uniformly increases, and conversely) that the areas swept out with respect to the center of circulation are proportional to the times, no matter what law governs the motion toward or away from the center. And so the matter comes directly down to this, that we have done something that the ancients seemed scarcely to have touched upon even in their prayers, that through geometrical analysis we have reduced the primary phenomena of the universe to principles that are the simplest and clearest for understanding, that is to the best, and, in our sense, truest hypothesis.[137]

## *On Freedom* (1689?)[138]

**H**OW FREEDOM and contingency can coexist with the series of causes and with providence is the oldest worry of the human race. And the difficulty of the problem has only increased through the investigations Christians have made concerning God's justice in providing for the salvation of men.

When I considered that nothing happens by chance or by accident (unless we are considering certain substances taken by themselves), that fortune distinguished from fate is an empty name, and that no thing exists unless its own particular conditions [*requisitis*] are present (conditions from whose joint presence it follows, in turn, that the thing exists), I was very close to the view of those who think that everything is absolutely necessary,[139] who judge that it is enough for freedom that we be uncoerced, even though we might be subject to necessity, and close to the view of those who do not distinguish what is infallible or certainly known to be true, from that which is necessary.

But the consideration of possibles, which are not, were not, and will not be, brought me back from this precipice. For if there are certain possibles that never exist, then the things that exist, at any rate, are not always necessary, for otherwise it would be impossible for others to exist in their place, and thus, everything that never exists would be impossible. Nor can we really deny that many stories, especially those called novels, are thought to be possible, though they might find no place in this universal series God selected—unless one imagined that in such an expanse of space and time there are certain poetical regions, where you can see King Arthur of Great Britain, Amadis of Gaul, and the illustrious Dietrich von Bern of the German stories, all wandering through the world. This seems not too far from the view of a certain distinguished philosopher of our age, who in a certain place explicitly affirms that matter successively takes on all of the forms of which it is capable (*Principles of Philosophy*, part III, art. 47), something hardly defensible.[140] For it would

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137. The last paragraph refers to the theory Leibniz gives in the "Tentamen de Motuum Coelestium Causis," two versions of which are given in GM VI, pp. 144–87.
138. Editors' title. F de C 178–85 & Gr 326. Latin.
139. Leibniz first wrote, then deleted: "and judged that being possible is the same as actually existing at some time."
140. The "certain distinguished philosopher" is, of course, Descartes.

eliminate all beauty from the universe and all choice among things, not to speak of other considerations by which the contrary can be proved.

Therefore, recognizing the contingency of things, I further considered what a clear notion of truth might be, for I hoped, and not absurdly, for some light from that direction on how necessary and contingent truths could be distinguished. Now, I saw that it is common to every true affirmative proposition, universal and particular, necessary or contingent, that the predicate is in the subject, that is, that the notion of the predicate is involved somehow in the notion of the subject. And this is the source [*principium*] of infallibility in every sort of truth for that being who knows everything *a priori*. But this seemed only to increase the difficulty, for if the notion of the predicate is in the notion of the subject at a given time, then how could the subject lack the predicate without contradiction and impossibility, and without changing that notion?

At last a certain new and unexpected light shined from where I least expected it, namely, from mathematical considerations on the nature of infinity. For there are two labyrinths of the human mind, one concerning the composition of the continuum, and the other concerning the nature of freedom, and they arise from the same source, infinity. That same distinguished philosopher I cited a short while ago preferred to slash through both of these knots with a sword since he either could not solve the problems, or did not want to reveal his view. For in his *Principles of Philosophy* I, art. 40 and 41, he says that we can easily become entangled* in enormous difficulties if we try to reconcile God's preordination with freedom of the will; but, he says, we must refrain from discussing these matters, since we cannot comprehend God's nature. And also, in *Principles of Philosophy* II, art. 35, he says that we should not doubt the infinite divisibility of matter even if we cannot grasp it. But this is not satisfactory, for it is one thing for us not to comprehend something, and quite something else for us to comprehend that it is contradictory. And so, we must at least be able to respond to those arguments, which seem to entail that freedom or the division of matter implies a contradiction.

Therefore, we must realize that all creatures have impressed upon them a certain mark [*character*] of divine infinity, and that this is the source of many wonderful things which amaze the human mind.

