6th Grade Textbook Packet

3/30/2020-4/3/2020

Monday, March 30 and **Tuesday, March 31**

"Dictionary of Geographic Terms" (pg. 24 in textbook)

DICTIONARY OF GEOGRAPHIC TERMS

The list below includes important geographic terms and their definitions. All of these terms are illustrated on the diagram.

1. **bay** part of a body of water that is partly enclosed by land
2. **cape** narrow point of land that extends into a body of water
3. **coast** land that borders the sea or an ocean
4. **delta** area formed by soil deposited at the mouth of a river
5. **divide** ridge that separates rivers that flow in one direction from those that flow in the opposite direction
6. **hill** area of raised land that is lower and more rounded than a mountain
7. **isthmus** narrow strip of land joining two large land areas or joining a peninsula to a mainland
8. **lake** body of water surrounded by land
9. **mountain** high, steep, rugged land area that rises sharply above the surrounding land
10. **mouth of a river** place where a river empties into a larger body of water
11. **peninsula** piece of land that is surrounded by water on three sides
12. **plain** broad area of fairly level land that is usually close to sea level
13. **plateau** large area of high land that is flat or gently rolling
14. **river** large stream of water that empties into an ocean, a lake, or another river
15. **river valley** land drained or watered by a river
16. **source of a river** place where a river begins
17. **strait** narrow channel that connects two larger bodies of water
18. **tributary** stream or small river that flows into a larger stream or river

Wednesday, April 1

"Skill Lesson 1-- Reading a Map: East and Southeast Asia" (pg. 48)

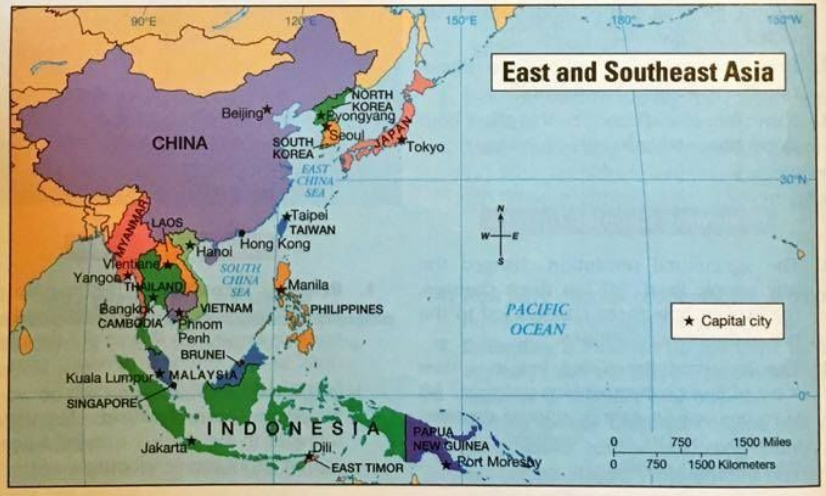
SKILL LESSON 1

Reading a Map: East and Southeast Asia

Maps can be useful tools in learning about the world and its people. Some maps show physical features such as oceans, rivers, and mountains. Others provide information about people, such as how they use the land and where they live.

To read a map, it is important to look at all its parts. Most maps have a title, key, scale, directional arrow, and lines of latitude and longitude. Use the following steps to read the map below.

1. **Scan the map carefully to find out what information it contains.** The title tells you the subject of the map. The key explains what the symbols or colors on the map represent. **(a)** What is the title of this map? **(b)** List the countries labeled on the map. **(c)** Which of the world's oceans do most of the nations on this map border? **(d)** What do the stars on the map symbolize? **(e)** What is the capital of Malaysia?
2. **Practice reading distances on the map.** The scale tells you the actual distance in miles and kilometers between places on the map. **(a)** About how far in miles is it from Bangkok to Jakarta? **(b)** In kilometers?
3. **Study the map to read directions.** The directional arrow shows which way is north, south, east, and west. **(a)** Which East and Southeast Asian nations are west of Japan? **(b)** In which direction is Singapore from the Philippines?
4. **Locate places on the map using map coordinates.** The horizontal lines on the map are called lines of latitude. Each line of latitude is numbered in degrees north or south of the Equator. The vertical lines on the map are called lines of longitude. Each of these lines is numbered in degrees east or west of the Prime Meridian. Latitude and longitude are helpful in locating places on a map. **(a)** Which capital is located at 35°N/139°E? **(b)** Where is Phnom Penh located?

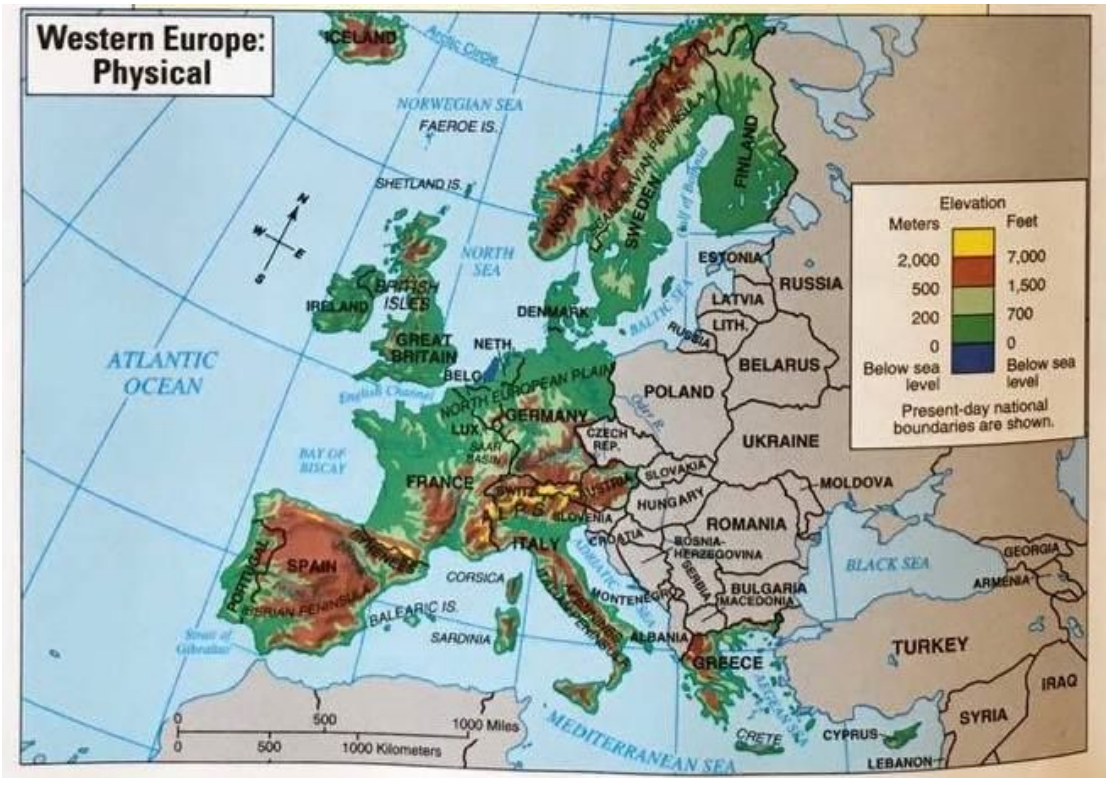


Wednesday, April 1 and **Thursday, April 2**

Map of the Middle East and North Africa (pg. 549)

Friday, April 3

Map of Western Europe (pg. 640)



CAMBRIDGE
LATIN COURSE

Unit 1

Fifth Edition

THERMAE

Stage 9

About the language

1 Study the following examples:

Clēmēns **puellae** vīnum offerēbat.
*Clemens was offering wine **to the girl**.*

iuvenis **servō** pecūniam trādidit.
*The young man handed over money **to the slave**.*

dominus **mercātōrī** statuam ēmit.
*The master bought a statue **for the merchant**.*

Grumiō **ancillīs** cēnam parāvit.
*Grumio prepared a dinner **for the slave girls**.*

Quīntus **amīcīs** discum ostendit.
*Quintus showed the discus **to his friends**.*

servī **leōnibus** cibum dedērunt.
*The slaves gave food **to the lions**.*

The Latin words in **boldface** are nouns in the **dative case**.

2 You have now met three cases. Notice the different ways in which they are used:

nominative **servus** dormiēbat.
***The slave** was sleeping.*

dative dominus **servō** signum dedit.
*The master gave a sign **to the slave**.*

accusative dominus **servum** excitāvit
*The master woke **the slave**.*

About the language

3 Here is a full list of the noun endings that you have met.
The new dative cases are in **boldface**.

		first declension	*second declension*	*third declension*
SINGULAR	*nominative*	puella	servus	mercātor
	dative	**puellae**	**servō**	**mercātōrī**
	accusative	puellam	servum	mercātōrem
PLURAL	*nominative*	puellae	servī	mercātōrēs
	dative	**puellīs**	**servīs**	**mercātōribus**
	accusative	puellās	servōs	mercātōrēs

4 Further examples:

a ancilla dominō cibum ostendit.
b agricola uxōrī ānulum ēmit.
c servus Metellae togam trādidit.
d mercātor gladiātōribus pecūniam offerēbat.
e fēmina ancillīs tunicās quaerēbat.

5 Notice the different cases of the words for "I" and "you":

nominative	ego	tū
dative	mihi	tibi
accusative	mē	tē

ego senem salūtō.
senex **mihi** statuam ostendit.
senex **mē** salūtat.

__I__ greet the old man.
*The old man shows a statue **to me**.*
*The old man greets **me**.*

tū pictūram pingis.
āthlēta **tibi** pecūniam dat.
āthlēta **tē** laudat.

__You__ are painting a picture.
*The athlete gives money **to you**.*
*The athlete praises **you**.*

in tabernā

Metella et Melissa ē vīllā māne discessērunt. Metella fīliō togam quaerēbat. Metella et ancilla, postquam forum intrāvērunt, tabernam cōnspexērunt, ubi togae optimae erant. multae fēminae erant in tabernā. servī fēminīs stolās ostendēbant. duo gladiātōrēs quoque in tabernā erant. servī gladiātōribus tunicās ostendēbant.

mercātor in mediā tabernā stābat. mercātor erat Marcellus. Marcellus, postquam Metellam vīdit, rogāvit,

"quid quaeris, domina?"

"togam quaerō," inquit Metella. "ego fīliō dōnum quaerō, quod diem nātālem celebrat."

"ego multās togās habeō," respondit mercātor.

mercātor servīs signum dedit. servī mercātōrī togās celeriter trādidērunt. Marcellus fēminīs togās ostendit. Metella et ancilla togās īnspexērunt.

"hercle!" clāmāvit Melissa. "hae togae sunt sordidae."

Marcellus servōs vituperāvit.

"sunt intus togae splendidae," inquit Marcellus.

Marcellus fēminās intus dūxit. mercātor fēminīs aliās togās ostendit. Metella Quīntō mox togam splendidam ēlēgit.

"haec toga, quantī est?" rogāvit Metella.

"quīnquāgintā dēnāriōs cupiō," respondit Marcellus.

"quīnquāgintā dēnāriōs cupis! furcifer!" clāmāvit Melissa. "ego tibi decem dēnāriōs offerō."

"quadrāgintā dēnāriōs cupiō," respondit mercātor.

"tibi quīndecim dēnāriōs offerō," inquit ancilla.

