Scientific Knowledge* (London: Routledge & Kegan Paul, 1963). The work is in copyright; brief quotations appear here under ordinary fair-quotation practice. Wording was checked 2026-07-25 at an unofficial web transcription of the chapter; the transcription is a wording-check witness only, no printed edition was collated for this essay, and the printed text governs. Popper’s *Logik der Forschung* (Vienna: Springer, imprinted 1935, issued 1934), translated as *The Logic of Scientific Discovery* (London: Hutchinson, 1959), is cited bibliographically, not collated; the account of its doctrine follows the chapter quoted here and Stephen Thornton, “Karl Popper,” *Stanford Encyclopedia of Philosophy* (substantive revision 12 September 2022), checked 2026-07-25.

²⁰Popper, “Science: Conjectures and Refutations,” as in the preceding note. Popper’s examples of fruitful metaphysics include Empedocles’ evolutionary conjecture and the atomism that preceded testable atomic theory; his examples of pseudo-science protected by irrefutability were, notoriously, Marxist historical theory and the psychoanalysis of Freud and Adler. Nothing in this essay depends on endorsing those particular verdicts, or on the adequacy of falsifiability itself as a demarcation—a question with its own critical literature (the roles of auxiliary hypotheses and of degrees of testability among the classic difficulties, as reported in Thornton’s SEP article). What the essay takes from Popper is only what he insists on: that the line around science is not a line around sense.

²¹Ayer, introduction to the 2nd edition (1946), section “The Principle of Verification”; wording checked 2026-07-25 in the same scan. He partially rescues conclusive verification for “basic propositions” recording a single present experience, then observes that such propositions convey nothing beyond the experience itself: “It is, in short, a case of ‘nothing venture, nothing lose’... equally a case of ‘nothing venture, nothing win’.”

²²Ayer, 1946 introduction, same section, checked 2026-07-25; the footnote cites Berlin’s “Verifiability in Principle,” *Proceedings of the Aristotelian Society* 39 (1938–39). Ayer immediately adds that “the same objection applies to the proposal that we should take the possibility of falsification as our criterion,” since any statement conjoined with a suitable conditional contradicts some observation-statement—the mirror-image failure. A criterion of meaning, unlike Popper’s criterion of demarcation, cannot tolerate these results, because it was supposed to sort *all* discourse.

²³Alonzo Church, review of *Language, Truth and Logic*, 2nd ed., *Journal of Symbolic Logic* 14 (1949): 52–53; cited bibliographically, not collated; the standard account of its result is as reported in the Stanford Encyclopedia narratives already identified. The pattern—repair, breach, repair, breach—is the documented career of every sharp formulation of the criterion.

²⁴Hempel, “Problems and Changes in the Empiricist Criterion of Meaning” (1950), with the 1965 revision, as identified bibliographically in the earlier section. The precise verification ceiling asserted here should be stated exactly: Hempel’s texts were identified but not read for this essay; no Hempel wording is quoted anywhere in it; the account of his survey’s structure (which criteria he examined, in which order, and the degrees-of-significance conclusion) is taken from the named secondary witness, James Fetzer’s “Carl Hempel,” *Stanford Encyclopedia of Philosophy* (substantive revision 16 March 2026), checked 2026-07-24 and 2026-07-25, corroborated by Ayer’s own 1946 admissions quoted above, which were read directly. Any claim about Hempel finer than this—his examples, his exact formulations, his qualifications—is deliberately not made.

²⁵W. V. Quine, “Two Dogmas of Empiricism,” *Philosophical Review* 60 (1951): 20–43, revised in *From a Logical Point of View* (1953). The paper is in copyright; it is quoted here minimally under ordinary fair-quotation practice. Wording was

checked 2026-07-25 at the widely used web transcription edited by Andrew Chrucky (ditext.com), which marks the 1951 and 1961 readings; the transcription is a wording-check witness, and the printed journal text governs. The previous edition of this essay cited the paper from its standard bibliographic record only; the deepened edition upgrades the citation to checked quotation at the named transcription, and says so.

²⁶Ayer, *Language, Truth and Logic*, introduction to the second edition (1946; printed as an appendix in the Pelican issue), section “The Principle of Verification,” wording checked 2026-07-24 and 2026-07-25 in the same scan. The same paragraph continues with the concession quoted later in this subsection. The definitional reading has a deeper root in the Circle: Carnap’s principle of tolerance in *The Logical Syntax of Language* (1934; English 1937)—every one is free to build his own language form as he wishes, and philosophy issues proposals, not assertions—is the systematic version of the same retreat. Carnap’s work is cited here bibliographically, not collated; the characterization is the standard one and nothing in the argument turns on its details.

²⁷Ayer, 1946 introduction, closing sentences of the section “The Principle of Verification,” checked 2026-07-25 in the same scan. The sentence deserves its full weight: the author of the criterion, ten years on, concedes that as a definition it will compel no one, and that the elimination of metaphysics requires... arguing with the metaphysicians, case by case. That is the tribunal this essay has been asking for all along. A “methodological principle,” retained as such, is a policy for one’s own inquiry; policies are answerable to the goods they serve, and a policy of ignoring every question that outruns one’s favorite instruments has to be defended before the bar of those goods—by philosophy.