Indeed, there is no portion of matter so tiny that it does not contain a sort of world of creatures infinite in number, and there is no individual created substance so imperfect that it does not act on all others and is not acted upon by all others, no substance so imperfect that it does not contain the entire universe, and whatever it is, was, or will be, in its complete notion (as it exists in the divine mind), nor is there any truth of fact or any truth concerning individual things that does not depend upon the infinite series of reasons; whatever is in this series can be seen by God alone. This is also the reason why God alone knows contingent truths *a priori* and sees their infallibility in a way other than through experience.

After I considered these matters more attentively, a most profound distinction between necessary and contingent truths was revealed. Namely, every

truth is either basic [*originaria*] or derivative. Basic truths are those for which we cannot give a reason; identities or immediate truths, which affirm the same thing of itself or deny the contradictory of its contradictory, are of this sort. Derivative truths are, in turn, of two sorts, for some can be resolved into basic truths, and others, in their resolution, give rise to a series of steps that go to infinity. The former are necessary, the latter contingent. Indeed, a necessary proposition is one whose contrary implies a contradiction. Every identical proposition and every derivative proposition resolvable into identical propositions is of such a kind, as are the truths called metaphysical or geometrical necessities. For demonstrating is nothing but displaying a certain equality or coincidence of the predicate with the subject (in the case of a reciprocal proposition) by resolving the terms of a proposition and substituting a definition or part of one for that which is defined, or in other cases at least displaying the inclusion so that what lies hidden in the proposition and was contained in it virtually is made evident and explicit through demonstration. For example, if by a ternary, senary, and duodenary number we understand one divisible by 3, 6, 12, then we can demonstrate the proposition that every duodenary number is senary. For every duodenary number is a binary-binary-ternary (which is the resolution of a duodenary into its prime factors, $12 = 2 \times 2 \times 3$, that is,* the definition of a duodenary), and every binary-binary-ternary is binary-ternary (which is an identical proposition), and every binary-ternary is senary (which is the definition of senary, $6 = 2 \times 3$). Therefore, every duodenary is senary ($12 = 2 \times 2 \times 3$, and $2 \times 2 \times 3$ is divisible by $2 \times 3$, and $2 \times 3$ is equal to 6. Therefore, 12 is divisible by 6).

But in contingent truths, even though the predicate is in the subject, this can never be demonstrated, nor can a proposition ever be reduced [*revocari*] to an equality or to an identity, but the resolution proceeds to infinity, God alone seeing, not the end of the resolution, of course, which does not exist, but the connection of the terms or the containment of the predicate in the subject, since he sees whatever is in the series. Indeed, this very truth was derived in part from his intellect, in part from his will, and it expresses his infinite perfection and the harmony of the entire series of things in its own particular way.

However, two ways remain for us to know contingent truths, one through experience, and the other through reason—by experience when we perceive a thing sufficiently distinctly through the senses, and by reason when something is known from the general principle that nothing is without a reason, or that there is always some reason why the predicate is in the subject. And so, we can take it for certain that God made everything in the most perfect way, and that he does nothing without a reason, and that nothing happens anywhere unless he who understands, understands its reason, that is, why the state of things is this way rather than that. And so, reasons can be given no less for the actions of minds than for the actions of bodies, although the choices minds make lack necessity. Sins arise from the original limitation of things. God does not choose sins as much as he chooses to admit into existence certain possible substances, which involve free sins as possible in their com-

plete notions and even contain the whole series of things in which they will be contained.\* Nor should we doubt that there are hidden reasons that completely transcend the grasp of a creature, reasons why God prefers one series of things, although it includes a sin, over another. But God chooses only perfection, that is, what is positive. However, limitation and, arising from that, sin is permitted, since by establishing certain positive decrees, its absolute rejection is ruled out. But none of the precepts [*rationes*] of wisdom are of use here except the one that limitation and sin are to be compensated for by an otherwise unobtainable good. However, these matters are not appropriate here.