"quid? haec est toga pulcherrima! quadrāgintā dēnāriōs cupiō," respondit Marcellus.

"tū nimium postulās," inquit Metella. "ego tibi trīgintā dēnāriōs dō."

"cōnsentiō," respondit Marcellus.

Melissa Marcellō pecūniam dedit. Marcellus Metellae togam trādidit.

"ego tibi grātiās maximās agō, domina," inquit Marcellus.

māne *in the morning*
togam *toga*

domina *my lady, ma'am*
dōnum *present, gift*
hae togae *these togas*
sordidae *dirty*
intus *inside*
aliās *other*
ēlēgit *chose*
haec *this*
quantī est? *how much is it?*
quīnquāgintā dēnāriōs *fifty denarii*
cupiō *I want*
decem *ten*
quadrāgintā *forty*
quīndecim *fifteen*
pulcherrima *very beautiful*
nimium *too much*
trīgintā *thirty*
cōnsentiō *I agree*
ego tibi grātiās maximās agō *I thank you very much*

A fabric shop.

Practicing the language

1 Complete each sentence with the verb that makes good sense.
Then translate the sentence, taking care with the different forms of the noun.

For example mercātōrēs fēminīs tunicās . . . . . (audīvērunt, ostendērunt, timuērunt)
mercātōrēs fēminīs tunicās **ostendērunt**.
The merchants showed the tunics to the women.

a ancilla dominō vīnum . . . . . (timuit, dedit, salūtāvit)
b iuvenis puellae stolam . . . . . (ēmit, vēnit, prōcessit)
c fēminae servīs tunicās . . . . . (intrāvērunt, quaesīvērunt, contendērunt)
d cīvēs āctōrī pecūniam . . . . . (laudāvērunt, vocāvērunt, trādidērunt)
e centuriō mercātōribus decem dēnāriōs . . . . . (trādidit, ēmit, vīdit)

2 Complete each sentence with the correct form of the verb. Then translate the sentence.

For example gladiātor amīcīs togam . . . . . (ostendit, ostendērunt)
gladiātor amīcīs togam **ostendit**.
The gladiator showed the toga to his friends.

a puella gladiātōribus tunicās . . . . . (dedit, dedērunt)
b cīvēs Milōnī statuam . . . . . (posuit, posuērunt)
c mercātor amīcō vīnum . . . . . (trādidit, trādidērunt)
d coquus ancillae ānulum . . . . . (ēmit, ēmērunt)
e Clēmēns et Grumiō Metellae cēnam optimam . . . . . (parāvit, parāvērunt)

3 This exercise is based on the story **in tabernā**, opposite. Read the story again.
Write out each sentence, completing it with the correct noun or phrase. Then translate the sentence.

a Metella . . . . . ad forum ambulāvit. (cum Quīntō, cum Grumiōne, cum Melissā)
b postquam forum intrāvērunt, ... cōnspexērunt. (portum, tabernam, vīllam)
c Metella gladiātōrēs et . . . . . in tabernā vīdit. (āctōrēs, fēminās, centuriōnēs)
d servī fēminīs . . . . . ostendēbant. (tunicās, stolās, togās)
e servī gladiātōribus . . . . . ostendēbant. (togās, stolās, tunicās)
f mercātor servīs . . . . . dedit. (signum, togam, gladium)
g servī mercātōrī . . . . . trādidērunt. (togam, togās, stolās)
h mercātor . . . . . vituperāvit, quod togae erant sordidae. (gladiātōrēs, fēminās, servōs)

The baths

About the middle of the afternoon, Caecilius would make his way, with a group of friends, to the public baths. The great majority of Pompeians did not have bathrooms in their houses, so they went regularly to the public baths to keep themselves clean. As at a leisure center, city pool, or health club today, they could also take exercise, meet friends, and have a snack. Let us imagine that Caecilius decides to visit the baths situated just to the north of the forum, and let us follow him through the various rooms and activities.

At one of the entrances, he pays a small admission fee to the doorkeeper and then goes to the **palaestra** (exercise area). This is an open space surrounded by a colonnade, rather like a large peristylium. Here he spends a little time greeting other friends and taking part in some of the popular exercises, which included throwing a large ball from one to another, wrestling, and fencing with wooden swords. These games were not taken too seriously but were a pleasant preparation for the bath which followed.

From the palaestra, Caecilius and his friends walk along a passage into a large hall known as the **apodytērium** (changing room). Here they undress and hand their clothes to one of the slave attendants who places them in recesses arranged in rows along the wall.

Leaving the apodyterium, they pass through an arched doorway into the **tepidārium** (warm room) and spend a little time sitting on benches round the wall in a warm, steamy atmosphere, perspiring gently and preparing for the higher temperatures in the next room.

This is the **caldārium** (hot room). At one end of the caldarium there was a large marble bath, rectangular in shape, and stretching across the full width of the room. This bath was filled with hot water in which the bathers sat or wallowed. The Romans did not have soap, but used olive oil instead. After soaking in the bath, Caecilius summons a slave to rub him down with the oil that he has brought with him in a little pot. For this rubbing down, Caecilius lies on a marble slab while the slave works the oil into his skin, and then gently removes it and the dirt with a blunt metal scraper known as a **strigil**. Next comes the masseur to massage skin and muscles. Refreshed by this treatment, Caecilius then goes to the large stone basin at the other end of the caldarium for a rinse down with cold water.

A visit to the baths

These pictures show us one route which a bather might take through the baths after he leaves the palaestra.

They are taken from several different sets of baths, as no one set has all its rooms well preserved today.

1 The entrance hall with the apodyterium beyond.
Stabian Baths, Pompeii.

2 The tepidarium. This sometimes had recesses for clothes like the apodyterium.
Forum Baths, Pompeii.

3 The hot tub in the caldarium.
Herculaneum.

Strigils and oil bottles.

4 The caldarium, showing a marble bench for sitting or massage.
Herculaneum.

5 The frigidarium: cold plunge bath.
Forum Baths, Pompeii.

in apodytēriō

duo servī in apodytēriō stant. servī sunt Sceledrus et Anthrāx.

Sceledrus: cūr nōn labōrās, Anthrāx? num dormīs?
Anthrāx: quid dīcis? dīligenter labōrō. ego cīvibus togās custōdiō.
Sceledrus: togās custōdīs? mendāx es!
Anthrāx: cūr mē vituperās? mendāx nōn sum. togās custōdiō.
Sceledrus: tē vituperō, quod fūr est in apodytēriō, sed tū nihil facis.
Anthrāx: ubi est fūr? fūrem nōn videō.
Sceledrus: ecce! homō ille est fūr. fūrem facile agnōscō. *(Sceledrus Anthrācī fūrem ostendit. fūr togam suam dēpōnit et togam splendidam induit. servī ad fūrem statim currunt.)*
Anthrāx: quid facis? furcifer! haec toga nōn est tua!
fūr: mendāx es! mea est toga! abī!
Sceledrus: tē agnōscō! pauper es, sed togam splendidam geris. *(mercātor intrat. togam frūstrā quaerit.)*
mercātor: ēheu! ubi est toga mea? toga ēvānuit! *(mercātor circumspectat.)* ecce! hic fūr togam meam gerit!
fūr: parce! parce! pauperrimus sum … uxor mea est aegra … decem līberōs habeō …

mercātor et servī fūrem nōn audiunt, sed eum ad iūdicem trahunt.

This mosaic of a squid is in an apodyterium in Herculaneum.

in apodytēriō *in the changing room*

num dormīs? *surely you are not asleep?*

suam *his*
induit *is putting on*

abī! *go away!*
pauper *poor*
geris *you are wearing*

parce! *have pity on me! spare me!*
pauperrimus *very poor*
aegra *sick, ill*
līberōs *children*
audiunt *listen to*

An apodyterium (changing room) in the women's section of the Stabian Baths at Pompeii.

The caldarium (hot room) in the Forum Baths, Pompeii. At the nearer end note the large rectangular marble bath, which was filled with hot water. At the far end there is a stone basin for cold water. Rooms in baths often had grooved, curved ceilings to channel condensation down the walls.

Before dressing again he might well visit the frigidārium (cold room) and there take a plunge in a deep circular pool of unheated water, followed by a brisk rub down with his towel.

Metella, too, would have visited public baths. Some baths had a separate suite of rooms for the use of female bathers; others may have given access to men and women at different times, or may have allowed mixed bathing. We do not know whether women were allowed to exercise in the palaestra. In the Forum and Stabian Baths, where separate facilities for men and women existed, those for the women were smaller, and had a pool of cold water in the apodyterium rather than a separate frigidarium. The smaller facilities may be an indication that fewer women attended the baths, or that women attended less regularly than men. Alternatively, it may indicate that women's needs were regarded as less important than those of men.

A visit to the baths was a leisurely social occasion. Men and women enjoyed a noisy, relaxed time in the company of friends. The Roman writer Seneca lived uncomfortably close to a set of baths in Rome and his description gives us a vivid impression of the atmosphere there:

> **I am surrounded by uproar. I live over a set of baths. Just imagine the babel of sounds that strikes my ears. When the athletic gentlemen below are exercising themselves, lifting lead weights, I can hear their grunts. I can hear the whistling of their breath as it escapes from their lungs. I can hear somebody enjoying a cheap rub down and the smack of the masseur's hands on his shoulders. If his hand comes down flat, it makes one sound; if it comes down hollowed, it makes another. Add to this the noise of a brawler or thief being arrested down below, the racket made by the man who likes to sing in his bath, or the sound of enthusiasts who hurl themselves into the water with a tremendous splash. Next I can hear the screech of the hair plucker, who advertises himself by shouting. He is never quiet except when he is plucking hair and making his victim shout instead. Finally, just imagine the cries of the cake seller, the sausage man, and the other food sellers as they advertise their goods round the bath, all adding to the din.**

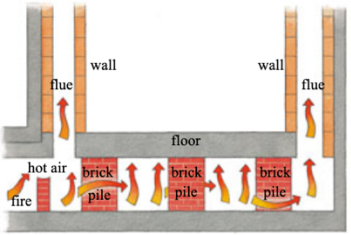
A bronze statue of a boxer from a set of baths in Rome. His training would no doubt have contributed to the din about which Seneca complains.

Heating the baths

The Romans were not the first people to build public baths. This was one of the many things they learned from the Greeks. But with their engineering skill the Romans greatly improved the methods of heating them. The previous method had been to heat the water in tanks over a furnace and to stand braziers (portable metal containers in which wood was burned) in the tepidarium and the caldarium to keep up the air temperature. The braziers were not very efficient and they failed to heat the floor.

In the first century BC, a Roman invented the first central heating system. The furnace was placed below the floor level; the floor was supported on small brick piles leaving space through which hot air from the furnace could circulate. In this way, the floor was warmed from below. The hot bath was placed near the furnace and a steady temperature was maintained by the hot air passing immediately below. Later, flues (channels) were built into the walls and warm air from beneath the floor was drawn up through them. This ingenious heating system was known as a **hypocaust**. It was used not only in baths but also in private houses, particularly in the colder parts of the Roman empire. Many examples have been found in Britain. Wood was the fuel most commonly burned in the furnaces.

Hypocaust in the Stabian Baths. Notice the floor suspended on brick piles, so that hot air can circulate beneath and warm both the room and the tank of water for bathing.