²⁸The ascent is the natural reading of the Circle’s mature program—philosophy as “the logic of science,” issuing syntactic and semantic analyses of the object language of science rather than first-order claims; Carnap’s *Logical Syntax of Language* is again the systematic document, cited bibliographically as before. The manifesto’s formula quoted in the genealogy—the task of philosophy is “die Klärung von Problemen und Aussagen,” the clarification of problems and statements, “nicht aber... die Aufstellung eigener ‘philosophischer’ Aussagen,” not the erection of its own “philosophical” statements—is the same doctrine in programmatic dress, checked at the witness identified there. The reply given in this subsection is the standard one in substance; its formulation here is this essay’s own, and no particular author is charged with the position in exactly this form.

²⁹John Paul II, encyclical *Fides et ratio* (14 September 1998), no. 88: scientism “is the philosophical notion which refuses to admit the validity of forms of knowledge other than those of the positive sciences,” relegating “religious, theological, ethical and aesthetic knowledge to the realm of mere fantasy”; “In the past, the same idea emerged in positivism and neo-positivism, which considered metaphysical statements to be meaningless. Critical epistemology has discredited such a claim...” Official English text at vatican.va, checked 2026-07-24. The encyclical is cited here only as a witness that the Church’s response engages this exact position; its doctrinal use comes later in the essay.

³⁰An empiricist of Quine’s stripe replies that logic and mathematics are not known apart from experience but are simply the most protected members of a single web of belief that faces experience as a whole, revisable in principle like everything else (W. V. Quine, “Two Dogmas of Empiricism,” *Philosophical Review* 60 [1951]: 20–43; cited from the standard bibliographic record, not collated for this essay). The reply is serious, but notice what it concedes and what it costs: it concedes that nothing is verifiable sentence-by-sentence, which was the criterion’s whole mechanism; and any deliberate *revision* of the web must itself be conducted by inference—some norm of consistency decides what “facing experience” requires—so the authority of logic reappears inside the very act said to revise it. Either way, the instrumentalist’s sharp test is gone.

³¹Hume, *Enquiry*, sect. IV. The point here is not Humean skepticism—this essay takes induction to be rationally warranted—but the location of the warrant: whatever justifies trusting nature’s uniformity, it is not delivered by an instrument, since instruments report actual cases only and the uniformity claim outruns every actual case.

³²Comte, in Martineau’s condensation, vol. 1, p. 4, as identified and checked in the genealogy above. Comte used the point to explain why primitive man needed theology; it applies with equal force to the fantasy of a tribunal of bare observation before which all theory is arraigned. The tribunal’s evidence is theory-soaked from the first exhibit—which does not make observation circular or untrustworthy, but does make “observation alone” a description of nothing.

³³Thomas Aquinas, *Summa theologiae* I, q. 12, a. 12, corpus: “naturalis nostra cognitio a sensu principium sumit, unde tantum se nostra naturalis cognitio extendere potest, in quantum manuduci potest per sensibilia.” Latin checked 2026-07-24 at the Corpus Thomisticum online corpus; English from the public-domain translation of the Fathers of the English Dominican Province, checked the same day at New Advent. Work, question, and article govern over either website’s presentation.

³⁴*Summa theologiae* I, q. 2, a. 2, corpus. Aquinas distinguishes demonstration *propter quid* (through the cause, explaining why) from demonstration *quia* (from the effect back to the cause’s existence). Only the second is claimed for natural knowledge of God. Latin checked at Corpus Thomisticum, English at New Advent, 2026-07-24 and again 2026-07-25, as above.

³⁵*Summa theologiae* I, q. 2, a. 2, ad 1. Latin checked 2026-07-25 at Corpus Thomisticum (“sic enim fides praesupponit cognitionem naturalem, sicut gratia naturam, et ut perfectio perfectibile”); English from the English Dominican translation at New Advent, checked the same day. The scholastic term *praeambula fidei* names the class of truths—God’s existence and attributes knowable naturally—that stand before the act of faith as its rational forecourt, without being themselves revealed mysteries.

³⁶*Summa theologiae* I, q. 2, a. 2, ad 1, English Dominican translation as above; Latin: “Nihil tamen prohibet illud quod secundum se demonstrabile est et scibile, ab aliquo accipi ut credibile, qui demonstrationem non capit.” The Catechism’s

account of why revelation addresses even naturally knowable truths (CCC 37–38, quoted in the next section) is this sentence’s direct descendant.

³⁷This essay defends the admissibility and rational character of such reasoning; it deliberately does not execute any demonstration or claim that the reader is now in possession of one. The five ways of *Summa theologiae* I, q. 2, a. 3, and their modern reconstructions and criticisms, are a literature of their own and lie outside this essay’s scope. Nothing here argues from gaps in scientific explanation; the reasoning at issue begins from the existence and dependence of things, not from phenomena science has not yet explained—a distinction developed in the Scope appendix.

³⁸*Summa theologiae* I, q. 2, a. 3, objections 1 and 2, English Dominican translation at New Advent, checked 2026-07-25; Latin checked the same day at Corpus Thomisticum (“Praeterea, quod potest compleri per pauciora principia, non fit per plura. . . nulla igitur necessitas est ponere Deum esse”). The corpus of the article opens, “Respondeo dicendum quod Deum esse quinque viis probari potest”—the existence of God can be proved in five ways—and proceeds to the five ways, which this essay, by its stated scope, neither executes nor evaluates. The objections are quoted here for what they establish about the tradition’s method, not as a covert entry into the arguments themselves.

³⁹*Summa theologiae* I, q. 12, a. 12, corpus, in the English Dominican translation as above. The doctrine of analogical rather than univocal naming of God, which disciplines all such language, is at I, q. 13, and is noted here without development.