But in order better to fix the attention of the mind so that it doesn't leap from one aimless objection to another, a certain analogy between truth and proportions comes to mind, which seems marvelously to illuminate the entire matter and place it in a clear light. Just as in every proportion a smaller number is in a larger one or an equal is in an equal, so in every truth the predicate is in the subject. And just as in every proportion between homogeneous quantities, one can undertake a certain analysis of equals or congruents, and can subtract the lesser from the greater by subtracting from the greater a part equal to the lesser, and similarly, one can subtract a remainder from the result of that subtraction, and so on, either as far as you like, or to infinity, so too in the analysis of truths, an equivalent can always be substituted for a term, so that the predicate is resolved into the things contained in the subject. But in proportions, while the analysis sometimes comes to an end, and arrives at a common measure, namely, one that measures out each term of the proportion through exact repetitions of itself, in other cases the analysis can be continued to infinity, as happens in the comparison between a rational number and an irrational number, such as the comparison of the side and the diagonal of a square. So, similarly, truths are sometimes provable, that is, necessary, and sometimes they are free or contingent, and so cannot be reduced by any analysis to an identity, to a common measure, as it were. And this is an essential distinction, both for proportions and for truths.

However, just as incommensurable proportions\* are treated in the science of geometry, and we even have proofs about infinite series, so to a much greater extent, contingent or infinite truths are subordinate to God's knowledge, and are known by him not, indeed, through demonstration (which would imply a contradiction) but through his infallible intuition [*visio*].[141] However, God's intuition should hardly be thought of as a kind of experiential knowledge (as if he sees something in things distinct from himself), but as *a priori* knowledge, knowledge derived from the reasons for truths, insofar as he sees things within himself [*ex se ipsâ*], possibles through a consideration of his own nature, and existing things through the additional\* consideration of his free will and his decrees, the most important

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141. The reference here is to the *scientia visionis*, knowledge by intuition, discussed in connection with the Arnauld correspondence. See note 109 to p. 74.

of which is that everything happens in the best way, and for the best reason. However, what they call middle knowledge is nothing but the knowledge of contingent possibles.[142]

Moreover, once these things have properly been considered, I don't think that any difficulty on this matter can arise whose solution cannot be derived from what has been said. For having accepted the notion of necessity everyone accepts, namely that those things whose contrary implies a contradiction are precisely those that are necessary, it readily appears from a consideration of the nature of demonstration and analysis that there surely can be, indeed there must be, truths which cannot be reduced by any analysis to identical truths or to the principle of contradiction, truths endowed with an infinite series of reasons, fully known to God alone. And, it readily appears, this is the nature of everything called free and contingent, especially those which involve place and time. This has sufficiently been shown above from the very infinity of the parts of the universe and from the mutual interpenetration and connection of things.

## The Source of Contingent Truths (1685–89?)[143]

T HE SOURCE [*origo*] of contingent truths in an infinite progression, on analogy with the proportion between incommensurable quantities:

| TRUTH | PROPORTION |
|---|---|
| is containment | |
| of the predicate in the subject. | of a smaller quantity in a larger or of an equal in an equal. |
| It is shown by | |
| giving a reason [for the truth] | displaying the relation [of the numbers] |
| through the analysis of both terms into common | |
| notions. | quantities. |

This analysis is either finite or infinite.

If it is finite, it is said to be

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142. Middle knowledge or *scientia media* is a notion due to Louis de Molina. Molina argued that God knows propositions of the form "P will freely perform action A in circumstances C" independently of his knowledge of what he will create. This is what Molina called middle knowledge, which he distinguished from God's knowledge by intuition, that is, his knowledge of what he wills, and God's knowledge of simple understanding, that is, his knowledge of pure possibles. See also note 109 to p. 74 of the Arnauld correspondence.

143. Editors' title. C 1–3 & Gr 325–26. Latin.

| | |
|---|---|
| a demonstration, and the truth is necessary, | the discovery of a common measure or a commensuration, and the proportion is expressible [*effabilis*], |

for it is reduced to

| | |
|---|---|
| identical truths, | congruence with respect to the same repeated measure, |

that is, to the primary principle

| | |
|---|---|
| of contradiction or identity. | of equality of those things which are congruent. |

But if the analysis proceeds to infinity
and never attains completion then

| | |
|---|---|
| the truth is contingent, one which involves an infinite number of reasons, | the proportion is unexpressible, one which has an infinite number of quotients, |

but in such a way that there is
always something that remains,

| | |
|---|---|
| for which we must, again, give some reason. | a new remainder that furnishes a [new] quotient. |

Moreover, the analysis continued
yields an infinite series

| | |
|---|---|
| which, however, is known perfectly by God. | about which geometry knows many things. |