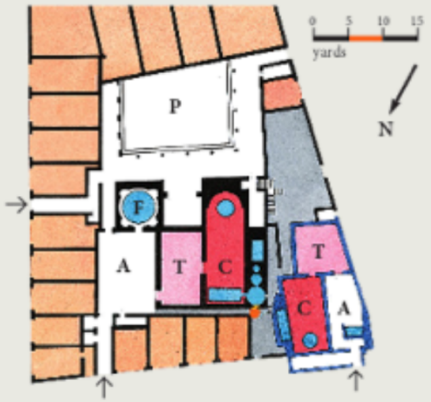


A hypocaust viewed from the side.

Plan of the Forum Baths, Pompeii

The men's section is outlined in black and the women's in blue. See how the hottest rooms (red) in both suites are arranged on either side of the one furnace (marked by an orange dot). The blue circles near this are boilers. After losing some heat to the hot rooms the hot air goes on to warm the warm rooms (pink).

Key:
P: palaestra
A: apodytērium
T: tepidārium
C: caldārium
F: frigidārium
The small arrows mark public entrances.
The orange spaces are shops.



Vocabulary checklist 9

agnōscit: agnōvit	*recognizes*
celeriter	*quickly*
cupit: cupīvit	*wants*
dat: dedit	*gives*
diēs	*day*
ēmittit: ēmīsit	*throws, sends out*
fert: tulit	*brings, carries*
homō	*human being, man*
hospes	*guest*
ille	*that*
īnspicit: īnspexit	*looks at, examines*
iterum	*again*
manet: mānsit	*remains, stays*
medius	*middle*
mox	*soon*
offert: obtulit	*offers*
ostendit: ostendit	*shows*
post	*after*
prōcēdit: prōcessit	*proceeds, advances*
pulcher	*beautiful*
revenit: revēnit	*comes back, returns*
trādit: trādidit	*hands over*

The floors of baths often had marine themes. This mosaic of an octopus is in the women's baths at Herculaneum.

KENNETH GRAHAME

The Wind in the Willows

Introduction and Notes by
GILLIAN AVERY

PENGUIN BOOKS

I

THE RIVER BANK

The Mole had been working very hard all the morning, spring-cleaning his little home. First with brooms, then with dusters; then on ladders and steps and chairs, with a brush and a pail of whitewash; till he had dust in his throat and eyes, and splashes of whitewash all over his black fur, and an aching back and weary arms. Spring was moving in the air above[1] and in the earth below and around him, penetrating even his dark and lowly little house with its spirit of divine discontent and longing. It was small wonder, then, that he suddenly flung down his brush on the floor, said "Bother!" and "O blow!" and also "Hang spring-cleaning!" and bolted out of the house without even waiting to put on his coat. Something up above was calling him imperiously, and he made for the steep little tunnel which answered in his case to the gravelled carriage-drive owned by animals whose residences are nearer to the sun and air. So he scraped and scratched and scrabbled and scrooged and then he scrooged again and scrabbled and scratched and scraped, working busily with his little paws and muttering to himself, "Up we go! Up we go!" till at last, pop! his snout came out into the sunlight, and he found himself rolling in the warm grass of a great meadow.

"This is fine!" he said to himself. "This is better than whitewashing!" The sunshine struck hot on his fur, soft breezes caressed his heated brow, and after the seclusion of the cellarage he had lived in so long the carol of happy birds fell on his dulled hearing almost like a shout. Jumping off all his four legs at once, in the joy of living and the delight of spring without its cleaning, he pursued his way across the meadow till he reached the hedge on the further side.

"Hold up!" said an elderly rabbit at the gap. "Sixpence for the privilege of passing by the private road!" He was bowled over in an instant by the impatient and contemptuous Mole, who trotted along the side of the hedge chaffing the other rabbits as they peeped hurriedly from their holes to see what the row was about. "Onion-sauce! Onion-sauce!" he remarked jeeringly, and was gone before they could think of a thoroughly satisfactory reply. Then they all started grumbling at each other. "How *stupid* you are! Why didn't you tell him——" "Well, why didn't *you* say——" "You might have reminded him——" and so on, in the usual way; but, of course, it was then much too late, as is always the case.

It all seemed too good to be true. Hither and thither through the meadows he rambled busily, along the hedgerows, across the copses, finding everywhere birds building, flowers budding, leaves thrusting—everything happy, and progressive, and occupied. And instead of having an uneasy conscience pricking him and whispering "whitewash!" he somehow could only feel how jolly it was to be the only idle dog among all these busy citizens. After all, the best part of a holiday is perhaps not so much to be resting yourself, as to see all the other fellows busy working.

He thought his happiness was complete when, as he meandered aimlessly along, suddenly he stood by the edge of a full-fed river. Never in his life had he seen a river before—this sleek, sinuous, full-bodied animal, chasing and chuckling, gripping things with a gurgle and leaving them with a laugh, to fling itself on fresh playmates that shook themselves free, and were caught and held again. All was a-shake and a-shiver—glints and gleams and sparkles, rustle and swirl, chatter and bubble. The Mole was bewitched, entranced, fascinated. By the side of the river he trotted as one trots, when very small, by the side of a man who holds one spell-bound by exciting stories; and when tired at last, he sat on the bank, while the river still chattered on to him, a babbling procession of the best stories in the world, sent from the heart of the earth to be told at last to the insatiable sea.

As he sat on the grass and looked across the river, a dark hole in the bank opposite, just above the water's edge, caught his

eye, and dreamily he fell to considering what a nice snug dwelling-place it would make for an animal with few wants and fond of a bijou riverside residence, above flood level and remote from noise and dust. As he gazed, something bright and small seemed to twinkle down in the heart of it, vanished, then twinkled once more like a tiny star. But it could hardly be a star in such an unlikely situation; and it was too glittering and small for a glow-worm. Then, as he looked, it winked at him, and so declared itself to be an eye; and a small face began gradually to grow up round it, like a frame round a picture.

A brown little face, with whiskers.[2]

A grave round face, with the same twinkle in its eye that had first attracted his notice.

Small neat ears and thick silky hair.

It was the Water Rat!

Then the two animals stood and regarded each other cautiously.

"Hullo, Mole!" said the Water Rat.

"Hullo, Rat!" said the Mole.

"Would you like to come over?" inquired the Rat presently.

"Oh, it's all very well to *talk*," said the Mole, rather pettishly, he being new to a river and riverside life and its ways.

The Rat said nothing, but stooped and unfastened a rope and hauled on it; then lightly stepped into a little boat which the Mole had not observed. It was painted blue outside and white within, and was just the size for two animals; and the Mole's whole heart went out to it at once, even though he did not yet fully understand its uses.

The Rat sculled smartly across and made fast. Then he held up his forepaw as the Mole stepped gingerly down. "Lean on that!" he said. "Now then, step lively!" and the Mole to his surprise and rapture found himself actually seated in the stern of a real boat.

"This has been a wonderful day!" said he, as the Rat shoved off and took to the sculls again. "Do you know, I've never been in a boat before in all my life."

"What?" cried the Rat, open-mouthed: "Never been in a—you never—well I—what have you been doing, then?"

"Is it so nice as all that?" asked the Mole shyly, though he was quite prepared to believe it as he leant back in his seat and surveyed the cushions, the oars, the rowlocks, and all the fascinating fittings, and felt the boat sway lightly under him.

"Nice? It's the *only* thing," said the Water Rat solemnly, as he leant forward for his stroke. "Believe me, my young friend, there is *nothing*—absolute nothing—half so much worth doing as simply messing about in boats. Simply messing," he went on dreamily: "messing—about—in—boats; messing——"

"Look ahead, Rat!" cried the Mole suddenly.

It was too late. The boat struck the bank full tilt. The dreamer, the joyous oarsman, lay on his back at the bottom of the boat, his heels in the air.

"—about in boats—or *with* boats," the Rat went on composedly, picking himself up with a pleasant laugh. "In or out of 'em, it doesn't matter. Nothing seems really to matter, that's the charm of it. Whether you get away, or whether you don't; whether you arrive at your destination or whether you reach somewhere else, or whether you never get anywhere at all, you're always busy, and you never do anything in particular; and when you've done it there's always something else to do, and you can do it if you like, but you'd much better not. Look here! If you've really nothing else on hand this morning, supposing we drop down the river together, and have a long day of it?"

The Mole waggled his toes from sheer happiness, spread his chest with a sigh of full contentment, and leaned back blissfully into the soft cushions. "*What* a day I'm having!" he said. "Let us start at once!"

"Hold hard a minute, then!" said the Rat. He looped the painter through a ring in his landing-stage, climbed up into his hole above, and after a short interval reappeared staggering under a fat, wicker luncheon-basket.

"Shove that under your feet," he observed to the Mole, as he passed it down into the boat. Then he untied the painter and took the sculls again.

"What's inside it?" asked the Mole, wriggling with curiosity.

"There's cold chicken inside it," replied the Rat briefly;

"coldtonguecoldhamcoldbeefpickledgherkinssaladfrenchrolls cresssandwichespottedmeatgingerbeerlemonadesodawater——"

"O stop, stop," cried the Mole in ecstasies: "This is too much!"

"Do you really think so?" inquired the Rat seriously. "It's only what I always take on these little excursions; and the other animals are always telling me that I'm a mean beast and cut it *very* fine!"

The Mole never heard a word he was saying. Absorbed in the new life he was entering upon, intoxicated with the sparkle, the ripple, the scents and the sounds and the sunlight, he trailed a paw in the water and dreamed long waking dreams. The Water Rat, like the good little fellow he was, sculled steadily on and forebore to disturb him.

"I like your clothes awfully, old chap," he remarked after some half an hour or so had passed. "I'm going to get a black velvet smoking-suit myself some day, as soon as I can afford it."

"I beg your pardon," said the Mole, pulling himself together with an effort. "You must think me very rude; but all this is so new to me. So—this—is—a—River!"

"*The* River," corrected the Rat.

"And you really live by the river? What a jolly life!"

"By it and with it and on it and in it," said the Rat. "It's brother and sister to me, and aunts, and company, and food and drink, and (naturally) washing. It's my world, and I don't want any other. What it hasn't got is not worth having, and what it doesn't know is not worth knowing. Lord! the times we've had together! Whether in winter or summer, spring or autumn, it's always got its fun and its excitements. When the floods are on in February, and my cellars and basement are brimming with drink that's no good to me, and the brown water runs by my best bedroom window; or again when it all drops away and shows patches of mud that smells like plum-cake, and the rushes and weed clog the channels, and I can potter about dry shod over most of the bed of it and find fresh food to eat, and things careless people have dropped out of boats!"

"But isn't it a bit dull at times?" the Mole ventured to ask. "Just you and the river, and no one else to pass a word with?"

"No one else to—well, I mustn't be hard on you," said the Rat with forbearance. "You're new to it, and of course you don't know. The bank is so crowded nowadays that many people are moving away altogether: O no, it isn't what it used to be, at all. Otters, kingfishers, dabchicks, moorhens, all of them about all day long and always wanting you to *do* something—as if a fellow had no business of his own to attend to!"

"What lies over *there?*" asked the Mole, waving a paw towards a background of woodland that darkly framed the water-meadows on one side of the river.

"That? O, that's just the Wild Wood," said the Rat shortly. "We don't go there very much, we river-bankers."

"Aren't they—aren't they very *nice* people in there?" said the Mole, a trifle nervously.

