Philosophy 203: History of Modern Western Philosophy Hamilton College
Spring 2010 Russell Marcus
Tuesdays, Thursdays: 9am - 10:15am rmarcus1@hamilton.edu

Class 12 - February 25
Leibniz, *Monadology* and *Discourse on Metaphysics*
Newton, "Scholium to Definitions" from *Principia*, and other selections
Leibniz, from *Letters to Clarke*

I. Contingent and Necessary Truths

In our previous class, we discussed Leibniz's theodicy, or defense of God's goodness, and his claim that this is the best of all possible worlds.
After class, I sent you an excerpt from his *Theodicy*, which is one of only two books that Leibniz published in his lifetime.
(The other was his extended commentary on Locke's work, *New Essays on the Human Understanding*.)
The claim about our world being the best of all possible worlds may give us insight into Leibniz's subtle claims about contingency and freedom, which is the penultimate topic we will discuss before moving on to Locke.)

Where Spinoza thought that everything that was possible was actual, Leibniz thinks that there are other possible worlds which are non-actual.
Ordinarily, and for Leibniz, we think of alternate worlds as descriptions of paths not taken, of choices we have not chosen.
Thus, the questions surrounding possible worlds are linked to questions surrounding human freedom.
If there are non-actual possible worlds, they are naturally seen as the result of our freedom to choose this one, rather than another.
The existence of this world, as against other possible worlds, is contingent on our free choice.
Indeed, Leibniz's work is motivated in large part by a rejection of Spinozan necessitarianism, the claim that every decision is determined, since God instantiates every possibility.
Leibniz believes that, for some actions, I could have done otherwise.

On the other hand, Leibniz holds, as a basic and fundamental principle, that nothing happens without sufficient reason (PSR).
PSR, combined with God's omniscience, entails that God has foreknowledge of all of our actions.
Further, Leibniz believes that any truth can be discovered by analyzing the complete concept of a substance into its component parts.
By analysis, we will either find a given predicate inside the original concept, or find a contradiction arising from that predication.
Either a property is true of a substance or it is not, both in the future and in the past.
The status of any claim can be evaluated by analyzing the concept of any monad at any time.
There seems to be no room for free choice, for denying that one can act other than one does, that the world can be other than what it is.

In Leibniz's discussions of contingency and necessity, we can see three hints at room for a resolution of this conundrum.
First, while Leibniz states that the actual world is the best of all possible worlds, he does accept that such other worlds are possible.
We can look at those possibilities more carefully for an account of contingency.
Second, Leibniz claims that contingent claims can by discovered only by infinite analysis, while necessary truths are discoverable by finite analysis.

Third, Leibniz distinguishes between certain truths and necessary ones.

> Everyone grants that future contingents are certain, since God foresees them, but we do not concede that they are necessary on that account (D13, AW 230b).

By exploring these three hints, we can arrive at a characterization of contingency and freedom, and then see if we can accommodate this view with the more necessitarian elements of Leibniz's work.

Leibniz's claim about other possible worlds arises directly from his observation of the phenomenology of free will, like that which Haley mentioned in her presentation.
The problem with the phenomenology of free will is that we do not know whether it is an illusion.
The existence of an omniscient God seems to debar any future that was not already, in a sense, settled.
Further, the laws of physics seem, at least on the observable level, to be deterministic.
So, Leibniz's weakest claim about other possibilities, and our freedom to create them, is that they are merely chimerical.
It looks to us as if the world which is just the same as it is, except that Hamilton College is located on a small Caribbean island with fruited mango trees and sea breezes on campus all year around, is possible.
But, Leibniz argues, to make even one change in the world entails changing other factors in that world.
What seems possible in itself may not be compossible with other changes that moving Hamilton would entail.