And this is

| | |
|---|---|
| knowledge by intuition [*scientia visionis*], | the doctrine of irrational numbers, like what is contained in book X of the *Elements* [of Euclid], |

which is distinct

| | |
|---|---|
| from knowledge of simple understanding [*scientia simplicis intelligentiae*].[144] | from common arithmetic. |

However, neither is experiential but
both are *a priori* infallibles, and known
each according to its kind

| | |
|---|---|
| through certain reasons evident to God, who alone comprehends the infinite. However, they are not necessary, | through necessary demonstrations known to geometry. However, they cannot be captured by expressible numbers, |

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144. See note 109 to p. 74.

for it is impossible

| | |
|---|---|
| to give demonstrations of contingent truths. | for irrational proportions to be understood arithmetically, that is, they cannot be explained through the repetition of a measure.[145] |

That[146] there are contingent truths, in whose explanation the progression of reasons is infinite, can also be understood from the fact that there is an actually infinite number of creatures in any part of the universe whatsoever, and each and every individual substance contains the whole series of things in its complete notion, and harmonizes with everything else, and to that extent contains something of the infinite. Because this has not been understood, the union of the soul and the body has also been taken to be inexplicable. For, in metaphysical rigor, they do not flow into one another, nor, indeed, does God move the one on the occasion of the other and divert it from its own proper course. But following its own laws from the time they were instituted with an admirable but infallible constancy [*directio*], each agrees with the other as exactly as they would if there were a true influx. And there is something similar in all substances, even those the most distant from one another, although in them the agreement does not appear so distinctly.

If everything that exists were necessary, then it would follow that only things which existed at some time would be possible (as Hobbes and Spinoza hold) and that matter would receive all possible forms (as Descartes held). And so, one could not imagine a novel that did not actually take place at some time and in some place, which is absurd. And so, we should say, rather, that from an infinite number of possible series, God chose one for reasons that go beyond the comprehension of his creatures.

The cause of evil derives from the original limitation of creatures, before all sin. God decrees only that which is purely positive, or which consists in perfection, and therefore, evil is only permitted by God. But things are

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145. A few pages later in the ms Leibniz repeats this list of comparisons and adds the following two new ones:

| | |
|---|---|
| (21) There is no middle between these two. Indeed, what they call middle knowledge [*scientia media*] is knowledge by intuition [*scientia visionis*] of contingent possibles. | (21) There is no middle between these two. |
| (22) From these things it appears that the root of contingency is infinity in reasons. | (22) From these things it appears that the root of incommensurability is infinity in the parts of matter. |

On middle knowledge, see note 109 to p. 74.
146. Here begins the fragment published by Grua.

otherwise with people, who, in general, do not strive by their nature [*per se*] for the greater good.

Every truth which is not an identity admits of a proof; a necessary truth is proved by showing that the contrary implies a contradiction, a contingent truth by showing that there is more reason for that which has been done that there is for its opposite. For as with a wise person, so with God, the first decree and intention is that everything happen in accordance with the best reason. And so, if we were to imagine the case in which it is agreed that a triangle of given circumference should exist, without there being anything in the givens from which one could determine what kind of triangle to create, we must say that God would create an equilateral triangle, freely, or course, but without a doubt. There is nothing in the givens which prevents another kind of triangle from existing, and so, an equilateral triangle is not necessary. However, all that it takes for no other triangle to be chosen is the fact that in no triangle except for the equilateral triangle is there any reason for preferring it to others. Circumstances are the same if one were ordered to draw a line from one given point to another, without being given anything by which to determine what kind of line or how long a line to draw. Surely it would be a straight line, but it would be drawn freely, for just as nothing prevents a curve, nothing recommends one either.

### Notes on Some Comments by Michel Angelo Fardella (1690)[147]

#### Venice, March 1690

*In February and March of 1690, Leibniz was in Venice where he met the philosopher and theologian, Michel Angelo Fardella, beginning an association that was to last until 1714. The following document seems to be conversational notes, a record of Leibniz's positions, Fardella's objections, and responses Leibniz thought appropriate.*

I COMMUNICATED several of my metaphysical thoughts to the Reverend Father Michel Angelo Fardella of the Order of Friars Minor, because I saw that he combined meditation on intellectual things with an understanding of mathematics, and because he pursued truth with great ardor. And so, after he grasped my views, he wrote out certain propositions at home to remember them in order to master what he heard from me, along with objections, which, it so happens, he sent to me for my examination.

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147. Editors' title. S 322–25; F de C 317–23. Latin.