"W-e-ll," replied the Rat, "let me see. The squirrels are all right. *And* the rabbits—some of 'em, but rabbits are a mixed lot. And then there's Badger, of course. He lives right in the heart of it; wouldn't live anywhere else, either, if you paid him to do it. Dear old Badger! Nobody interferes with *him*. They'd better not," he added significantly.

"Why, who *should* interfere with him?" asked the Mole.

"Well, of course—there—are others," explained the Rat in a hesitating sort of way. "Weasels—and stoats—and foxes—and so on. They're all right in a way—I'm very good friends with them—pass the time of day when we meet, and all that—but they break out sometimes, there's no denying it, and then—well, you can't really trust them, and that's the fact."

The Mole knew well that it is quite against animal-etiquette to dwell on possible trouble ahead, or even to allude to it; so he dropped the subject.

"And beyond the Wild Wood again?" he asked: "Where it's all blue and dim, and one sees what may be hills or perhaps they mayn't, and something like the smoke of towns, or is it only cloud-drift?"

"Beyond the Wild Wood comes the Wide World," said the Rat. "And that's something that doesn't matter, either to you or me. I've never been there, and I'm never going, nor you either, if you've got any sense at all. Don't ever refer to it again, please. Now then! Here's our backwater at last, where we're going to lunch."

Leaving the main stream, they now passed into what seemed at first sight like a little land-locked lake. Green turf sloped down to either edge, brown snaky tree-roots gleamed below the surface of the quiet water, while ahead of them the silvery shoulder and foamy tumble of a weir, arm-in-arm with a restless dripping mill-wheel, that held up in its turn a grey-gabled mill-house, filled the air with a soothing murmur of sound, dull and smothery, yet with little clear voices speaking up cheerfully out of it at intervals. It was so very beautiful that the Mole could only hold up both forepaws and gasp, "O my! O my! O my!"

The Rat brought the boat alongside the bank, made her fast, helped the still awkward Mole safely ashore, and swung out the luncheon-basket. The Mole begged as a favour to be allowed to unpack it all by himself; and the Rat was very pleased to indulge him, and to sprawl at full length on the grass and rest, while his excited friend shook out the table-cloth and spread it, took out all the mysterious packets one by one and arranged their contents in due order, still gasping, "O my! O my!" at each fresh revelation. When all was ready, the Rat said, "Now, pitch in, old fellow!" and the Mole was indeed very glad to obey, for he had started his spring-cleaning at a very early hour that morning, as people *will* do, and had not paused for bite or sup; and he had been through a very great deal since that distant time which now seemed so many days ago.

"What are you looking at?" said the Rat presently, when the edge of their hunger was somewhat dulled, and the Mole's eyes were able to wander off the table-cloth a little.

"I am looking," said the Mole, "at a streak of bubbles that I see travelling along the surface of the water. That is a thing that strikes me as funny."

"Bubbles? Oho!" said the Rat, and chirruped cheerily in an inviting sort of way.

A broad glistening muzzle showed itself above the edge of the bank, and the Otter hauled himself out and shook the water from his coat.

"Greedy beggars!" he observed, making for the provender. "Why didn't you invite me, Ratty?"

"This was an impromptu affair," explained the Rat. "By the way—my friend Mr. Mole."

"Proud, I'm sure," said the Otter, and the two animals were friends forthwith.

"Such a rumpus everywhere!" continued the Otter. "All the world seems out on the river to-day. I came up this backwater to try and get a moment's peace, and then stumble upon you fellows!—At least—I beg pardon—I don't exactly mean that, you know."

There was a rustle behind them, proceeding from a hedge wherein last year's leaves still clung thick, and a stripy head, with high shoulders behind it, peered forth on them.

"Come on, old Badger!" shouted the Rat.

The Badger trotted forward a pace or two; then grunted, "H'm! Company," and turned his back and disappeared from view.

"That's *just* the sort of fellow he is!" observed the disappointed Rat. "Simply hates Society! Now we shan't see any more of him to-day. Well, tell us, *who's* out on the river?"

"Toad's out, for one," replied the Otter. "In his brand-new wager-boat;[3] new togs, new everything!"

The two animals looked at each other and laughed.

"Once, it was nothing but sailing," said the Rat. "Then he tired of that and took to punting. Nothing would please him but to punt all day and every day, and a nice mess he made of it. Last year it was house-boating, and we all had to go and stay with him in his house-boat, and pretend we liked it. He was going to spend the rest of his life in a house-boat. It's all the same, whatever he takes up; he gets tired of it, and starts on something fresh."

"Such a good fellow, too," remarked the Otter reflectively: "But no stability—especially in a boat!"

From where they sat they could get a glimpse of the main stream across the island that separated them; and just then a wager-boat flashed into view, the rower—a short, stout figure—splashing badly and rolling a good deal, but working his hardest. The Rat stood up and hailed him, but Toad—for it was he—shook his head and settled sternly to his work.

"He'll be out of the boat in a minute if he rolls like that," said the Rat, sitting down again.

"Of course he will," chuckled the Otter. "Did I ever tell you that good story about Toad and the lock-keeper? It happened this way. Toad. . . ."

An errant May-fly swerved unsteadily athwart the current in the intoxicated fashion affected by young bloods of May-flies seeing life. A swirl of water and a "cloop!" and the May-fly was visible no more.

Neither was the Otter.

The Mole looked down. The voice was still in his ears, but the turf whereon he had sprawled was clearly vacant. Not an Otter to be seen, as far as the distant horizon.

But again there was a streak of bubbles on the surface of the river.

The Rat hummed a tune, and the Mole recollected that animal-etiquette forbade any sort of comment on the sudden disappearance of one's friends at any moment, for any reason or no reason whatever.

"Well, well," said the Rat, "I suppose we ought to be moving. I wonder which of us had better pack the luncheon-basket?" He did not speak as if he was frightfully eager for the treat.

"O, please let me," said the Mole. So, of course, the Rat let him.

Packing the basket was not quite such pleasant work as unpacking the basket. It never is. But the Mole was bent on enjoying everything, and although just when he had got the basket packed and strapped up tightly he saw a plate staring up at him from the grass, and when the job had been done again the Rat pointed out a fork which anybody ought to have seen, and last of all, behold! the mustard pot, which he had been sitting on without knowing it—still, somehow, the thing got finished at last, without much loss of temper.

The afternoon sun was getting low as the Rat sculled gently homewards in a dreamy mood, murmuring poetry-things over to himself, and not paying much attention to Mole. But the Mole was very full of lunch, and self-satisfaction, and pride, and already quite at home in a boat (so he thought) and was getting a bit restless besides: and presently he said, "Ratty! Please, *I* want to row, now!"

The Rat shook his head with a smile. "Not yet, my young friend," he said—"wait till you've had a few lessons. It's not so easy as it looks."

The Mole was quiet for a minute or two. But he began to feel more and more jealous of Rat, sculling so strongly and so easily along, and his pride began to whisper that he could do it every bit as well. He jumped up and seized the sculls, so suddenly, that the Rat, who was gazing out over the water and saying more poetry-things to himself, was taken by surprise and fell backwards off his seat with his legs in the air for the second time, while the triumphant Mole took his place and grabbed the sculls with entire confidence.

"Stop it, you *silly* ass!" cried the Rat, from the bottom of the boat. "You can't do it! You'll have us over!"

The Mole flung his sculls back with a flourish, and made a great dig at the water. He missed the surface altogether, his legs flew up above his head, and he found himself lying on the top of the prostrate Rat. Greatly alarmed, he made a grab at the side of the boat, and the next moment—Sploosh!

Over went the boat, and he found himself struggling in the river.

O my, how cold the water was, and O, how *very* wet it felt. How it sang in his ears as he went down, down, down! How bright and welcome the sun looked as he rose to the surface coughing and spluttering! How black was his despair when he felt himself sinking again! Then a firm paw gripped him by the back of his neck. It was the Rat, and he was evidently laughing—the Mole could *feel* him laughing, right down his arm and through his paw, and so into his—the Mole's—neck.

The Rat got hold of a scull and shoved it under the Mole's arm; then he did the same by the other side of him and, swimming behind, propelled the helpless animal to shore, hauled him out, and set him down on the bank, a squashy, pulpy lump of misery.

When the Rat had rubbed him down a bit, and wrung some of the wet out of him, he said, "Now, then, old fellow! Trot up and down the towing-path as hard as you can, till you're warm and dry again, while I dive for the luncheon-basket."

So the dismal Mole, wet without and ashamed within, trotted about till he was fairly dry, while the Rat plunged into the water again, recovered the boat, righted her and made her fast, fetched his floating property to shore by degrees, and finally dived successfully for the luncheon-basket and struggled to land with it.

When all was ready for a start once more, the Mole, limp and dejected, took his seat in the stern of the boat; and as they set off, he said in a low voice, broken with emotion, "Ratty, my generous friend! I am very sorry indeed for my foolish and ungrateful conduct. My heart quite fails me when I think how I might have lost that beautiful luncheon-basket. Indeed, I have been a complete ass, and I know it. Will you overlook it this once and forgive me, and let things go on as before?"

"That's all right, bless you!" responded the Rat cheerily. "What's a little wet to a Water Rat? I'm more in the water than out of it most days. Don't you think any more about it; and, look here! I really think you had better come and stop with me for a little time. It's very plain and rough, you know—not like Toad's house at all—but you haven't seen that yet; still, I can make you comfortable. And I'll teach you to row, and to swim, and you'll soon be as handy on the water as any of us."

The Mole was so touched by his kind manner of speaking that he could find no voice to answer him; and he had to brush away a tear or two with the back of his paw. But the Rat kindly looked in another direction, and presently the Mole's spirits revived again, and he was even able to give some straight backtalk to a couple of moorhens who were sniggering to each other about his bedraggled appearance.

When they got home, the Rat made a bright fire in the parlour, and planted the Mole in an arm-chair in front of it, having fetched down a dressing-gown and slippers for him, and told him river stories till supper-time. Very thrilling stories they were, too, to an earth-dwelling animal like Mole. Stories about weirs, and sudden floods, and leaping pike, and steamers that flung hard bottles—at least bottles were certainly flung, and *from* steamers, so presumably *by* them; and about herons, and how particular they were whom they spoke to; and about adventures down

drains, and night-fishings with Otter, or excursions far a-field with Badger. Supper was a most cheerful meal; but very shortly afterwards a terribly sleepy Mole had to be escorted upstairs by his considerate host, to the best bedroom, where he soon laid his head on his pillow in great peace and contentment, knowing that his new-found friend the River was lapping the sill of his window.

This day was only the first of many similar ones for the emancipated Mole, each of them longer and full of interest as the ripening summer moved onward. He learnt to swim and to row, and entered into the joy of running water; and with his ear to the reed-stems he caught, at intervals, something of what the wind went whispering so constantly among them.

II

THE OPEN ROAD[4]

"Ratty," said the Mole suddenly, one bright summer morning, "if you please, I want to ask you a favour."

The Rat was sitting on the river bank, singing a little song. He had just composed it himself, so he was very taken up with it, and would not pay proper attention to Mole or anything else. Since early morning he had been swimming in the river, in company with his friends the ducks. And when the ducks stood on their heads suddenly, as ducks will, he would dive down and tickle their necks, just under where their chins would be if ducks had chins, till they were forced to come to the surface again in a hurry, spluttering and angry and shaking their feathers at him, for it is impossible to say quite *all* you feel when your head is under water. At last they implored him to go away and attend to his own affairs and leave them to mind theirs. So the Rat went away, and sat on the river bank in the sun, and made up a song about them, which he called

"DUCKS' DITTY."[5]

All along the backwater,
Through the rushes tall,
Ducks are a-dabbling,
Up tails all!

