

## The thesis of “The assayer”

Heat, ...

(together with colour, taste, sound, scent)

... is not a “primary and real property” of bodies.

Instead, it is a quality that “resides exclusively in our sensitive body.”

## A theory of heat, based on this thesis

Heat as it exists in bodies is nothing like the sensation we feel when we touch a hot body.

As it exists in bodies it is a motion of very small, very sharp particles.

When these particles hit our skin they produce sensations of warmth or burning, depending on how many there are and how fast they are moving.

- warmth: if few enough to simply open the pores
- burning: if so many that they tear the skin

When the particles hit other bodies they can break them apart and release other fire particles in those bodies

or cause them to melt into a fluid mass by destroying their architecture

## Experiments to prove the theory

It explains why heat is released by a piece of calcified stone immersed in water.

That motion produces heat is evident in cases of rubbing.

## A further advantage of the theory

It might be able to explain light as well as heat, and why light is produced by high heat.

(By considering light to be a stream of absolutely small — atomic — round particles produced when the motion of heat smashes particles into their smallest constituents and sends them flying off in all directions.)

1<sup>st</sup> argument for this thesis  
(the “conceivability argument”)

If I am to conceive of a body (a “corporeal or material substance”) I must conceive of it as:

extended (bounded, shaped, large or small)

located

in motion or at rest

in contact with or separated from other bodies

numbered and arranged

but I don't have to conceive it as having any sensible qualities (indeed, I often perceive it without perceiving them)

So the mechanical properties are more “primary and real”

whereas the sensible qualities are not qualities any body necessarily has to have

Note how this first argument privileges “first notions of the intellect” over sensory experience.

what the intellect finds to be conceivable or inconceivable counts for more than what the senses tell us is in fact the case

just because the intellect cannot conceive bodies to lack mechanical qualities but can conceive them to lack sensible qualities, the mechanical qualities are considered more real or true on that account than things that our senses assure us are there

## Problems with Galileo's first argument

It may not be true that bodies are conceivable without the sensible qualities

I conceive shape without edges

I cannot conceive edges without conceiving *some* qualitative contrast or other

if not of contrasting colours, then of hardness and softness, or heat and cold, or differences in roughness and smoothness, etc.

If it is true, it may be only trivially true (that is, true only because of the way we define "body," "corporeal," or "material")

Even if it is both true and non-trivial, it does not prove that sensible qualities are not real?

Just because they don't *have to* be there, it does not follow that they are not *in fact* there anyway

## 2<sup>nd</sup> argument for the thesis (the analogy argument)

Tickles, itches and pains are obviously things that exist only in us and not in the bodies that tickle, itch, or pain us.

We see that these sensations are produced in us by bodies moving over or penetrating our skin.

The bodies and the motions are nothing like the feelings they produce.

And the feelings themselves vary even when the bodies and motions are the same depending on what part of the body is touched.

But the other sensible qualities are like tickles, itches, and pains.

They are sensations that are only felt in certain organs.

So they, too, might arise from motion and contact rather than transmission of quality

## Problems with Galileo's second argument

We only think tickles and other tactile qualities exist in us to the extent that we consider them to be modes of pleasure or pain.

e.g., burns

We also think that things like visual after-images, tunes stuck in the head, ringing ears, etc. exist only in us

In all these cases, we carry the quality away with us after turning away from the body that caused it. That proves the qualities are in us.

But this is not true of warmth and cold, roughness & smoothness, smell, taste, or colour as normally experienced, when there is no damage to the sense organ or no particular pleasure or pain. In these cases we do not have the same reasons to suppose the qualities do not exist outside of us.

To claim that they do is just to float a conjecture.



### 3<sup>rd</sup> argument for the thesis (a further analogy)

All our tactile sensations, except for heat and cold, are obviously produced by an “earthy” object that moves to touch or penetrate the skin

It stands to reason that we should have similar sensitivities to fire, water, and air.

And in fact our sense organs can be accounted for in these terms:

a “watery” object mixes with the fluids on the tongue

a “firey” object sends particles up into the nasal passages

a percussion sends a wave of air to hit the ears

When we think in these terms, we discover a reason for something that was previously inexplicable

The theory is that it explains why our noses are higher on our faces than our mouths.

When a theory formulated for other purposes (explaining heat) turns out to explain some previously unnoticed or inexplicable regularity, that is a reason to think there might be something to it.

## Problems with Galileo's third argument

The comparison of the senses to the 4 elements is irrelevant to proving the thesis and only serves to draw out an analogy that functions as an illegitimate ground of assent (an idol of the tribe).

Except in the case of touch, and apart from the two experiments invoked to justify the theory of heat in particular, it is sheer speculation that the cause of the sensation is motion and impact of particles. It may "stand to reason" but reason ought not to be preferred to sense experience which says nothing to support this hypothesis.

## 4<sup>th</sup> argument for the thesis (the causal argument)

“I cannot believe that there exists in external bodies anything, other than their size, shape, or motion (slow or rapid), which could excite in us our tastes, sounds, and odours” (Matthews, 59)

If you accept that all change in nature is mechanically produced by the mechanical qualities of bodies,

then the same must be supposed to hold of the changes brought about in sentient creatures when they perceive bodies

Instead of being produced by similar qualities (e.g., of heat or colour) actually existing in bodies,

they must be produced by shape, size, motion, and collision

But if it is the mechanical qualities of bodies that cause our experience of their sensible qualities, then why would bodies nonetheless have sensible qualities?

Such qualities would have no purpose

## Problems with Galileo's 4<sup>th</sup> argument

It begs the question to ask us to accept that what causes our sensations of taste, sound, and odour is the size shape and motion of bodies.

This supposition gains all its force from the analogy with the case of touch, and the question-begging supposition that the only possible cause of change in nature is motion and impact.

The alternative view, that proximity of one object to another leads qualities in the one object to infect the other is equally credible.

## Further problems with the thesis

### The ontological problem

if sensible qualities do not exist in bodies, where do they exist?

(we can't say that they are nothing)

Galileo's answer:

they exist in the bodies of sentient creatures

Descartes's answer:

they exist in the minds of sentient creatures

## Problems with Galileo's answer

If they can exist in the bodies of sentient creatures, why not in other bodies as well?

What is it about the bodies of these creatures that makes them so special that they can take on a kind of quality no other body has?

If all bodies are just made up of perfectly homogeneous, shaped and moving parts, how could any of them come to have colour or fragrance or taste?

And if some of them could, why not others?

## Problems with Descartes's answer

It sounds odd to say that qualities like red and hot are qualities of minds rather than of bodies. Do minds become hot and red?

Colours have shape, size, position, motion and arrangement, just like material bodies. If colours are properties of minds, wouldn't minds need to have these qualities as well and so be just another kind of body? This lands us back with Galileo's problems.

On the other hand, if minds are radically distinct from bodies, how could they interact with bodies and be affected in any way by them?



## Problems with Galileo's thesis, cont.'d

### The sceptical problem

Few things are as obvious to ordinary sensory experience as that colours exist outside us on the surfaces of objects

and that heat resides in the warm body rather than stay in us when we move away from it

if this is not in fact so then our senses are subjecting us to a massive illusion

But then how could we trust them, or gain any knowledge at all?