⁴⁰Wisdom 13:1, 5, 9, Douay–Rheims translation (Challoner revision; public domain), checked 2026-07-24 at drbo.org. Wisdom belongs to the Catholic canon; readers of traditions that place it among the apocrypha may treat it here as an important pre-Christian Jewish witness. Verses 6–8 balance the rebuke with a striking gentleness: those who erred while “seeking God, and desirous to find him” are “less to be blamed”—the fault is resting in the search’s instruments rather than following them through.

⁴¹Romans 1:20; cf. 1:19, Douay–Rheims, checked 2026-07-24 at drbo.org. Exegetical honesty requires noting Paul’s purpose: the passage grounds a charge of culpability—the suppression of an available knowledge—within an indictment of idolatry; it is not a treatise on philosophical method. The reading of the verse as warrant for a real natural knowability of God from creatures is the Church’s received reading, made explicit when *Dei Filius* cites this very text for its definition and when the Catechism (CCC 32) appeals to it.

⁴²First Vatican Council, dogmatic constitution *Dei Filius* (24 April 1870), ch. 2, *De revelatione*, with the corresponding canon: “Si quis dixerit, Deum unum et verum, Creatorem et Dominum nostrum, per ea, quae facta sunt, naturali rationis humanae lumine certo cognosci non posse; anathema sit” (canons on revelation, no. 1)—in working English, “If anyone says that the one true God, our Creator and Lord, cannot be known with certainty by the natural light of human reason through the things that are made, let him be anathema” (gloss by this essay; the Latin governs). Latin checked 2026-07-24 and again 2026-07-25 at the Holy See’s Latin text at vatican.va; the English rendering of the chapter 2 definition is that of the official English Catechism, no. 36, checked 2026-07-24.

⁴³*Dei Filius*, canons on God, the Creator of all things, no. 2; Latin checked 2026-07-25 at the same Holy See text; working gloss by this essay, the Latin governing. The neighboring canons condemn pantheism and emanationism with equal economy—the council’s targets were never only the sceptics, but every collapse of the distinction between the world and its ground, in whichever direction.

⁴⁴The correspondence is not this essay’s construction: *Fides et ratio* 67, recalling Romans 1:19–20, reads the council exactly so—“the First Vatican Council pointed to the existence of truths which are naturally, and thus philosophically, knowable; and an acceptance of God’s Revelation necessarily presupposes knowledge of these truths,” which belong to “a truly propaedeutic path to faith.” Official English at vatican.va, checked 2026-07-25. On the council’s reservation of the mysteries: *Dei Filius*, ch. 4, teaches that divine mysteries “suapte natura intellectum creatum sic excedunt”—by their very nature so exceed the created intellect—that even revealed they remain veiled in this mortal life; Latin checked 2026-07-25, working gloss by this essay.

⁴⁵CCC 37–38, quoting Pius XII, *Humani generis*; official English at vatican.va, checked 2026-07-24. CCC 31 describes the classical arguments as “converging and convincing arguments” rather than “proofs in the sense of proofs in the natural sciences”; CCC 32–34 sketch the two starting points, the world (movement, becoming, contingency, order, beauty) and the human person (openness to truth, moral conscience, longing for the infinite); CCC 35 and 39 draw the consequence that reason’s capacity grounds both the credibility of faith and the Church’s ability to speak with unbelievers. Checked at the same source and date.

⁴⁶*Dei Filius*, ch. 4, opening; Latin checked 2026-07-25 at the same witness; working gloss by this essay. The doctrine of the two orders is the council’s structural answer to both rationalism (which would dissolve faith into reason) and fideism (which would dissolve reason into faith); each order keeps its own principle and its own object.

⁴⁷*Dei Filius*, ch. 4 (working gloss; Latin checked 2026-07-24 and 2026-07-25 as above). The chapter locates apparent conflicts in either misstated dogma or errors paraded as conclusions of reason—a diagnosis that cuts, on even terms, against both bad theology and bad philosophy.

⁴⁸*Dei Filius*, ch. 4: “cum recta ratio fidei fundamenta demonstret, eiusque lumine illustrata rerum divinarum scientiam excolat; fides vero rationem ab erroribus liberet ac tueatur, eamque multiplici cognitione instruat.” Latin checked 2026-07-25; working gloss by this essay. The sentence’s first clause—right reason *demonstrates the foundations* of faith—is the council’s own restatement of the preambles doctrine in its strongest form.

⁴⁹*Fides et ratio*, nos. 88 and 83, official English at vatican.va, checked 2026-07-24. No. 88 is authoritative papal teaching engaging a philosophical position; its philosophical claims persuade by the arguments that support them, which this essay has tried to supply independently.

⁵⁰The absence of the classical criterion from live philosophical doctrine is asserted here at reported level, on the strength of the named encyclopedic witnesses already identified (Fetzer on Hempel; Uebel on the Vienna Circle), whose narratives treat the criterion's failure as settled history, and of *Fides et ratio* 88's "critical epistemology has discredited such a claim," quoted earlier. The claim is about the criterion in its classical, blanket form; contemporary philosophy contains sophisticated empiricisms, naturalisms, and expressivisms of many kinds, none of which this essay addresses or needs to.

⁵¹Stephen Hawking and Leonard Mlodinow, *The Grand Design* (New York: Bantam, 2010), p. 5. The book is in copyright and was not collated for this essay; the sentence is quoted at a stated ceiling: its wording and page locus were checked 2026-07-25 at a named secondary witness (the study page maintained by C. R. Nave at Georgia State University's HyperPhysics site, which quotes the passage with its page number), and the sentence's authenticity is a matter of universal public record from the book's reception. Any finer claim about the book's argument is deliberately not made here.