Ducks' tails, drakes' tails,
Yellow feet a-quiver,
Yellow bills all out of sight
Busy in the river!

Slushy green undergrowth
Where the roach swim—
Here we keep our larder,
Cool and full and dim.

Everyone for what he likes!
We like to be
Heads down, tails up,
Dabbling free!

High in the blue above
Swifts whirl and call—
We are down a-dabbling
Up tails all!

"I don't know that I think so *very* much of that little song, Rat," observed the Mole cautiously. He was no poet himself and didn't care who knew it; and he had a candid nature.

"Nor don't the ducks neither," replied the Rat cheerfully. "They say, '*Why* can't fellows be allowed to do what they like *when* they like and *as* they like, instead of other fellows sitting on banks and watching them all the time and making remarks and poetry and things about them? What *nonsense* it all is!' That's what the ducks say."

"So it is, so it is," said the Mole, with great heartiness.

"No, it isn't!" cried the Rat indignantly.

"Well then, it isn't, it isn't," replied the Mole soothingly. "But what I wanted to ask you was, won't you take me to call on Mr. Toad? I've heard so much about him, and I do so want to make his acquaintance."

"Why, certainly," said the good-natured Rat, jumping to his feet and dismissing poetry from his mind for the day. "Get the boat out, and we'll paddle up there at once. It's never the wrong time to call on Toad. Early or late he's always the same fellow. Always good-tempered, always glad to see you, always sorry when you go!"

"He must be a very nice animal," observed the Mole, as he got into the boat and took the sculls, while the Rat settled himself comfortably in the stern.

"He is indeed the best of animals," replied Rat. "So simple, so good-natured, and so affectionate. Perhaps he's not very clever—we can't all be geniuses; and it may be that he is both boastful and conceited. But he has got some great qualities, has Toady."

Rounding a bend in the river, they came in sight of a handsome, dignified old house of mellowed red brick, with well-kept lawns reaching down to the water's edge.

"There's Toad Hall," said the Rat; "and that creek on the left, where the notice-board says, 'Private. No landing allowed,' leads to his boat-house, where we'll leave the boat. The stables are over there to the right. That's the banqueting-hall you're looking at now—very old, that is. Toad is rather rich, you know, and this is really one of the nicest houses in these parts, though we never admit as much to Toad."

They glided up the creek, and the Mole shipped his sculls as they passed into the shadow of a large boat-house. Here they saw many handsome boats, slung from the crossbeams or hauled up on a slip, but none in the water; and the place had an unused and a deserted air.

The Rat looked around him. "I understand," said he. "Boating is played out. He's tired of it, and done with it. I wonder what new fad he has taken up now? Come along and let's look him up. We shall hear all about it quite soon enough."

They disembarked, and strolled across the gay flower-decked lawns in search of Toad, whom they presently happened upon resting in a wicker garden-chair, with a pre-occupied expression of face, and a large map spread out on his knees.

"Hooray!" he cried, jumping up on seeing them, "this is splendid!" He shook the paws of both of them warmly, never waiting for an introduction to the Mole. "How *kind* of you!" he went on, dancing round them. "I was just going to send a boat down the river for you, Ratty, with strict orders that you were to be fetched up here at once, whatever you were doing. I want you badly—both of you. Now what will you take? Come inside and have something! You don't know how lucky it is, your turning up just now!"

"Let's sit quiet a bit, Toady!" said the Rat, throwing himself into an easy chair, while the Mole took another by the

side of him and made some civil remark about Toad's "delightful residence."

"Finest house on the whole river," cried Toad boisterously. "Or anywhere else, for that matter," he could not help adding.

Here the Rat nudged the Mole. Unfortunately the Toad saw him do it, and turned very red. There was a moment's painful silence. Then Toad burst out laughing. "All right, Ratty," he said. "It's only my way, you know. And it's not such a very bad house, is it? You know you rather like it yourself. Now, look here. Let's be sensible. You are the very animals I wanted. You've got to help me. It's most important!"

"It's about your rowing, I suppose," said the Rat, with an innocent air. "You're getting on fairly well, though you splash a good bit still. With a great deal of patience, and any quantity of coaching, you may——"

"O, pooh! boating!" interrupted the Toad, in great disgust. "Silly boyish amusement. I've given that up *long* ago. Sheer waste of time, that's what it is. It makes me downright sorry to see you fellows, who ought to know better, spending all your energies in that aimless manner. No, I've discovered the real thing, the only genuine occupation for a lifetime. I propose to devote the remainder of mine to it, and can only regret the wasted years that lie behind me, squandered in trivialities. Come with me, dear Ratty, and your amiable friend also, if he will be so very good, just as far as the stable-yard, and you shall see what you shall see!"

He led the way to the stable-yard accordingly, the Rat following with a most mistrustful expression; and there, drawn out of the coach-house into the open, they saw a gipsy caravan, shining with newness, painted a canary-yellow picked out with green, and red wheels.

"There you are!" cried the Toad, straddling and expanding himself. "There's real life for you, embodied in that little cart. The open road, the dusty highway, the heath, the common, the hedgerows, the rolling downs! Camps, villages, towns, cities! Here to-day, up and off to somewhere else to-morrow! Travel, change, interest, excitement! The whole world before you, and a horizon that's always changing! And mind! this is the very

finest cart of its sort that was ever built, without any exception. Come inside and look at the arrangements. Planned 'em all myself, I did!"

The Mole was tremendously interested and excited, and followed him eagerly up the steps and into the interior of the caravan. The Rat only snorted and thrust his hands deep into his pockets, remaining where he was.

It was indeed very compact and comfortable. Little sleeping bunks—a little table that folded up against the wall—a cooking-stove, lockers, bookshelves, a bird-cage with a bird in it; and pots, pans, jugs and kettles of every size and variety.

"All complete!" said the Toad triumphantly, pulling open a locker. "You see—biscuits, potted lobster, sardines—everything you can possibly want. Soda-water here—baccy there—letter-paper, bacon, jam, cards and dominoes—you'll find," he continued, as they descended the steps again, "you'll find that nothing whatever has been forgotten, when we make our start this afternoon."

"I beg your pardon," said the Rat slowly, as he chewed a straw, "but did I overhear you say something about *'we,'* and *'start,'* and *'this afternoon?'* "

"Now, you dear good old Ratty," said Toad, imploringly, "don't begin talking in that stiff and sniffy sort of way, because you know you've *got* to come. I can't possibly manage without you, so please consider it settled, and don't argue—it's the one thing I can't stand. You surely don't mean to stick to your dull fusty old river all your life, and just live in a hole in a bank, and *boat?* I want to show you the world! I'm going to make an *animal* of you, my boy!"

"I don't care," said the Rat, doggedly. "I'm not coming, and that's flat. And I *am* going to stick to my old river, *and* live in a hole, *and* boat, as I've always done. And what's more, Mole's going to stick to me and do as I do, aren't you, Mole?"

"Of course I am," said the Mole, loyally. "I'll always stick to you, Rat, and what you say is to be—has got to be. All the same, it sounds as if it might have been—well, rather fun, you know!" he added, wistfully. Poor Mole! The Life Adventurous was so new a thing to him, and so thrilling; and this fresh aspect of it

was so tempting; and he had fallen in love at first sight with the canary-coloured cart and all its little fitments.

The Rat saw what was passing in his mind, and wavered. He hated disappointing people, and he was fond of the Mole, and would do almost anything to oblige him. Toad was watching both of them closely.

"Come along in, and have some lunch," he said, diplomatically, "and we'll talk it over. We needn't decide anything in a hurry. Of course, *I* don't really care. I only want to give pleasure to you fellows. 'Live for others!' That's my motto in life."

During luncheon—which was excellent, of course, as everything at Toad Hall always was—the Toad simply let himself go. Disregarding the Rat, he proceeded to play upon the inexperienced Mole as on a harp. Naturally a voluble animal, and always mastered by his imagination, he painted the prospects of the trip and the joys of the open life and the road-side in such glowing colours that the Mole could hardly sit in his chair for excitement. Somehow, it soon seemed taken for granted by all three of them that the trip was a settled thing; and the Rat, though still unconvinced in his mind, allowed his good-nature to over-ride his personal objections. He could not bear to disappoint his two friends, who were already deep in schemes and anticipations, planning out each day's separate occupation for several weeks ahead.

When they were quite ready, the now triumphant Toad led his companions to the paddock and set them to capture the old grey horse, who, without having been consulted, and to his own extreme annoyance, had been told off by Toad for the dustiest job in this dusty expedition. He frankly preferred the paddock, and took a deal of catching. Meantime Toad packed the lockers still tighter with necessaries, and hung nose-bags, nets of onions, bundles of hay, and baskets from the bottom of the cart. At last the horse was caught and harnessed, and they set off, all talking at once, each animal either trudging by the side of the cart or sitting on the shaft, as the humour took him. It was a golden afternoon. The smell of the dust they kicked up was rich and satisfying; out of thick orchards on either side the road, birds called and whistled to them cheerily; good-natured

wayfarers, passing them, gave them "Good-day," or stopped to say nice things about their beautiful cart; and rabbits, sitting at their front doors in the hedgerows, held up their fore-paws, and said, "O my! O my! O my!"

Late in the evening, tired and happy and miles from home, they drew up on a remote common far from habitations, turned the horse loose to graze, and ate their simple supper sitting on the grass by the side of the cart. Toad talked big about all he was going to do in the days to come, while stars grew fuller and larger all around them, and a yellow moon, appearing suddenly and silently from nowhere in particular, came to keep them company and listen to their talk. At last they turned in to their little bunks in the cart; and Toad, kicking out his legs, sleepily said, "Well, good night, you fellows! This is the real life for a gentleman! Talk about your old river!"

"I *don't* talk about my river," replied the patient Rat. "You *know* I don't, Toad. But I *think* about it," he added pathetically, in a lower tone: "I *think* about it—all the time!"

The Mole reached out from under his blanket, felt for the Rat's paw in the darkness, and gave it a squeeze. "I'll do whatever you like, Ratty," he whispered. "Shall we run away to-morrow morning, quite early—*very* early—and go back to our dear old hole on the river?"

"No, no, we'll see it out," whispered back the Rat. "Thanks awfully, but I ought to stick by Toad till this trip is ended. It wouldn't be safe for him to be left to himself. It won't take very long. His fads never do. Good night!"

The end was indeed nearer than even the Rat suspected.

After so much open air and excitement the Toad slept very soundly, and no amount of shaking could rouse him out of bed next morning. So the Mole and Rat turned to, quietly and manfully, and while the Rat saw to the horse, and lit a fire, and cleaned last night's cups and platters, and got things ready for breakfast, the Mole trudged off to the nearest village, a long way off, for milk and eggs and various necessaries the Toad had, of course, forgotten to provide. The hard work had all been done, and the two animals were resting, thoroughly exhausted, by the time Toad appeared on the scene, fresh and

gay, remarking what a pleasant easy life it was they were all leading now, after the cares and worries and fatigues of housekeeping at home.

