



ARISTOTLE  
384-322 B.C.E.

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# PHYSICS

*PHUSIKA*  
*φυσικά*

GREEK: *PHUSIS*  
*φύσις*

LATIN: NATURA

"THE SCIENCE OF NATURE"

NATURE (= phusís / φύσις)

## PHYSICS II.1



192b9-23

MOTION / CHANGE  
(= KINĒSIS / κίνησις)

STATIONARINESS / REST  
(= STASIS / στασις)

ART

(= TECHNĒ / τεχνη)

(‘art’ in the  
generic sense  
of ‘craft’ or  
‘technique’)

### OF THINGS THAT EXIST, some exist by NATURE, some from other causes.

By **NATURE** the animals and their parts exist, and the plants and the simple bodies (earth, fire, air, water) – for we say that these and the like exist by nature.

All the things mentioned plainly differ from things which are *not* constituted by nature. For each of them has within itself a principle of MOTION [*i.e.*, CHANGE] and STATIONARINESS [*i.e.*, REST] (in respect of place, or of growth and decrease, or by way of alteration).

On the other hand a bed and a coat and anything else of that sort, *qua*\*receiving these designations – i.e., in so far as they are products of art – have no innate impulse to change.

But insofar as they happen to be composed of stone or of earth or of a mixture of the two, they *do* have such an impulse, and just to that extent – which seems to indicate that NATURE is a principle or cause of being moved and of being at rest in that to which it belongs primarily, in virtue of itself and not accidentally.

\* “*qua*” = Latin for ‘AS’  
now used to mean “insofar as it is”

# PHYSICS II.1



193b10 - 23

# 1

Nature = "primary underlying matter"

Some identify the **NATURE** or substance of a natural object with that immediate constituent of it which taken by itself is without arrangement, e.g. the wood is the nature of the bed, and the bronze is the nature of the statue....

This then is one account of nature, namely that it is the primary underlying **MATTER** of things which have in themselves a principle of motion or change.

But

Another account is that nature is the **SHAPE** or **FORM** which is specified in the definition (*logos*) of a thing.

# 2

✓ Nature = "shape or form"

For the word 'nature' is applied to what is according to nature and the natural in the same ways as 'art' (*technē*) is applied to what is artistic (*technikon*) or a work of art.

The **FORM** indeed is nature rather than the matter; for a thing is more properly said to be what it is when it exists in **ACTUALITY** than when it exists **POTENTIALLY**...

Again, **NATURE** in the sense of **COMING-TO-BE** proceeds towards nature. What grows *qua* growing grows from something into something. Into what then does it grow? Not into that from which it arose but into that **TO WHICH IT TENDS**. The shape then is nature.

(The word 'technikon' might be better translated as 'artful', instead of 'artistic.' It merely implies the presence of (deliberate) design, with no connotation of aesthetic value, etc. 'work of art' might be rendered as 'artifact,' or 'product of design'.)

actuality

↑  
potentiality

"...to which it tends"

## PHYSICS II.2



193b23 –  
194a15

Plato!



THE NEXT POINT to consider is how the MATHEMATICIAN differs from the student of NATURE; for NATURAL BODIES contain surfaces and volumes, lines, and points, and these are the subject-matter of MATHEMATICS....

Now the mathematician, though he too treats of these things, nevertheless does not treat of them as the limits of a natural body; nor does he consider the attributes indicated as the attributes of such bodies.

That is why he separates them; for in thought they are separable from motion, and it makes no difference, nor does any falsity result, if they are separated.

The holders of the THEORY OF FORMS do the same, though they are not aware of it; for they separate the objects of natural science, which are less separable than those of mathematics.

This becomes plain if one tries to state in each of the two cases the definitions of the things and of their attributes.

Odd and even, straight and curved, and likewise number, line, and figure, do not involve motion [*i.e.*, change]; not so flesh and bone and man—these are defined like snub nose, not like curved....

Since two sorts of thing are called nature, the FORM and the MATTER, we must investigate its objects as we would the essence of snubness, that is neither independently of matter nor in terms of matter only.

form in matter

# PHYSICS II.3



194b18 - 34

**Cause**  
= the 'why'

...[We] must proceed to consider **CAUSES**, their character and number.