⁵²Lawrence M. Krauss, "The Consolation of Philosophy," *Scientific American* (online), 27 April 2012; wording checked 2026-07-25 at the publisher's page. The piece is Krauss's own clarification, following criticism of remarks in a widely discussed interview, and includes both the apology quoted below and his continued insistence on the sterility, as he judges it, of "the classical ontological definition of nothing." The controversy concerned whether his book's physical "nothing"—a quantum vacuum, laws in place—answers the philosopher's question why there is anything at all; that dispute lies outside this essay's scope, though the reader will recognize in it the state-to-state versus ground-of-states distinction drawn earlier.

⁵³Alex Rosenberg, *The Atheist's Guide to Reality: Enjoying Life without Illusions* (New York: W. W. Norton, 2011), p. 6, where he names his own position "scientism" and embraces the label. The book is in copyright and was not collated for this essay; the quoted sentence and its page locus were checked 2026-07-25 at a named secondary witness (Neil Shenvi's review, which quotes it with page references), and the sentence is quoted identically across the book's critical literature. The question-and-answer pair quoted in the text ("What is the nature of reality? What physics says it is") is the book's own opening-chapter catechism of the "persistent questions," likewise reported here from that critical literature rather than from a collated copy. Rosenberg, it should be said plainly, is a serious philosopher of science stating a thesis many hold tacitly; engaging his formulation is the opposite of strawmanning—it is taking the position at its published best.

⁵⁴*Fides et ratio* 88, quoted and identified earlier; checked 2026-07-24. The encyclical's description—"refuses to admit the validity of forms of knowledge other than those of the positive sciences"—fits Rosenberg's sentence almost verbatim, though the encyclical was written thirteen years before it; the fit is a fact about the durability of the position, not a claim that any named author derived his view from another.

⁵⁵*Dei Filius*, ch. 4; Latin checked 2026-07-25 at the Holy See text identified earlier; working gloss by this essay, the Latin governing. The clause continues with the boundary conditions—that the disciplines not take errors into themselves by contradicting divine doctrine, nor overstep their own limits and occupy what belongs to faith—which is, precisely, the two-directional discipline this essay has urged: methods proportioned to objects, and no method annexing its neighbor's field. The council wrote the charter of methodological autonomy and the indictment of scientism in a single sentence.

A Positions and Fates: A Synopsis

The table below is a navigational summary of the positions engaged in this essay, in chronological order, with the fate of the verifiability criterion (or of its ancestor and descendant theses) as each position bears on it. It is editorial synthesis: every entry compresses a treatment given, with citations, verification dates, and qualifications, in the body, the Notes, and the References, which govern over this compression. “Reported” marks positions engaged at a stated secondary-witness ceiling rather than from collated primary text.

Thinker	Thesis	Key text and locus	Fate of the criterion
Thomas Aquinas (1225–1274)	Natural knowledge begins from sense and can be led by sensible effects to the existence of their first cause; such truths are preambles to faith, not articles of it; the essence remains unseen.	<i>Summa theologiae</i> I, q. 2, aa. 2–3; I, q. 12, a. 12.	Antecedent standard: meaning never confined to the verifiable; reasoning from effects admitted under explicit discipline, objections stated first.
David Hume (1711–1776)	Only reasoning concerning quantity or number and experimental reasoning concerning matter of fact escape the flames.	<i>Enquiry</i> , sect. XII, pt. III (E 12.34); sect. IV.	Ancestor thesis; also supplies the induction problem that outruns every instrument reading.
Auguste Comte (1798–1857)	Law of the three stages; theology and metaphysics are outgrown ages; knowledge confined to invariable relations of phenomena; positive philosophy to reorganize society.	<i>Cours de philosophie positive</i> (1830–42), in Martineau’s condensation (1896), vol. 1, pp. 1–17, 148–149.	Boundary of the knowable drawn a priori (planetary chemistry, stellar temperatures) and broken by spectroscopy within a generation; theory-ladenness of facts conceded in the founding chapter.
Vatican Council I (1870)	God knowable with certainty from created things by natural reason; fideism and materialism alike condemned; two orders of knowledge in mutual aid; sciences free in their own spheres.	<i>Dei Filius</i> , chs. 2, 4; canons on God no. 2, on revelation no. 1.	Counter-definition contemporary with ascendant positivism: reason’s reach dogmatically affirmed against both exclusivism and fideism.
Vienna Circle (1929)	No depths, everywhere surface; no insoluble riddles; metaphysical and theological sentences express only a feeling for life; the rubble of millennia to be cleared.	<i>Wissenschaftliche Weltauffassung: Der Wiener Kreis</i> (Vienna, 1929).	Criterion adopted as movement creed with social program; circle dispersed by death, murder, and exile in the 1930s (reported); doctrine emigrates into English-language philosophy.
A. J. Ayer (1936)	A sentence is factually significant only if analytic or empirically verifiable; metaphysical and theological sentences are literally senseless.	<i>Language, Truth and Logic</i> , chs. 1, 6.	Strong form self-stultifying (kills laws and history); falsifiability form rejected; weak form adopted as “liberal enough.”
Karl Popper (1934/1959; 1963)	Falsifiability demarcates science from non-science; the problem of meaning is a pseudo-problem; metaphysics may be meaningful, important, and ancestral to science.	<i>Logik der Forschung</i> (1934, bibliographic); “Science: Conjectures and Refutations” (1963, quoted at stated ceiling).	Refuses to serve as a meaning criterion; judges verifiability inadequate even as demarcation; no fallback for the instrumentalist.
Isaiah Berlin (1939)	The weak criterion admits arbitrary sentences via suitable auxiliaries.	“Verification,” <i>Proc. Aristotelian Soc.</i> 39 (not collated; credited in Ayer 1946).	First breach: Ayer concedes in 1946 that the 1936 criterion “allows meaning to any statement whatsoever.”