We can see the problem of compossibility clearly when we recall Leibniz's complete-concept view of the monad.
I could not live in the Caribbean-Hamilton world.
For, my complete concept includes living in Clinton, not in the Caribbean.
And, one could, in principle, know that I live in Clinton just by analyzing my concept.
If Hamilton were located in the Caribbean, none of us would be members of its community.
There would be people somewhat like us attending and teaching at that school.
We do not know what other properties of those people would have to be different from us in order to construct a system of compossibilities.
We could call the people in the Caribbean-Hamilton world our counterparts, but they would not be us.

> These worlds are all here, that is, in ideas. I will show you some, wherein shall be found, not absolutely the same Sextus as you have seen (that is not possible, he carries with him always that which he shall be) but several Sextuses resembling him, possessing all that you know already of the true Sextus, but not all that is already in him imperceptibly, nor in consequence all that shall yet happen to him. You will find in one world a very happy and noble Sextus, in another a Sextus content with a mediocre state, a Sextus, indeed, of every kind and endless diversity of forms (Theodicy, ~416).

Note the subtlety of Leibniz's position, here.
There are other Sextuses, in the other possible worlds, but they are not him.
The controversy over whether we exist in other possible worlds, or whether only our counterparts exist in other worlds, continues to be a hot topic in contemporary modal metaphysics.
Saul Kripke, in *Naming and Necessity*, argued that we stipulate other possible worlds, keeping as much as we like the same across worlds.
This claim is related to his assertion that names are rigid designators, that they refer to the same thing across all possible worlds.
According to Kripke, we exist in other possible worlds.

In contrast, David Lewis, whose modal realism I mentioned above, defended counterpart theory, the claim that I am not the same across all possible worlds.
According to counterpart theory, there are counterpart relations among me and all my dopplegangers in other possible worlds.
Exploring the nature of other possible worlds involves specifying, as far as possible, those counterpart relations.
We might identify me with the set of my counterparts across all possible worlds, but that would be to make me a mathematical object (a set), rather than a person!
Today, we use the term Kripkean semantics to refer to theories of possible worlds with transworld identity, in which the same object can exist in more than one world.
We use the term counterpart theory to refer to theories of possible worlds with merely transworld counterpart relations, following Lewis and Leibniz.

Here, for you logicians, are the axioms of counterpart theory, with the given translation key:

Wx: x is a world
Ixy: x is in world y
Ax: x is actual (exists in the actual world)
Cxy x is a counterpart of y

C1. $(x)(y)(Ixy \supset Wy)$	worlds are the containers of objects
C2. $(x)(y)(z)[(Ixy \bullet Ixz) \supset y=z]$	individuals can only exist in one world
C3. $(x)(y)[Cxy \supset (\exists z)Ixz]$	
C4. $(x)(y)[Cxy \supset (\exists z)Iyz]$	all counterparts exist in worlds
C5. $(x)(y)(z)[(Ixy \bullet Izy \bullet Cxz) \supset x=z]$	there are no distinct counterparts in any given world
C6. $(x)(y)(Ixy \supset Cxx)$	a thing is the counterpart of itself
C7. $(\exists x)[Wx \bullet (y)(Iyx \equiv Ay)]$	there is a world which contains all and only actual things
C8. $(\exists x)Ax$	the actual world exists

Returning to Leibniz, we have looked at the first of three hints at Leibniz's account of contingency.
But, the fact that Leibniz embraces talk about possible worlds does not entail that such talk does not conflict with other of his claims.
In particular, as we have seen, an account of contingency is likely to conflict with Leibniz's complete-world view of substance.
But, we have also seen, our second hint, that Leibniz makes a distinction between those truths which require infinite analysis and those which require only finite analysis.
The topics of analysis and conceptual containment are, like the nature of possible worlds, important in contemporary philosophy, and will continue to be relevant through this course.
In a finite analysis, we can unpack a complex concept until we reach what Leibniz calls an identity statement.

$3^2 = \sqrt{81}$
3 x 3 = 9
3 x 3 = 3 x 3

Since the terms on each side are identical, we have shown the original statement to be, for Leibniz, necessary.
Later, we will call such claims analytic truths.