They had a pleasant ramble that day over grassy downs and along narrow by-lanes, and camped as before, on a common, only this time the two guests took care that Toad should do his fair share of work. In consequence, when the time came for starting next morning, Toad was by no means so rapturous about the simplicity of the primitive life, and indeed attempted to resume his place in his bunk, whence he was hauled by force. Their way lay, as before, across country by narrow lanes, and it was not till the afternoon that they came out on the high-road, their first high-road; and there disaster, fleet and unforeseen, sprang out on them—disaster momentous indeed to their expedition, but simply overwhelming in its effect on the after-career of Toad.

They were strolling along the high-road easily, the Mole by the horse's head, talking to him, since the horse had complained that he was being frightfully left out of it, and nobody considered him in the least; the Toad and the Water Rat walking behind the cart talking together—at least Toad was talking, and Rat was saying at intervals, "Yes, precisely; and what did *you* say to *him?*"—and thinking all the time of something very different, when far behind them they heard a faint warning hum, like the drone of a distant bee. Glancing back, they saw a small cloud of dust, with a dark centre of energy, advancing on them at incredible speed, while from out the dust a faint "Poop-poop!" wailed like an uneasy animal in pain. Hardly regarding it, they turned to resume their conversation, when in an instant (as it seemed) the peaceful scene was changed, and with a blast of wind and a whirl of sound that made them jump for the nearest ditch, It was on them! The "Poop-poop" rang with a brazen shout in their ears, they had a moment's glimpse of an interior of glittering plate-glass and rich morocco and the magnificent motor-car, immense, breath-snatching, passionate, with its pilot tense and hugging his wheel, possessed all earth and air for the fraction of a second, flung an enveloping cloud of dust that blinded and enwrapped them utterly, and then

dwindled to a speck in the far distance, changed back into a droning bee once more.

The old grey horse, dreaming, as he plodded along, of his quiet paddock, in a new raw situation such as this simply abandoned himself to his natural emotions. Rearing, plunging, backing steadily, in spite of all the Mole's efforts at his head, and all the Mole's lively language directed at his better feelings, he drove the cart backwards towards the deep ditch at the side of the road. It wavered an instant—then there was a heartrending crash—and the canary-coloured cart, their pride and their joy, lay on its side in the ditch, an irredeemable wreck.

The Rat danced up and down in the road, simply transported with passion. "You villains!" he shouted, shaking both fists, "You scoundrels, you highwaymen, you—you—road-hogs!—I'll have the law on you! I'll report you! I'll take you through all the Courts!" His home-sickness had quite slipped away from him, and for the moment he was the skipper of the canary-coloured vessel driven on a shoal by the reckless jockeying of rival mariners, and he was trying to recollect all the fine and biting things he used to say to masters of steam-launches when their wash, as they drove too near the bank, used to flood his parlour-carpet at home.

Toad sat straight down in the middle of the dusty road, his legs stretched out before him, and stared fixedly in the direction of the disappearing motor-car. He breathed short, his face wore a placid satisfied expression, and at intervals he faintly murmured "Poop-poop!"

The Mole was busy trying to quiet the horse, which he succeeded in doing after a time. Then he went to look at the cart, on its side in the ditch. It was indeed a sorry sight. Panels and windows smashed, axles hopelessly bent, one wheel off, sardine-tins scattered over the wide world, and the bird in the bird-cage sobbing pitifully and calling to be let out.

The Rat came to help him, but their united efforts were not sufficient to right the cart. "Hi! Toad!" they cried. "Come and bear a hand, can't you!"

The Toad never answered a word, or budged from his seat in the road; so they went to see what was the matter with him.

They found him in a sort of a trance, a happy smile on his face, his eyes still fixed on the dusty wake of their destroyer. At intervals he was still heard to murmur "Poop-poop!"

The Rat shook him by the shoulder. "Are you coming to help us, Toad?" he demanded sternly.

"Glorious, stirring sight!" murmured Toad, never offering to move. "The poetry of motion! The *real* way to travel! The *only* way to travel! Here to-day—in next week to-morrow! Villages skipped, towns and cities jumped—always somebody else's horizon! O bliss! O poop-poop! O my! O my!"

"O *stop* being an ass, Toad!" cried the Mole despairingly.

"And to think I never *knew!*" went on the Toad in a dreamy monotone. "All those wasted years that lie behind me, I never knew, never even *dreamt!* But *now*—but now that I know, now that I fully realise! O what a flowery track lies spread before me, henceforth! What dust-clouds shall spring up behind me as I speed on my reckless way! What carts I shall fling carelessly into the ditch in the wake of my magnificent onset! Horrid little carts—common carts—canary-coloured carts!"

"What are we to do with him?" asked the Mole of the Water Rat.

"Nothing at all," replied the Rat firmly. "Because there is really nothing to be done. You see, I know him from of old. He is now possessed. He has got a new craze, and it always takes him that way, in its first stage. He'll continue like that for days now, like an animal walking in a happy dream, quite useless for all practical purposes. Never mind him. Let's go and see what there is to be done about the cart."

A careful inspection showed them that, even if they succeeded in righting it by themselves, the cart would travel no longer. The axles were in a hopeless state, and the missing wheel was shattered into pieces.

The Rat knotted the horse's reins over his back and took him by the head, carrying the bird-cage and its hysterical occupant in the other hand. "Come on!" he said grimly to the Mole. "It's five or six miles to the nearest town, and we shall just have to walk it. The sooner we make the start the better."

"But what about Toad?" asked the Mole anxiously, as they

set off together. "We can't leave him here, sitting in the middle of the road by himself, in the distracted state he's in! It's not safe. Supposing another Thing were to come along?"

"O, *bother* Toad," said the Rat savagely; "I've done with him!"

They had not proceeded very far on their way, however, when there was a pattering of feet behind them, and Toad caught them up and thrust a paw inside the elbow of each of them; still breathing short and staring into vacancy.

"Now, look here, Toad!" said the Rat sharply: "as soon as we get to the town, you'll have to go straight to the police-station, and see if they know anything about that motor-car and who it belongs to, and lodge a complaint against it. And then you'll have to go to a blacksmith's or a wheelwright's and arrange for the cart to be fetched and mended and put to rights. It'll take time, but it's not quite a hopeless smash. Meanwhile, the Mole and I will go to an inn and find comfortable rooms where we can stay till the cart's ready, and till your nerves have recovered their shock."

"Police-station! Complaint!" murmured Toad dreamily. "Me *complain* of that beautiful, that heavenly vision that has been vouchsafed me! *Mend* the *cart!* I've done with carts for ever. I never want to see the cart, or to hear of it, again. O, Ratty! You can't think how obliged I am to you for consenting to come on this trip! I wouldn't have gone without you, and then I might never have seen that—that swan, that sunbeam, that thunderbolt! I might never have heard that entrancing sound, or smelt that bewitching smell! I owe it all to you, my best of friends!"

The Rat turned from him in despair. "You see what it is?" he said to the Mole, addressing him across Toad's head: "He's quite hopeless. I give it up—when we get to the town we'll go to the railway station, and with luck we may pick up a train there that'll get us back to River Bank to-night. And if ever you catch me going a-pleasuring with this provoking animal again!"—He snorted, and during the rest of that weary trudge addressed his remarks exclusively to Mole.

On reaching the town they went straight to the station and deposited Toad in the second-class waiting-room, giving a

porter twopence to keep a strict eye on him. They then left the horse at an inn stable, and gave what directions they could about the cart and its contents. Eventually, a slow train having landed them at a station not very far from Toad Hall, they escorted the spell-bound, sleep-walking Toad to his door, put him inside it, and instructed his housekeeper to feed him,[6] undress him, and put him to bed. Then they got out their boat from the boat-house, sculled down the river home, and at a very late hour sat down to supper in their own cosy riverside parlour, to the Rat's great joy and contentment.

The following evening the Mole, who had risen late and taken things very easy all day, was sitting on the bank fishing, when the Rat, who had been looking up his friends and gossiping, came strolling along to find him. "Heard the news?" he said. "There's nothing else being talked about, all along the river bank. Toad went up to Town by an early train this morning. And he has ordered a large and very expensive motor-car."

III
THE WILD WOOD

The Mole had long wanted to make the acquaintance of the Badger. He seemed, by all accounts, to be such an important personage and, though rarely visible, to make his unseen influence felt by everybody about the place. But whenever the Mole mentioned his wish to the Water Rat he always found himself put off. "It's all right," the Rat would say. "Badger'll turn up some day or other—he's always turning up—and then I'll introduce you. The best of fellows! But you must not only take him *as* you find him, but *when* you find him."

"Couldn't you ask him here—dinner or something?" said the Mole.

"He wouldn't come," replied the Rat simply. "Badger hates Society, and invitations, and dinner, and all that sort of thing."

"Well, then, supposing we go and call on *him?*" suggested the Mole.

"O, I'm sure he wouldn't like that at *all,*" said the Rat, quite alarmed. "He's so very shy, he'd be sure to be offended. I've never even ventured to call on him at his own home myself, though I know him so well. Besides, we can't. It's quite out of the question, because he lives in the very middle of the Wild Wood."

"Well, supposing he does," said the Mole. "You told me the Wild Wood was all right, you know."

"O, I know, I know, so it is," replied the Rat evasively. "But I think we won't go there just now. Not *just* yet. It's a long way, and he wouldn't be at home at this time of year anyhow, and he'll be coming along some day, if you'll wait quietly."

The Mole had to be content with this. But the Badger never

THE EXTERIOR SENSES AND THEIR OBJECTS

Aristotle says that we take delight in our senses and, most of all, in the sense of sight. When we see things, what exactly are we seeing? When we sense things using any of our five senses, what is it about the object that we are sensing?

Take a look at a round object in front of you. Can you see the back side of it from your perspective? If you are careful, you realize that you cannot actually see the other side even though you may know what it looks like. Hence, your vision of the object does not completely capture the entirety of it. Further, your eyes cannot capture the smell or the taste of the object, even though it surely has a certain odor and flavor. Rather, what you see is the only visible qualities of it from one perspective.

This realization may give us a clue about what we are encountering when we use our senses. While we do recognize objects as wholes—whole people, trees, or dogs, etc.—our individual senses first sense the *properties* of these objects, properties particular to each of our five senses. The size of a person, the shape of a tree, and the texture of the dog's fur are what we first encounter through our senses.

Properties, of course, are always properties of a particular thing or body. In the Western tradition, these "things" are known as *substances*. Properties exist in substances. When we say,

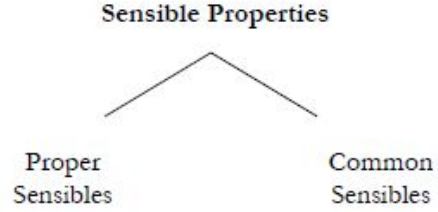
> This tree is *brown*.

we are saying that the property of brownness is present in the tree, which is the substance. It would not make any sense to say,

> This *brown* is tree.

Properties are present in substances and dependent on substances for their existence. Substances, however, have independent existences. Properties are also called *accidents*, which is a technical term describing anything that is dependent on a substance for its existence, but is not itself a substance.

There are two different kinds of properties that can be sensed: *proper sensibles* and *common sensibles*. Proper sensibles are properties that can be sensed by only one sense. Common sensibles are properties that can be sensed by more than one sense.