Thinker	Thesis	Key text and locus	Fate of the criterion
A. J. Ayer (1946)	Strong/weak distinction collapses; criterion re-engineered as direct/indirect verifiability; principle reclassified as a definition, “not... entirely arbitrary.”	<i>Language, Truth and Logic</i> , 2nd ed., introduction.	The retreat: blanket verdict traded for a declinable proposal; elimination of metaphysics referred to “detailed analyses of particular metaphysical arguments.”
Alonzo Church (1949)	The repaired criterion again admits (near enough) any statement.	Review of Ayer, <i>JSL</i> 14 (not collated).	Second breach; no further repair achieves both sharpness and adequacy.
Carl Hempel (1950/1965)	Every proposed criterion either excludes manifest science or excludes nothing; cognitive significance is a matter of degree.	“Problems and Changes in the Empiricist Criterion of Meaning” (reported via named SEP witness).	The audit: no sharp criterion of the promised kind can be drawn.
W. V. Quine (1951)	The analytic/synthetic cleavage and sentence-by-sentence reductionism are dogmas; statements face experience as a corporate body; no statement immune to revision.	“Two Dogmas of Empiricism,” <i>Phil. Rev.</i> 60 (quoted at stated transcription ceiling).	Terminal: nothing remains for a sentence-level criterion to be; the metaphysician re-enters the web as a colleague, not a patient.
John Paul II (1998)	Scientism refuses validity to non-scientific knowledge; positivism’s meaning-claim stands discredited; philosophy of genuinely metaphysical range required.	<i>Fides et ratio</i> , nos. 67, 83, 88.	The coroner’s finding reported in magisterial teaching; reason’s reach reaffirmed.
Contemporary residue (2010–2012)	“Philosophy is dead” (Hawking–Mlodinow, reported); philosophy useless to physics (Krauss, checked); “the methods of science are the only reliable ways to secure knowledge of anything” (Rosenberg, reported).	<i>The Grand Design</i> , p. 5; “The Consolation of Philosophy” (2012); <i>The Atheist’s Guide to Reality</i> , p. 6.	The criterion’s posture without its machinery: self-refuting, category-mistaken, or self-excepting, as analyzed in the residue section.

B Scope, Method, and Qualifications

B.1 Reader, question, and method

This is a discursive philosophical and theological article for a serious general reader who respects the empirical sciences and may hold, explicitly or by unexamined habit, that empirical testability is the boundary of the knowable or the real. Its governing question is whether that exclusivist thesis—named “instrumentalism” in these pages by a deliberate coinage—survives examination, and what standing metaphysical reasoning about God retains once it does not. The article’s claim is that the thesis fails by self-application under every formulation its own tradition produced, and by misdescribing the sciences it honors; that knowledge is proportioned to its objects; that reasoning from sensible effects toward their ground is therefore admissible and disciplined; and that the Catholic Church is dogmatically committed to the competence of natural reason so to reason. The article clears and defends this space; it does not execute a demonstration of God’s existence.

The argument proceeds in epistemic order: the instrumentalist case at full strength; a genealogy of the criterion read from its own documents (Comte in Martineau’s condensation, the Vienna Circle manifesto, Ayer’s two editions, Popper’s demarcation alternative, the Berlin–Church–Hempel collapse, Quine’s holism); the self-application problem worked through three formulations—statement, proposal, and metalinguistic ascent—each with its rejoinder and the rejoinder’s costs; the epistemology of scientific practice; the Thomistic account of knowledge from sensible effects, its preambles distinction, and its limits; the received scriptural and dogmatic witnesses, cited as the Church’s teaching rather than as conclusions of the preceding philosophy; a bounded examination of the scientistic residue

in contemporary discourse; and the restoration of empirical method to its proper scope. English is the working language; German and Latin sources are quoted in the original with labeled working glosses. No liturgical rite, civil or canonical jurisdiction, or mutable discipline governs any conclusion. Online witnesses were checked on 2026-07-24 and 2026-07-25.