Similarly, given a false statement, we will arrive at some kind of contradiction by analysis.
Leibniz thinks that we can one use the same process of analysis to determine the truth of other statements, including scientific claims.
But, consider:

> Russell has two children.

According to the doctrine of conceptual containment, my concept contains, in some way, my having two children.
Nevertheless, there are possible worlds in which I don't have two children.
Correspondingly, when we analyze the concept 'Russell', we will not be able to unpack the claim that I have two children.
God could do so, but we can not.

> The one whose contrary implies a contradiction is absolutely necessary; this deduction occurs in the eternal truths, for example, the truths of geometry. The other is necessary only *ex hypothesi* and, so to speak, accidentally, but it is contingent in itself, since its contrary does not imply a contradiction. And this connection is based not purely on ideas and God's simple understanding, but on his free decrees and on the sequence of the universe (D13, AW 231a).

So, Leibniz claims, it is certain that I have two children; God can see that fact.
But, it is not necessary that I have two children, since this fact depends on my free choice.
Leibniz illustrates his distinction between certainty and necessity, our third hint, referring to Julius Caesar.

> If someone were able to carry out the whole demonstration by virtues of which he could prove this connection between the subject, Caesar, and the predicate, his successful undertaking, he in fact be showing that Caesar's future dictatorship is grounded in his notion or nature, that there is a reason why he crossed the Rubicon rather than stopped at it and why he won rather than lost at Pharsalus and that it was reasonable, and consequently certain, that this should happen. But this would not show that it was necessary in itself nor that the contrary implies a contradiction... For it will be found that the demonstration of this predicate of Caesar is not as absolute as those of numbers or of geometry, but that it supposes the sequence of things that God has freely chosen, a sequence based on God's first free decree always to do what is most perfect and on God's decree with respect to human nature, following out of the first decree, that man will always do (although freely) that which appears to be best. But every truth based on these kinds of decrees is contingent, even though it is certain; for these decrees do not change the possibility of things...it is not its impossibility but its imperfection which causes it to be rejected. And nothing is necessary whose contrary is possible (D13, AW 231b).

Necessary events will have possible contraries.
But, alternative possibilities need not be compossible with other alternatives.
They may be possible only in themselves, not in respect to the broader world.

I am not going to defend Leibniz's distinction between necessity and certainty, which is also called the distinction between truths of reason and truths of fact.
If my future actions are certain, my free will is denigrated, even if Leibniz calls those actions contingent.
Leibniz may have provided us only a semantic difference, not a real difference.
Putting that complaint aside, let's see how Leibniz's distinction manifests his resultant theory of freedom.

II. Freedom

For freedom, as Nick said in his presentation, Leibniz is most concerned to establish a theory of will on which God's will is free.
Leibniz claims that God's will is constrained to choose the best, which makes God's will appear determined.
Leibniz's solution is to say that while God's is constrained to choose the best, that choice is still free.
There is nothing in the nature of any possible world that constrains God to create it.
All worlds are contingent, and remain to be brought into existence by God.
Only God could perform the infinite analysis which would yield knowledge of which world is best.

Elsewhere Leibniz argues for what is called the doctrine of striving possibles.
Each possible entity strives for existence against other possible entities.

> Since something rather than nothing exists, there is a certain urge for existence or (so to speak) a straining toward existence in possible things or in possibility or essence itself; in a word, essence in and of itself strives for existence. Furthermore, it follows from this that all possibles, that is, everything that expresses essence or possible reality, strive with equal right for existence in proportion to the amount of essence or reality or the degree of perfection they contain, for perfection is nothing but the amount of essence. From this it is obvious that of the infinite combinations of possibilities and possible series, the one that exists is the one through which the most essence or possibility is brought into existence. In practical affairs one always follows the decision rule in accordance with which one ought to seek the maximum or the minimum: namely, one prefers the maximum effect at the minimum cost, so to speak ("On the Ultimate Origination of Things").