PROPER SENSIBLES

Each of our five senses is designed to take in a different quality of bodies. Through our sense of sight, we encounter the quality of *color*. Through our sense of smell, we encounter the quality of *odor*. Through our sense of hearing, we encounter the quality of *sound*. Through our sense of taste, we encounter the quality of *flavor*. Finally, through our sense of touch, we encounter the qualities of *texture, heat, cold, moisture, dryness, heaviness, lightness, hardness,* and perhaps others. The sense of touch is unique, because through it we can experience several different qualities of bodies.

Each of these qualities (*color, odor, sound, flavor, texture, heat, cold, moisture, dryness, heaviness, lightness, hardness*) is *proper* because only one particular sense can grasp it. For instance, colors cannot be felt or smelled or heard or tasted—they can only be seen. In the same way, textures cannot be seen or smelled or heard or tasted—they can only be felt. These qualities are traditionally known as *proper sensibles* because they can only be sensed by one sense.

Color – sensed only by sight
Odor – sensed only by smell
Sound – sensed only by hearing
Flavor – sensed only by taste
Texture, heat, cold, moisture, dryness, heaviness, lightness, hardness – sensed only by touch

COMMON SENSIBLES

Some qualities can be grasped by more than one sense, and these qualities are called *common sensibles*. Imagine you are trying to figure out the shape of a football. How many ways are there to figure out its shape? You can discover its shape by holding it in your hand or even by simply looking at it. So, *shape* is one of the common sensibles.

Motion, rest, number, size, and *shape* are all considered common sensibles. The common sensibles have an important relation to the proper sensibles. The proper sensibles make it possible for us to sense the common sensibles. For instance, with the eye we can see the size of a thing because of its color (a proper sensible). Likewise, with the hand we can detect the shape of something through its texture. Thus, the proper sensibles serve as a window through which we know the common sensibles.

Motion
Rest
Number
Size
Shape

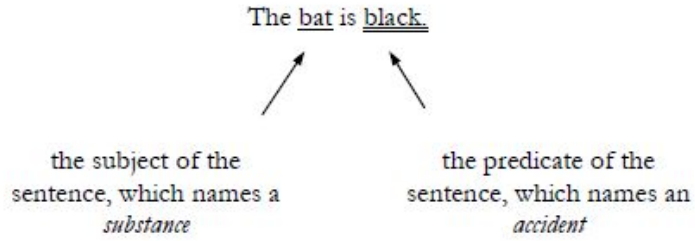
THE TEN CATEGORIES

Properties, as you have learned, are *accidents* that exist in *substances*. While a property is not a substance in itself, it is still a certain kind of being. There are ten kinds of being or categories of being, which Aristotle wrote about in his *Categories*. When we look at something and ask, "What is it?", there are ten kinds of answers that can be given to the question. These ten kinds of answers reveal ten ultimate categories of being:

1. **Substance**
2. Quantity
3. Quality
4. Relation
5. Action
6. Passion
7. Time
8. Place
9. Position
10. Possession

} **Accidents**

The second through the ninth categories are all kinds of *accidents*. This division of the 10 categories into *substance* and *accident* is clear in our language. First, there are the things that we talk about (the grammatical subjects of sentences): lions, lizards, leaves, or bats, for instance. These are *substances*. But there are also the things we say about these subjects (the grammatical predicates of sentences): the lion is fierce, the lizard runs quickly, the leaf is smooth, or the bat is black. These things said about substances are most often *accidents*.



Substance – a being that exists in itself rather than in another being

Accident – a modification or attribute of a substance, which can only exist in a substance

There are nine different modifications or attributes of substances. These are the nine accidents of quantity, quality, relation, action, passion, time, place, posture, and possession. Accidents exist in and depend on substances for their existence. Colors, for instance, can't just exist by themselves. There is no separate thing such as whiteness, really—there are only white objects! Substances, however, exist on their own and do not depend on their accidents.

The word "substance" comes from a combination of the Latin verb *sto, stare,* which means "to stand" and the prefix *sub*, which means "under". A substance, then, can be thought of as that which stands under or underlies the accidents of a thing. It is what holds together and unites accidental features.

The word "accident" comes from the Latin verb *accido, accidere*, which means "to happen". The accidents of a substance, therefore, are features that *happen* to characterize a substance in particular times and circumstances. For instance, you happen to be sitting right now (position), but you could also be standing. *Accidere* even means "to fall towards", which helps us remember that accidents "befall" or characterize substances, often in an arbitrary way.

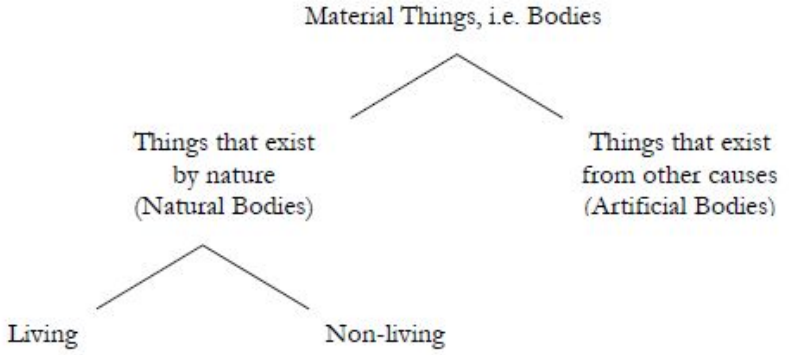
The chart below shows a set of questions that help to determine the different ways a thing exists:

Category	Relevant Question	Example
Substance	"What is the thing?"	The animal is a *dog*
Quantity	"How much is there of a thing?" "How many are there of a thing?"	There is *one* dog The dog is *small*
Quality	"What kind of thing is it?"	The dog is *brown* The dog is *hungry* The dog is *loud*
Relation	"How is the thing related to other things?"	The dog is *as big as* a horse
Action	"What does the thing do to other things?"	The dog is *barking*
Passion	"What is being done to this thing by something else?"	The dog is *being bitten*
Time	"When is the thing acting or being acted on?"	The dog is eating *today*
Place	"Where is the thing?"	The dog is *in the park*
Position	"In what position is the thing?"	The dog is *lying down*
Possession	"What does the thing have?"	The dog is *collared*

NATURAL THINGS & ARTIFICIAL THINGS

We began the year thinking about Aristotle's insight that all men *naturally* desire to know. Our desire for knowledge, he says, is clear to us because of the delight that we take in sensing. We used this as an opportunity to look more deeply into the nature of our senses. We looked first at *what* it is that we sense (qualities) and how these sensible qualities are accidents of material substances. After learning about *what* we sense, we turned to readings about *how* to sense—how to develop habits of attentive and receptive seeing. Burroughs, Thoreau, and Dillard model this art of seeing in their writing on nature and give us directions for how to practice this art. Most recently, we compared the sense of sight and the sense of touch with the help of DeKoninck. DeKoninck's essay reveals that our senses are not merely for knowing qualities, but ultimately for grabbing hold of reality itself, for encountering and knowing substances, through qualities.

The purpose of our scientific observations of nature is thus to know substances. But not everything we sense is a *natural* thing. Since natural science studies *natural* things, the observations of a natural scientist will be focused most of all on natural things. We will now study the difference between material things that are *natural* and material things that are not natural, which are called *artificial,* or manmade.



The tree above shows the main distinctions that Aristotle makes in Book II, Ch. 1 of the *Physics.* In order to understand what natural science studies, we must able to tell the difference between natural things and artificial things, i.e. between nature and art. Anything that is made or arranged by man or some other animal is a product of skill. We say these things are products of art, and hence *artificial.* Anything that is not made by man or some other animal but seems to exist on its own, we tend to call *natural.* We recognize artificial things because they bear the mark of our skill or planning or intelligence. Natural things, therefore, can be identified by contrast to artificial things.

As an aside, artificial things seem to be made of natural materials. Consider a wooden chair: it is clearly a product of art, but it is made of something once living and natural. Even materials that are man-made, such as plastic, are made out of chemicals that are natural. Human art seems to be the

arranging and reforming materials that already exist—we cannot ultimately bring things into being. Art therefore builds on nature.

NATURAL THINGS HAVE NATURES

While it is important to be able to identify a thing saying, "This is artificial" and "That is natural", identification does not represent a full understanding of the difference between natural and artificial things. So far, what we have said about natural things is negative – that they are "material things *not made by man*". To better understand the subject of natural science (what it studies), we need to seek a positive definition of natural things.

The classical answer to what makes natural things natural is that they have *natures*. As you read in *Physics* II.1, Aristotle explains that natural things have "a principle of moving and of resting" within them and artificial things do not have such a principle. Aristotle also describes this principle as an "inborn impulse to change." In both passages, he is describing a principle we call a *nature*. For instance, a tree grows leaves and bark on its own, but a wooden chair does not grow at all. The tree is the source of its own change, but the chair does not have such a power of change. We say that the tree is natural because it has a nature that causes its own growth. Not surprisingly, the word "nature" comes from the verb *nascor, nasci, natus sum,* which means "to be born".

Living things clearly have this principle of motion, as we see through their growth. It is perhaps more difficult to see this impulse to change in non-living natural things, such as rocks, dirt, or water. Aristotle suggests in other passages that these non-living things have a natural, inward motion towards their natural places. We will discuss this in more detail in our study of physics.

The idea that non-living natural things have natural motions raises another question: what about artificial things made out of natural materials? For instance, how do we explain the motion of a wooden chair as it is falling off of a rooftop? Doesn't the artificial chair have a source of motion in it? Aristotle addresses this in the third paragraph of *Physics* II.1. The chair falls to the ground not *qua* chair, but *qua* wood. Why it falls is not because it is shaped as a chair, but because it is made out of wood. Hence, the motion is due to what is natural about the chair (its matter) and not what is a product of art (its shape).

THE PORPHYRIAN TREE

The "Porphyian Tree" is taken from Porphry's *Isagoge*, a book that has been used for almost 2,000 years to help students understand Aristotle's categories. This tree helps us see, first of all, an ordered arrangement of the different kinds of beings that exist. It is also helpful for understanding that not all substances that exist are material. Comprehending and mastering this tree will be essential for your understanding of the kinds of natural beings that exist.

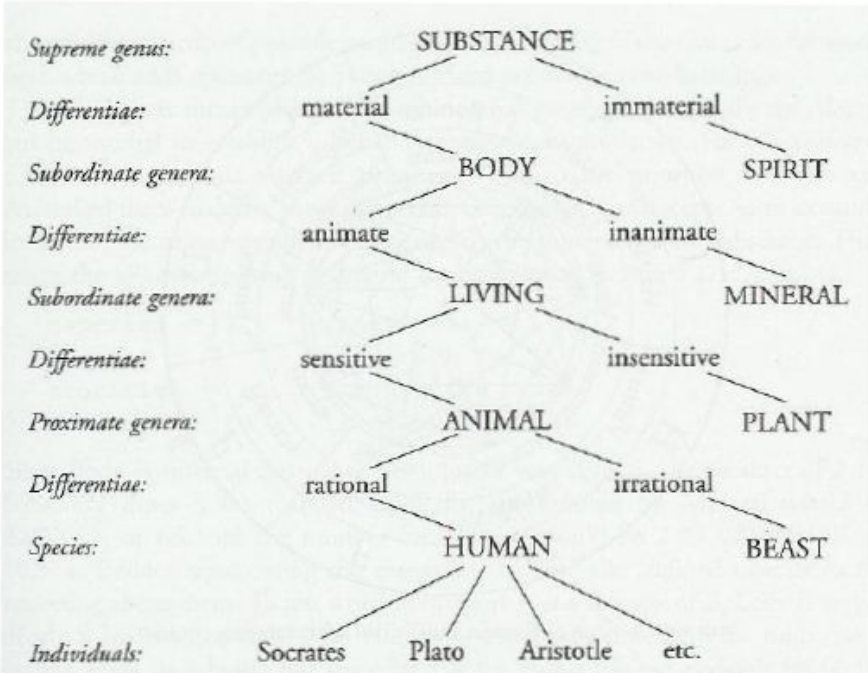


FIGURE 1.1 Tree of Porphyry, translated from a version by Peter of Spain (1239)

All of the terms in capital letters are genera or species, and all of the lowercase terms are differentiae, except for the individual humans at the bottom. To understand the tree, you must know what the terms "genus", "species", and "difference" mean. Genus and species are relative terms, which means that each one is understood in relation to the other.