Source class	Function in the article	Governing boundary
Positivist and empiricist primary texts	Hume, Comte (in Martineau), the Vienna Circle manifesto, Ayer (1936 and 1946), and Quine supply the exclusivist position and its internal history in its own words, quoted at exact loci.	The texts are engaged as arguments, not psychoanalyzed; the coined target is defined independently of any one author's full position; transcription witnesses are identified and their ceilings stated.
Demarcation and philosophy-of-science scholarship	Popper supplies the demarcation alternative, quoted at a stated transcription ceiling; Hempel's survey and the Berlin and Church objections establish the criterion's technical collapse.	Popper's falsifiability is kept strictly distinct from any criterion of meaning, on his own insistence; Hempel was identified but not collated, no Hempel wording is quoted, and the collapse narrative is checked against named encyclopedic witnesses and Ayer's own 1946 introduction.
Thomistic philosophy	ST I, q. 2, aa. 2–3 and q. 12, a. 12 govern the adopted account of demonstration from effects, the <i>praeambula fidei</i> , the tradition's method of stating objections, and the limits of natural knowledge.	Adopted as the article's philosophical framework, not asserted as dogma; the five ways themselves are named, quoted only at the corpus's opening formula and the objections, and neither executed nor evaluated.
Sacred Scripture	Wisdom 13 and Romans 1:19–20 witness the biblical claim that God is knowable from created things.	Quoted in the Douay–Rheims translation; exegetical limits of Romans 1 are stated beside the claim.
Authoritative Catholic teaching	<i>Dei Filius</i> chs. 2 and 4 with the canons quoted (revelation no. 1; God no. 2), CCC 31–39, and <i>Fides et ratio</i> 67, 83, and 88 govern the doctrinal frame.	Dogmatic force is confined to what the definitions state; canon glosses are labeled working glosses under the governing Latin; no particular proof is presented as dogma.
Contemporary scientism exhibits	Hawking–Mlodinow, Krauss, and Rosenberg document the residue of the position in current discourse, each at a stated verification ceiling.	Exhibits are quoted exactly, graded (obituary, uselessness claim, revived thesis), and engaged at their strongest reading; no author is charged with Ayer's semantic doctrine; in-copyright books are quoted at single sentences via named witnesses.
Project synthesis	The coined term, the presupposition inventory, the three-formulation analysis, the synopsis table, examples, orderings, and final formulations are original editorial synthesis.	Synthesis is argued from the checked sources and creates no doctrine; it is attributed to no source.

B.2 Included and excluded scope

Included are: the strongest form of the exclusivist appeal to scientific success; a genealogy of the verifiability criterion confined to the named documents (Comte–Martineau, the 1929 manifesto, Ayer's two editions, Popper's essay, and the reported collapse literature); the self-application problem in three formulations with rejoinders and costs; the knowledge presupposed by empirical practice (logic and mathematics, theory-laden observation, induction, testimony and memory, norms of inquiry, the judging knower); the proportioning of methods to objects; the Thomistic account of demonstration *quia* from sensible effects, the *praeambula fidei* distinction, the objections of ST I, q. 2, a. 3 as evidence of method, and the structural limits of natural knowledge; the scriptural witness of Wisdom 13 and Romans

1; the dogmatic definition and quoted canons of *Dei Filius*, its fourth chapter on the two orders and the liberty of the sciences, with CCC 31–39 and *Fides et ratio* 67, 83, and 88; a bounded, exhibit-based treatment of contemporary scientism; and the restoration of empirical method to its proper scope.

Excluded are: execution or evaluation of any demonstration of God’s existence, including the five ways and Aquinas’s replies to the objections quoted; a full history of logical positivism, of the Vienna Circle’s membership and internal debates (protocol sentences, physicalism), or of Comte’s later religion of humanity; adjudication of realism versus instrumentalism in the philosophy of science; the adequacy of Popper’s demarcation criterion beyond the distinctions quoted from him; a full treatment of Quinean confirmation holism or of the analytic/synthetic debate; philosophy of mind and the hard problem of consciousness; foundations of mathematics; probabilistic, fine-tuning, or miracle-based apologetics; arguments from present gaps in scientific explanation; assessment of the physics in the contemporary exhibits; biblical criticism of the Book of Wisdom beyond its canonical status; and any claim about the salvation, culpability, or good faith of particular persons.

B.3 Material qualifications

1. “Instrumentalist” is a coined, reader-facing term defined in the first section. It is not the philosophy-of-science doctrine of instrumentalism, not empiricism as such, and not methodological naturalism; scientists as such are not its referent.
2. The collapse of the verifiability criterion does not establish the truth or meaningfulness of any metaphysical claim. The article draws only the negative conclusion that the blanket dismissal fails, and says so where the collapse is analyzed.
3. The self-application objection is worked through the statement, proposal, and semantic-ascent formulations with the historically actual rejoinders (Ayer’s definition retreat; the Carnapian ascent) engaged on their merits; the objection is not treated as unanswerable by mere assertion, and the costs claimed for each rejoinder are argued, not stipulated.
4. The semantic-ascent discussion attributes the ascent to the Circle’s mature program in general terms; no particular author is charged with the position in exactly the form analyzed, and Carnap’s works are cited bibliographically without collation.
5. Popper is engaged solely for the demarcation/meaning distinction, on his own published insistence; the article takes no position on falsifiability’s adequacy as a demarcation criterion, and notes the existence of its critical literature.
6. The Quinean holist alternative to sentence-level verificationism is acknowledged and answered briefly at the point of use; a full treatment of confirmation holism is outside scope.
7. Hempel’s survey is used strictly at its stated ceiling: texts identified, not read; no wording quoted; structure and conclusion taken from the named SEP witness and corroborated by Ayer’s own printed concessions.
8. The presupposition inventory claims that the listed items are knowledge not delivered by instruments; it does not claim they are unrevisable, innate, or independent of experience in every sense. The Thomistic sense-origin thesis is affirmed alongside it.
9. The contingency reasoning sketched in the effects section is a compressed *shape* of classical argumentation, labeled as such; its needed refinements (against, for example, the fallacy-of-composition and brute-fact objections) are not supplied here.
10. The objections of ST I, q. 2, a. 3 are quoted as evidence of the tradition’s method; quoting them implies no verdict on the five ways or on Aquinas’s replies, which remain outside scope.
11. Aquinas’s account is adopted as the article’s philosophical framework where Catholic theology permits schools; it is not presented as the only orthodox account of natural knowledge.
12. Romans 1:19–20 functions in Paul’s argument as grounding culpability for idolatry; the article’s use of it for natural knowability follows the Church’s received reading, explicitly so labeled.
13. *Dei Filius* defines the *capacity* of natural reason (*cognosci posse*); it does not canonize any particular proof, assert that all persons achieve such knowledge, or make natural knowledge sufficient for salvation. The article states these limits where the definition is quoted, and confines the canons quoted (revelation no. 1; God no. 2) to what they condemn.