The actual world is the result of the resolution of the struggle among possibles.
In that struggle contains a hint of freedom, one that will allow us to assimilate the accounts of God's freedom and human freedom.

For human freedom, recall that one of the motivating factors in positing the existence of monads was to capture mental phenomena; bodies can not think.
Leibniz takes active, thinking things as elemental.
The life of the monad consists of the unfolding of its perceptions.
The activity of a monad corresponds to the distinctness of its perceptions.
Some perceptions are unconscious, some perceptions are conscious apperceptions, some perceptions are clear and distinct.
But all activity is self-determined, according to laws of final causes; Leibniz denies any transeunt causation.
Leibniz calls the guiding principles of the unfolding of a monad's perceptions appetition.

> The action of the internal principle which brings about the change or passage from one perception to another can be called *appetition*; it is true that the appetite cannot always completely reach the whole perception toward which it tends, but it always obtains something of it, and reaches new perceptions (D15, AW 276b).

As the monads of persons have both conscious experience (distinct perception) and memory, we apperceive our appetition.

Let's say that I desire a milkshake.
My desire for that milkshake is reasonably attributable to some prior beliefs and desires, along with some account of my current experiences and surroundings.
An account on which all of those factors are beyond my control is not implausible.
But notice, the more ignorant we are of those factors, the more we take them to be unconscious or hidden, the more likely we are to see our desire for the milkshake as free.
Once we analyze our beliefs, desire, and surrounding, we are more likely to see ourselves as constrained.
Consider the strength of subliminal advertising.
We might think that we are freely choosing to have a beverage, though that thought is actually the result of predictable subconscious trains of thought.
So, Leibniz's account of freedom on which our actions are determined (knowable in advance) and yet free, is not incompatible with common sense, in such cases.

Libertarians (in the philosophical sense - defenders of freedom of the will) are more concerned to defend the freedom of our decision to acquire and drink, or not, the milkshake.
Here, Leibniz's account of free will is harder to accept.
For Leibniz, human freedom, like God's freedom, is restricted.
God understands what is best, and freely chooses it; what is possible is independent of God's will, but not his understanding.
Our freedom, like God's, is the name we give to our faculty for striving, for unfolding the internal principles of our essence.
We strive for future states, even if they are states of pain and unhappiness, as these are preferable to the alternative, which is non-existence.

I won't pursue a defense of Leibniz, here.
I will just mention that contemporary discussions of free will are often less concerned with the metaphysical problem.
Most philosophers tend to agree that the arguments for metaphysical determinism are strong.
The focus of a lot of contemporary research is on how to retify determinism with our beliefs about moral responsibiliy.
Many people hold what is called compatibilist views: we can have free will, in a sense, and moral responsbility in a determined universe.
We will return to free will, and discuss compatibilism, when we get to Hume.

III. Absolute and Relational Notions of Space and Time

Theories of space and time have their roots in our observations about change.
Most or all change appears due to some sort of motion, of the change of place of some objects over time.
Motion is ordinarily measured relative to some external object.
When I am traveling on the highway, I am moving, with respect to the world outside the car, and sitting with respect to the car itself.
We use terms like 'up' and 'down', relative to the Earth.
But, even the Earth itself is moving, spinning on its axis.
The axis of the Earth is shifting as well, in the annual revolution of our planet around the sun.
The solar system is moving relative to our Milky Way Galaxy, and the Milky Way is moving within our local system of galaxies.
And so on, one supposes.
I am driving 50 mph west, while the Earth is spinning at 650 miles per hour East, and the whole system is

flying through space in its revolution around the sun at around 66,000 miles per hour, etc.
Is there some fixed point, some privileged reference frame, to which all motion can be measured?
For most practical purposes, we can pick a frame of reference outside of our solar system, measuring motion with respect to distant stars.
But, is there an absolute sense in which we can be said to be moving or not?
If so, can we measure this motion relative to some special body or substance, like absolute space?
Is there space, in addition to places?