Knowledge is the object of our inquiry, and men do not think they know a thing till they have grasped **THE 'WHY' OF IT**.

So clearly we must do this as regards both coming to be and passing away and every kind of natural change...

4 ways of citing cause:

"that out of which" (matter)

In one way, then, **THAT OUT OF WHICH** a thing comes to be and which persists is called a cause, e.g., the bronze of the statue, the silver of the bowl, and the genera of which the bronze and the silver are species.

1. "Material"

Form  
(account, or ordering of essence)

In another way, the **FORM** [eidos] or the archetype [paradeigma], i.e., the ~~definition~~ [logos] of the essence, and its genera, are called causes...

2. "Formal"

(LOGOS / λογος) = account, ordering

source of change  
(i.e., impetus)

Again, the primary **SOURCE** of the **CHANGE** or **REST**; e.g., the man who deliberated is a cause, the father is the cause of the child, and generally that makes of what is made and what changes of what is changed.

3. "Efficient"

'that for the sake of which' = **END**

IN GREEK,

"TELOS" (ΤΕΛΟΣ)

Again, in the sense of the **END** [telos] or **THAT FOR THE SAKE OF WHICH** a thing is done, e.g., health is the cause of walking about

4. "Final"

'TELEOLOGY' is a term used by philosophers for "final" causation



## PHYSICS II.8



198b10 –  
199a8

1. Things either are  
(merely) due to coincidence,  
or for sake of something

2. things that come to be  
regularly cannot be  
merely coincidental,  
so they must be for the  
sake of something

3. Natural things come to  
be regularly

4. ∴ natural things come to  
be and are the sake of  
something (i.e., are  
teleological.)

**A DIFFICULTY PRESENTS ITSELF:** why should nature not work, not for the sake of something, nor because it is better so, but just as the sky rains, not in order to make the corn grow, but of **NECESSITY**?

...If a man's crop is spoiled on the threshing-floor, the rain did not fall for the sake of this – in order that the crop might be spoiled – but that result just followed.

Why then should this not be the same with the parts of nature, e.g., that our teeth should come up by necessity – the front teeth sharp, fitted for tearing, the molars broad and useful for grinding down food – since they did not arise for this end, but it was merely a coincident result; and so with all parts in which we suppose there is a purpose?

...Yet it is impossible that this should be the true view. For teeth and all other natural things either invariably or for the most part come about in a given way; but of not one of the results of chance or spontaneity is this true....

If, then, it is agreed that things are either the results of coincidence or for the sake of something, and these cannot be the result of coincidence or spontaneity, it follows that they must be for the sake of something; and that such things are all due to nature even the champions of the theory which is before us would agree.

Therefore, action for an end is present in things which come to be and are by nature.

## PHYSICS II.8



199a9 - 32

...**WHERE** there there is **AN END**, all preceding steps are for the sake of that. Now surely as in **ACTION**, so in **NATURE**; and as in nature, so it is in each action, if nothing interferes. Now **ACTION** is for the sake of an **END**; therefore the **NATURE** of things also is so.

Thus if a house, e.g., had been a thing made by NATURE, it would have been made in the same way as it is now by ART; and if things made by nature were made not only by nature but also by art, they would come to be in the same way as by nature. The one, then, is for the sake of the other, and generally ART in some cases COMPLETES what NATURE cannot bring to a finish, and in others IMITATES nature. If, therefore, artificial products are for the sake of an end, so clearly also are natural products....

This is most obvious in the animals other than man: they make things neither by art nor after inquiry or deliberation... By gradual advance in this direction we come to see clearly that in plants too that is produced which is conducive to the end – leaves, e.g. grow to provide shade for the fruit.

If then it is both by nature and for an end that the swallow makes its nest and the spider its web, and plants grow leaves for the sake of the fruit and send their roots down (not up) for the sake of nourishment, it is plain that this kind of cause is operative in things which come to be and are by nature.

And since nature is twofold, the matter and the form, of which the latter is the end, and since all the rest is for the sake of the end, the form must be the cause in the sense of that for the sake of which.

1. nature is matter + form
2. the FORM is the end
3. the rest is for sake of the end
4. ∴ the form is the final cause