14. All English renderings of the *Dei Filius* canons and ch. 4 passages, and of the Vienna manifesto's German, are labeled project working glosses governed by the quoted originals; the ch. 2 definition's English follows CCC 36's official rendering.
15. *Fides et ratio* is authoritative papal teaching whose philosophical assessments bind as such teaching binds; the article supplies independent philosophical argument rather than resting the case on the encyclical's authority.
16. The claim that the criterion "died among friends" concerns the documented technical literature; it does not assert that no religious thinker criticized positivism.
17. The contemporary exhibits are quoted at single sentences, each at a stated verification ceiling (checked at the publisher's page for Krauss; reported at named witnesses for Hawking–Mlodinow and Rosenberg, whose books were not collated); the grading of the three exhibits is editorial analysis, and no exhibit is treated as defending Ayer's semantic criterion.
18. The spectroscopy sequel to Comte's astronomical exclusions, the neutrino illustration, and the cesium-clock figure are editorial illustrations from the common history and practice of science, bounded as such in the audit record; none carries doctrinal or argumentative weight beyond illustration.
19. The claim that the classical criterion has no living defenders in professional philosophy is asserted at reported level on the named encyclopedic witnesses and is confined to the criterion's classical, blanket form.
20. No claim is made that the Catholic Church's historical record on particular scientific episodes is beyond criticism; the argument concerns her doctrinal commitments, not her administrative history.

B.4 Notes, translations, rights, currentness, and review

The numbered Notes carry exact citations, translation and edition identifications, verification dates, witness ceilings, and qualifications that would interrupt the argument; they contain no missing premise. Scripture is quoted from the public-domain Douay–Rheims (Challoner) translation. *Dei Filius* is quoted from the Holy See's Latin text with the Catechism's official English for the chapter 2 definition and labeled working glosses elsewhere. Catechism and *Fides et ratio* quotations follow the official Vatican English web texts. Hume, Comte–Martineau, the 1929 German text of the Vienna manifesto (in the United States), and the English Dominican translation of Aquinas are public domain. Brief quotations from the copyrighted works of Ayer, Popper, Quine, Krauss, Hawking–Mlodinow, and Rosenberg appear under ordinary fair-quotation practice, each with its exact witness and ceiling identified in the Notes and References; the unofficial transcriptions used as wording-check witnesses for Popper and Quine are identified as such, and the printed texts govern. Scripture, official texts, and third-party translations remain outside the project's CC BY 4.0 grant; project-created prose, the coined terminology, the working glosses, the synopsis table, and the organization are project content.

All online witnesses were checked on 2026-07-24 or 2026-07-25; no mutable law or discipline is relied on, so no as-of fragility attaches to the conclusions. The 2026-07-25 revision is a deepening of the 2026-07-24 edition: it added the genealogy, the three-formulation analysis, the preambles and objections subsections, the two-orders subsection, the residue section, and the synopsis appendix, re-verified the previously quoted Aquinas and *Dei Filius* witnesses, and upgraded the Quine citation from bibliographic record to checked transcription wording. This revision received internal argumentative, source-consistency, quotation, rights, and production review by the authoring agent. Independent philosophical, theological, and ecclesiastical review is outstanding; no imprimatur, nihil obstat, or ecclesiastical approval is claimed, and internal checking is not independent review.

C References

Sacred Scripture

- Wisdom 13:1–9 and Romans 1:19–20, quoted from the Douay–Rheims translation (Challoner revision; public domain); working web witness checked 2026-07-24 at drbo.org (Wisdom 13) and drbo.org (Romans 1).

Authoritative Catholic witnesses

- First Vatican Council, dogmatic constitution *Dei Filius* (24 April 1870), ch. 2 *De revelatione* with canon 1 on revelation; canons on God no. 2 (materialism); and ch. 4 *De fide et ratione* (the two orders, the mutual-aid sentence, the just liberty of the sciences); Holy See Latin text, vatican.va, checked 2026-07-24 and 2026-07-25. English glosses of the canons and ch. 4 passages are labeled working glosses by this essay; the Latin governs.
- *Catechism of the Catholic Church* 31–35 (ways of coming to know God; “converging and convincing arguments”), official English; 36–38 (the knowledge of God according to the Church, quoting *Dei Filius* and *Humani generis*), official English; 39 (speaking of God with all men), official English. All checked 2026-07-24.
- John Paul II, encyclical *Fides et ratio* (14 September 1998), nos. 67 (fundamental theology and the naturally knowable truths; “truly propaedeutic path to faith”), 83 (philosophy of genuinely metaphysical range), and 88 (scientism); official English, checked 2026-07-24 (nos. 83, 88) and 2026-07-25 (no. 67).

Thomistic framework

- Thomas Aquinas, *Summa theologiae* I, q. 2, a. 2 (demonstration *quia* of God’s existence from effects; ad 1, the *praeambula fidei*); I, q. 2, a. 3 (objections 1–2 and the opening of the corpus, quoted for the tradition’s method; the five ways themselves outside scope); and I, q. 12, a. 12 (sense-origin, reach, and limits of natural knowledge of God). Latin checked 2026-07-24 and 2026-07-25 in the Corpus Thomisticum online corpus; English from the public-domain translation of the Fathers of the English Dominican Province via New Advent (q. 2) and New Advent (q. 12). Work, question, article, and division govern over either site’s presentation.