Newton and Leibniz clashed over whether space and time had absolute reality, or whether they were merely relational concepts.
Newton's view is that space is something distinct from the bodies that occupy it, and that time is something that passes uniformly without regard to events in the world.
Space is an empty container, and time marches inexorably forward.
Though we measure space and time using bodies and events, these are only indicative of relative motions.

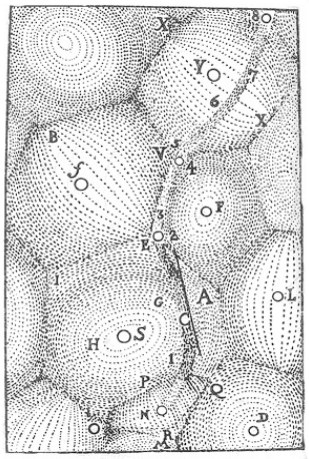
In contrast, Leibniz's relationalist view is that space and time are idealizations, abstractions from the realities of the material world.
(Here, we will put aside Leibniz's idealism, and consider bodies as real things.)

> I hold space to be something merely relative, as time is...an order of coexistences, as time is an order of successions (LIII.4, AW 297b).

The differences between Newton and Leibniz over the nature of space and time are tied to their conceptions of motion, and acceleration.
If motion is change of place over time, then to define motion, we have to know if we are appealing to absolute motion, the change in the place in absolute space of an object, or relative motion, the mere rearrangement of bodies.

Newton and Leibniz were influenced by two distinct schools of thought.
On the one hand, Descartes's physics denied the possibility of a void, or vacuum.
This view was inherited from the Aristoteleans who believed that a void is nothing, and what is nothing does not exist.
Descartes incorporated the opposition to a vacuum into the new science by taking the world to be a plenum, in which space is not distinct from the bodies which fill it.

> All places are full of bodies... Each body can move only in complete circle of matter, or ring of bodies which all move together at the same time: a body entering a given place expels another, and the expelled body moves on and expels another, and so on, until the body at the end of the sequence enters the place left by the first body... (Descartes, *Principles of Philosophy*, II.33).



(Right: Descartes's depiction of the plenum, *Principles of Philosophy*, II.553)

Despite his many differences with Descartes, both in physics and metaphysics, Leibniz adopts Descartes's views on the completeness of the material world.

Leibniz agrees with Descartes about the plenum.

> Let us fancy a space wholly empty. God could have placed some matter in it without derogating, in any respect, from all other things; therefore, he has actually placed some matter in that space; therefore, there is no space wholly empty; therefore, all is full (LIV.PS, AW 303a).

Leibniz believes that the idea of empty space is self-contradictory, and contradicts God's commitment to creating the best of all possible worlds.
His denial of a void implies that there is no space beyond the places of objects.

In contrast, the atomists, like Gassendi, the intellectual heirs of the Greek atomists, had argued that the places between objects are empty.
Objects are placed in a transcendent void.
When we move, we change our place relative to the objects around us, and we change our location in absolute space.

Here is one way to see the difference between Newton's absolutist and Leibniz's relationalist.
Consider the question, "What exists outside the universe?"
Leibniz, with the Cartesians, answers that the universe extends infinitely, so that there is no outside.
Newton, with the atomists, answers that there is an empty void.
Today, the debate between relationalist and absolutists continues between space-time relationalists, who believe that space-time is an artificial, or nominal, construct out of particular bodies, and substantivalists, who believe in the existence of space-time points or regions.

IV. Newton's Bucket

Here is a summary of Newton's views on space and time.

> Absolute time passes steadily without relation to anything external, and thus without reference to any change or way of measuring of time.
> Absolute space remains without relation to anything external.
> Relative spaces are measures of absolute space defined with reference to some system of bodies; a relative space may be in motion.
> The place of a body is the space which it occupies, whether absolute or relative.
> Absolute motion is the translation of a body from one absolute place to another; relative motion is the translation from one relative place to another.

Thus, space is distinct from, and exists independently of, bodies.
It is logically and metaphysically prior to bodies and events among bodies, in that bodies require space but space need not include any bodies.
There is a fact of the matter whether a given body moves and what its true quantity of motion is.
The true motion of a body does not consist of, or cannot be defined in terms of, its motion relative to other bodies.[1]
More speculatively, Newton refers to space as the sensorium of God, and as the seat of divine cognition.

---

[1] See the Stanford Encyclopedia of Philosophy article on Newton's views of Space, Time, and Motion: plato.stanford.edu/archives/fall2008/entries/newton-stm/; also see Tlumak 167-8.

Newton's view can be found in the Scholium, as well as in the other assigned selections.
In the Scholium, Newton starts with definitions of absolute and relative spaces, and motions, and then proceeds to argue for the existence of absolute time and space.
In large part, Newton's arguments are aimed against the Cartesians who defined motion in terms of the translation of a body relative to its surrounding objects in the plenum.
Newton had many reasons to be unhappy with Cartesian physics.
For one, Descartes centered his account of physics around motion, rather than acceleration.
The arguments in paragraphs 8-11, the last of which immediately precedes the discussion of the bucket experiment, are mainly directed at Cartesian physics.
He argues that the definition of motion as translation of a body relative to its surrounding objects will not allow us to arrive at a measurement of absolute motion.

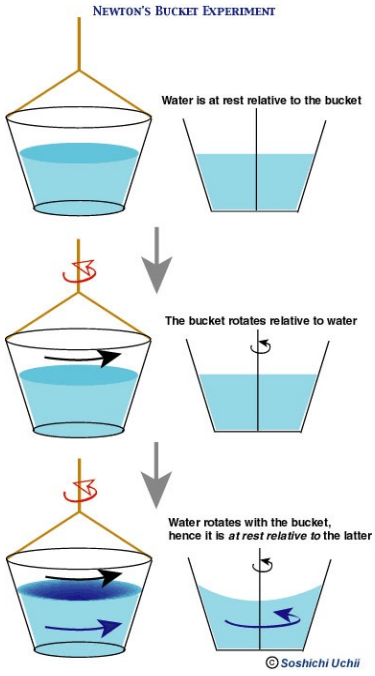
For example, take as axiomatic that bodies that are truly at rest are at rest with respect to one another.
Imagine that there is a distant star which is absolutely at rest.
We might wonder if something in our vicinity, say this computer, is at rest, too.
But, if we measure the motion of the computer relative to the motions of things around it, we can not know whether it is moving or at rest relative to the distant star.
The computer is at rest with respect to its surroundings, but that does not determine whether it is at rest, absolutely.
Thus, true rest cannot be defined simply in terms of position relative to bodies in the vicinity.

Newton discusses other properties of motion that lead to difficulties for Cartesian physics.
The property that if a part of a body maintains a fixed position with respect to the body as a whole, then it participates in the motion of the whole body entails that absolute motion cannot be defined as a translation from the immediately surrounding bodies.
Imagine that I am sleeping in the back of the car.
My femur is at rest with respect to me.
I am at rest with respect to the car.
But, my femur and I are both moving.
The property that a body participates in the motion of its place when it moves away from that place entails that the absolute motion of a body cannot be defined except by means of stationary places.
You can change the relative motion of a body by changing the motion of the bodies to which you are comparing it.
But, you can only change the true, or absolute, motion of a body by applying some force to it.

These arguments from properties and causes are important for characterizing Newton's concept of absolute space and motion.
But, the most influential argument in favor of his thesis that we must posit absolute space in order to make sense of motion is Newton's example of a rotating bucket.
Newton's bucket experiment provides a cases in which there are states of a system with different motions, yet which can not be described in terms of changes of place with respect to surrounding objects.
We know that the motions are different in the two states, but we can not differentiate them in terms of local changes of place.

Consider a bucket, suspended by a rope, and filled with water.
Turn the bucket many times, so that the rope twists.
In state 1, hold the bucket still.
The surface of the water inside the bucket is flat.
Now, let go of the bucket.