Positivist and empiricist primary texts

- David Hume, *An Enquiry Concerning Human Understanding* (1748), sect. IV (induction) and sect. XII, part III (the closing paragraph, E 12.34; SBN 165); public domain; critical web text checked 2026-07-24 at davidhume.org.
- Auguste Comte, *Cours de philosophie positive* (1830–1842), as condensed and translated by Harriet Martineau, *The Positive Philosophy of Auguste Comte*, vol. 1 (London: George Bell & Sons, 1896): pp. 1–4 (the law of the three stages, its grounds, and the theory–fact circle), pp. 15–17 (intellectual anarchy and social reorganization), pp. 148–149 (the astronomical limits of the knowable); public domain; scan of the 1896 printing checked 2026-07-24 and 2026-07-25 via the Internet Archive.
- *Wissenschaftliche Weltauffassung: Der Wiener Kreis* (Vienna: Artur Wolf Verlag, 1929; Veröffentlichungen des Vereines Ernst Mach; 59 pp.; no authors named on the title page, foreword signed for the Verein by Hans Hahn, Otto Neurath, and Rudolf Carnap). German text (1929) in the public domain in the United States; quoted in German with labeled working glosses by this essay. Wording checked 2026-07-25 at the transcription of the Collected Works of Rudolf Carnap editorial project (phil.cmu.edu); the 1929 printing governs.
- A. J. Ayer, *Language, Truth and Logic* (London: Victor Gollancz, 1936; 2nd ed. 1946), preface, ch. 1 (the verifiability criterion; strong and weak senses; rejection of conclusive verifiability and falsifiability), ch. 6 (theology), and the 1946 introduction (the retreat: strong/weak collapse, the “Absolute is lazy” concession, direct/indirect verifiability, the criterion as definition); in copyright, quoted briefly; wording checked 2026-07-24 and 2026-07-25 in an Internet Archive scan of the Pelican reprint, which prints the 1946 introduction as an appendix.
- W. V. Quine, “Two Dogmas of Empiricism,” *Philosophical Review* 60 (1951): 20–43; revised in *From a Logical Point of View* (Cambridge, Mass.: Harvard University Press, 1953). In copyright; quoted minimally under fair-quotation practice. Wording checked 2026-07-25 at the web transcription edited by Andrew Chrucky, ditext.com, which marks the 1951 and 1961 readings; the transcription is a wording-check witness only, and the printed text governs.

Demarcation and philosophy-of-science scholarship

- Karl R. Popper, *Logik der Forschung* (Vienna: Springer, imprinted 1935, issued 1934), translated as *The Logic of Scientific Discovery* (London: Hutchinson, 1959); cited bibliographically, not collated. “Science: Conjectures and Refutations” (1953 lecture), ch. 1 of *Conjectures and Refutations: The Growth of Scientific Knowledge* (London: Routledge & Kegan Paul, 1963); in copyright, quoted briefly; wording checked 2026-07-25 at an unofficial web transcription used as a wording-check witness only; no printed edition was collated, and the printed text governs.
- Carl G. Hempel, “Problems and Changes in the Empiricist Criterion of Meaning,” *Revue Internationale de Philosophie* 4, no. 11 (1950): 41–63; reprinted in Leonard Linsky, ed., *Semantics and the Philosophy of Language* (Urbana: University of Illinois Press, 1952), 163–185; revised as “Empiricist Criteria of Cognitive Significance: Problems and Changes” in *Aspects of Scientific Explanation* (New York: Free Press, 1965). Identified but not collated; no Hempel wording is quoted anywhere in this essay; the account of the survey’s structure and conclusion is used as reported in the Fetzer witness below.
- Isaiah Berlin, “Verification,” *Proceedings of the Aristotelian Society* 39 (1938–39): 225–248 (the objection Ayer credits in 1946 as “Verifiability in Principle”), and Alonzo Church, review of Ayer’s *Language, Truth and Logic*, 2nd ed., *Journal of Symbolic Logic* 14 (1949): 52–53; cited from standard bibliographic records as the classic technical objections; not collated. Berlin’s result is additionally witnessed by Ayer’s own 1946 concession, quoted from the Ayer scan above.
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Contemporary scientism exhibits

- Stephen Hawking and Leonard Mlodinow, *The Grand Design* (New York: Bantam, 2010), p. 5 (“philosophy is dead”); in copyright, not collated; the sentence and page locus checked 2026-07-25 at the named study-page witness of C. R. Nave, HyperPhysics (Georgia State University).
- Lawrence M. Krauss, “The Consolation of Philosophy,” *Scientific American* (online), 27 April 2012; in copyright, quoted briefly; wording checked 2026-07-25 at scientificamerican.com.
- Alex Rosenberg, *The Atheist’s Guide to Reality: Enjoying Life without Illusions* (New York: W. W. Norton, 2011), p. 6 and the opening-chapter list of “persistent questions”; in copyright, not collated; quoted as reported 2026-07-25 at the named review witness, Neil Shenvi, “A Short Review of Rosenberg’s *The Atheist’s Guide to Reality*,” shenviapologetics.com, corroborated across the book’s critical literature.

Last revised (UTC): 2026-07-25T10:37:00Z

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