In state 2, the motion of the bucket is fast, but the motion of the water is slow.
The surface of the water in the bucket remains flat.
The water is moving very rapidly with respect to the bucket, and yet there is no centrifugal force manifested.
After a while, the water begins to turn with the bucket, and centrifugal force pushes the water up the sides of the bucket.
The surface of the water becomes concave.
In state 3, the bucket and the water are at relative rest, and yet the water has a concave surface.



Now, compare state 1 to state 3.
In both states, the water and the bucket are at relative rest.
In state 1, for both the relationalist and the absolutist, there is no motion.
But state 3 is measurably different to state 1, and the relationalist seems unable to describe the difference between the two states, since the water and the bucket are at relative rest in both states.
The absolutist needs merely to point out that in state 3, the system is in absolute motion, while in state 1, the system is at absolute rest.

One problem for the doctrine of absolute motion, a problem which Newton admits, is that, in contrast to rotation, which the bucket experiment measures, it is difficult to measure absolute velocity.
The absolute speed of a body is the rate of change of its position relative to an arbitrary point of absolute space.
According to Newton's account, absolute velocity is a well-defined quantity.
But consider, as Galileo did, riding in a ship at a constant velocity.

> Shut yourself up with some friend in the main cabin below decks on some large ship, and have with you there some flies, butterflies, and other small flying animals. Have a large bowl of water with some fish in it; hang up a bottle that empties drop by drop into a wide vessel beneath it.
>
> With the ship standing still, observe carefully how the little animals fly with equal speed to all sides of the cabin. The fish swim indifferently in all directions; the drops fall into the vessel beneath; and, in throwing something to your friend, you need to throw it no more strongly in one direction than another, the distances being equal; jumping with your feet together, you pass equal spaces in every direction.
>
> When you have observed all of these things carefully (though there is no doubt that when the ship is standing still everything must happen this way), have the ship proceed with any speed you like, so long as the motion is uniform and not fluctuating this way and that. You will discover not the least change in all the effects named, nor could you tell from any of them whether the ship was moving or standing still. In jumping, you will pass on the floor the same spaces as before, nor will you make larger jumps toward the stern than towards the prow even though the ship is moving quite rapidly, despite the fact that during the time that you are in the air the floor under you will be going in a direction opposite to your jump. In throwing something to your companion, you will need no more force to get it to him whether he is in the direction of the bow or the stern, with yourself situated opposite.
>
> The droplets will fall as before into the vessel beneath without dropping towards the stern, although while the drops are in the air the ship runs many spans. The fish in the water will

> swim towards the front of their bowl with no more effort than toward the back, and will go with equal ease to bait placed anywhere around the edges of the bowl. Finally the butterflies and flies will continue their flights indifferently toward every side, nor will it ever happen that they are concentrated toward the stern, as if tired out from keeping up with the course of the ship, from which they will have been separated during long intervals by keeping themselves in the air... (Galileo Galilei, *Dialogues Concerning the Two Chief World Systems*)

We cannot determine from observations inside the cabin whether the boat is at rest in harbor or sailing smoothly.
The point of the ship example, in this context, is to show that Newton's absolute velocity cannot be experimentally determined, unlike absolute rotation.

> Yet the thing is not altogether desperate; for we have some arguments to guide us, partly from the apparent motions, which are the differences of the true motions, partly from the forces, which are the causes and effects of the true motions (Scholium to Definitions in *Principia*, AW 288a).

I will not pursue the details of Newton's solutions, which are really the elements of his mechanics.

V. Leibniz's Relationalism

Leibniz discusses many conflicts in his correspondence with Newton's secretary, Samuel Clarke.
Newton, it seems, participated in constructing some of the correspondence, though some of it appears to be written by Clarke, alone.

> Our dispute consists in many other things. The question is whether God does not act in the most regular and most perfect manner; whether his machine is liable to disorder, which he is obliged to mend by extraordinary means; whether the will of God can act without reason; whether space is an absolute being; also concerning the nature of miracles; and many such things, which make a wide difference between us (LIII.16, AW 299a).

We are focusing only on the question of whether space is relational or absolute.

One problem with Newton's claim is that space seems difficult to classify as a substance or an attribute.
Newton does not take space to be a substance, for it lacks causal powers.
But, it is also not an attribute, since its existence transcends the existence of any things.
Unlike, say, redness, it doesn't need a thing to be predicated of.

> If space is a property or attribute, it must be the property of some substance. But of what substance will that bounded empty space be an affection or property, which the persons I am arguing with suppose to be between two bodies? (LIV.8, AW 300a).

So, space is real, but hovers in between substance and attribute.
We could, for Newton, call it a pseudo-substance.
Leibniz seems to think that this argument is important.
He derives consequences from it that seem to impugn the perfections of God.
But, it is not clear that the argument has the ramifications that Leibniz takes it to have.
Perhaps the classification of all objects into substances and attributes is incomplete.

Leibniz's more influential arguments derive from his general principles which he claims rescue science from nonsense.

> Those great principles of sufficient reason and of the identity of indiscernibles change the state of metaphysics. That science becomes real and demonstrative by means of these principles, whereas before it did generally consist in empty words (LIV.5, AW 299b).

Leibniz says that the doctrine of absolute space and time lead to absurdities.
Could the universe, for example, have been created at a different time?
Could it be moved three inches to the left?
There would be no way to distinguish two universes that were identical in all their relations among objects, but put into a different space, or reoriented.

> Those two states, the one such as it is now, the other supposed to be the quite contrary way, would not at all differ from one another. Their difference therefore is only to be found in our chimerical supposition of the reality of space in itself. But in truth, the one would exactly be the same thing as the other, they being absolutely indiscernible, and consequently there is no room to inquire after a reason for the preference of the one to the other (LIII.5, AW 297b-298a; see also LIV.13, AW 300a-b).

Instead, Leibniz argues, space is a set of relations among bodies.
Time is an abstract relation among events (or perceptions).
Those systems of relations might be thought of as abstract, but they should not be reified.
Elsewhere, in the Fifth Letter, Leibniz refers to the structure of space time as analogous to a family tree, which is just set of organizing relations, and not a thing in itself.
The infinite divisibility of space and time are further arguments against their reality; no really existing thing could be infinitely divisible.
We must take space and time to be ideal, or imaginary constructs derived from the appearances of bodies.

The status of space and time are further impugned when we remember that even bodies, for Leibniz, are just appearances.
Space and time turn out to be abstractions on what is already only a mere appearance.
The only reality is monadic.
Monads have temporal properties, but not spatial properties, except in a thin, derivational sense.

VI. End Continental Rationalism (until Kant)

We have come to the end of the sometimes-trippy, often-speculative, and always-difficult- to-comprehend-and-interpret continental rationalists portion of the course.
Ahead of us lie the British Empiricists: Locke, Berkeley, and Hume.
Those three writers will rein in the speculation, both by restricting the use of intuitive principles in their philosophy and by paying close attention to the limits of human cognition.
From Descartes, Leibniz, and Spinoza, we were given grand systems of knowledge: of God, and Nature, and mathematical principles which grounded deterministic physical laws, governed by divine goodness.
Never mind that our ordinary beliefs had to be re-calibrated: to deny the veridicality of sense perception, to see the thin universe both packed with matter and infinitely divisible, to deny the very existence of a material world, and to prefer a universe in which bodily existence was reduced to a mere appearance.
We were introduced to 'compossibilities', and 'necessitarianism', and 'the plenum'.

At the end of this course, Kant will return to pick up the rationalist's thread of argument, and attempt to unite it with what we are now going to see from the British Empiricists.
For now, we will examine attacks on the fundamental presuppositions of the grand systems-builders.
We return to our senses.