Genus (from Gk. γενος, meaning "family, clan; ancestor") – a class with more than one species within it, which share something in common with one another.

Humans and beasts are in the genus of animals.

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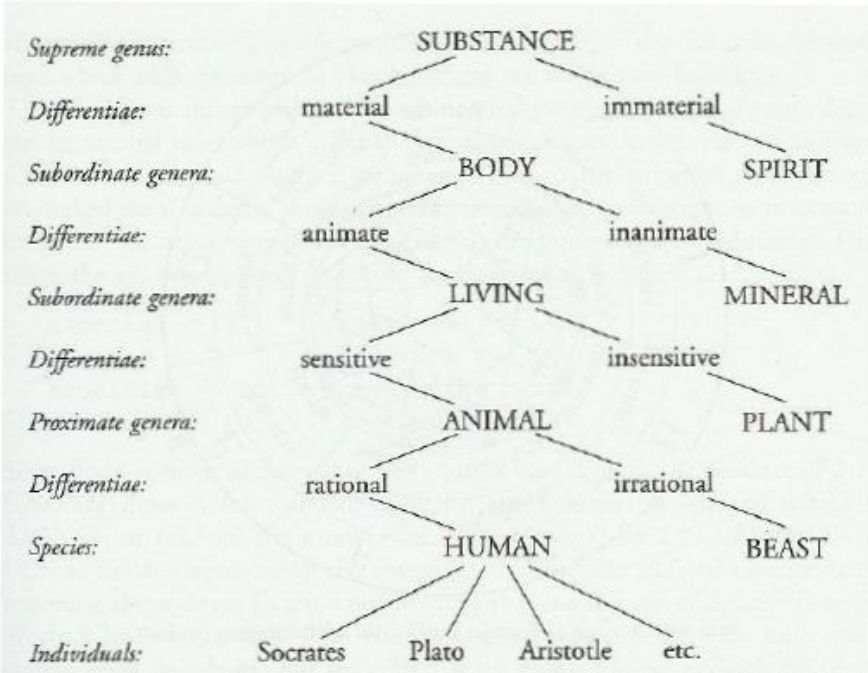

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Animals are in a different genus than minerals because animals are living.

Species (from Lat. species, speciei, f., meaning "appearance, shape; kind") – a class with only individual members within it.

Socrates and Plato are individuals of the same species.
Your dog and my cat are different species even though they are both animals.

Difference – what makes one species different from another in the same genus.

The differentia of humans is our rationality, since we are the only animals who can reason abstractly.
Living things and minerals have unique differentia because they are different species within the same genus.

Definition – a statement that expresses the nature of a thing through the combination of its nearest genus and its difference within the genus. (Definition = genus + specific difference)

Man is a rational animal.
Plants are insensitive organisms.

ARISTOTLE'S FOUR CAUSES

In the passage from Book II.3 of the *Physics*, Aristotle is reflecting on what knowledge is, or on what it means for us to say we *know* a thing. As he suggests, having a grasp of the *why* of something is the essential mark of knowledge. He then goes on to list four "causes", which will be explained more below. What does knowledge have to do with causes? It is important to understand that the "causes" Aristotle describes are the causes of beings, i.e., the reasons why certain beings are the way they are. When we ask, for example, "Why does the pen fall to the floor?", the answer begins with "be*cause*…". 'Why' questions are therefore questions that search for causes. When we grasp the causes of a thing, this is what we call *knowing* it in the richest sense.

There are four causes that we should look for when trying to understand something. Here they are summarized in the same order that Aristotle describes them:

1. **The Material Cause** – that out of which a thing is made

2. **The Formal Cause** – the essence or nature of a thing, what a thing is

3. **The Efficient Cause** (moving cause) – (a) the source of a thing's movement or (b) the cause of its existence

4. **The Final Cause** – that for the sake of which a thing exists, its purpose, end, aim, or goal

The causes can also be understood as answers to the following questions about an object:

1. Material Cause – What is it made out of?

2. Formal Cause – What is it? What kind of thing is it?

3. Efficient Cause – Who/what moves it or brings it into existence?

4. Final Cause – Why does it exist? What is its purpose or goal?

We can consider the four causes of almost any object in order to sift through and clarify what we know about it. Take a saw, for instance, and consider its causes.

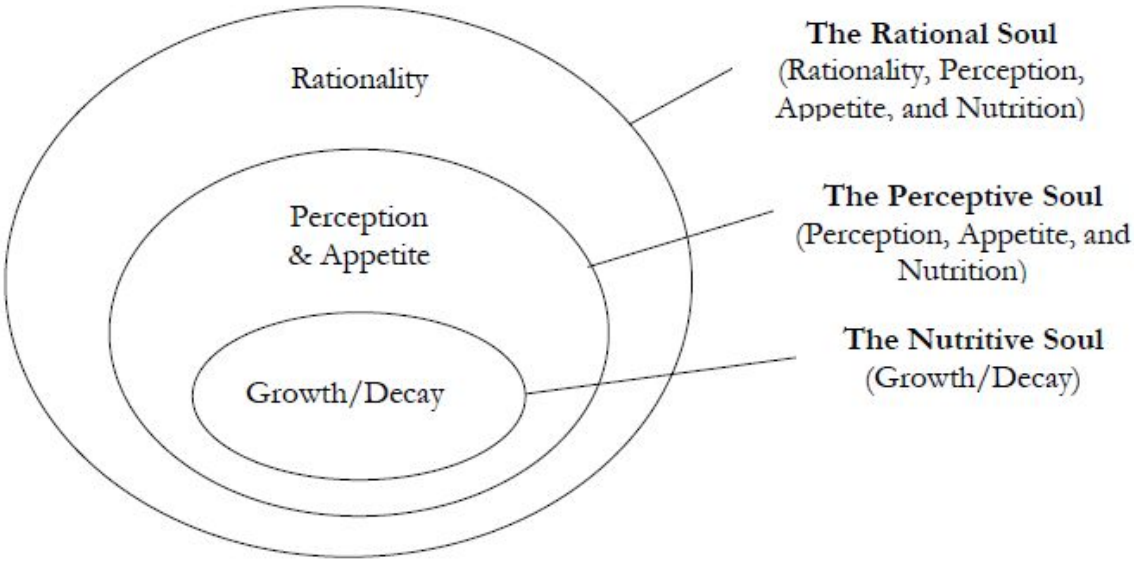
- The **material cause** of the saw is what it is made out of: the wood, metal, screws, and glue that make it up.
- The **formal cause** of the saw is what it is to be a saw: a tool used by humans for cutting materials by hand. The formal cause is often similar to a definition that might be given of a thing.
- The **efficient cause** of the saw is (a) the person who is using the saw at any given time or (b) the craftsman or machine that built the saw.
- The **final cause** of the saw is to cut things so that they are divided into pieces or made a certain size.

While the object in the case (the saw) is an artificial thing, the four causes are also present in natural things. The study of nature should include an investigation into all the causes of natural beings. When any of the four causes are ignored, the picture of nature that results is somehow incomplete or lacking. Keeping all four causes in mind helps us obtain a much more complete and well-rounded understanding of natural things. As lovers of wisdom, we should seek to know the deepest reasons *why* nature is the way that it is.

Below are the Greek terms that Aristotle uses to describe the causes, which you will need to know:

Material Cause	ὕλη
Formal Cause	οὐσία
Efficient Cause	ἀρχή
Final Cause	τέλος

KINDS OF SOULS AND THEIR POWERS

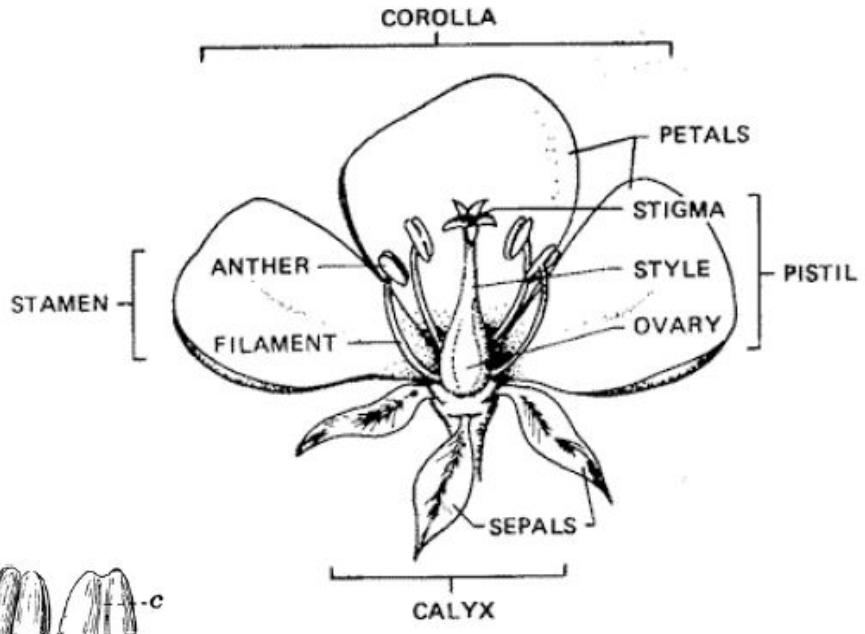


The diagram above shows the powers of the soul Aristotle discusses in Book II of *On the Soul.* The higher kinds of souls contain the powers (abilities) of the lower kinds and more. The perceptive soul contains the power of nutrition within it, since animals certainly eat and nourish themselves in addition to perceiving. The rational soul contains within it the powers of perception and nutrition, for man is also capable of sensing and growing like other animals. The souls are traditionally named according to their highest power.

One important point to note is that each living thing has only one soul. Man does not have three souls; he has only one. Since the soul is the source and cause of life in living things, to think that a man or a dog has multiple souls would be very much like saying that he has multiple lives. But this is an offense to reason. The soul is what unifies, directs, and forms all the parts and powers of a living thing such that it is a single, organized whole.

What about the ability to move oneself from one place to another, called locomotion? While most animals have the power to locomote, not all animals have it. Some plants also seem to behave as though they are moving from place to place. We cannot, therefore, use locomotion to distinguish animals from plants. Nonetheless, an animal's ability to locomote seems closely related to all its other powers: when an animal *perceives* food at a distance and *senses* its own hunger, how fitting that it also has the power to *traverse* the distance in order to *nourish* itself.

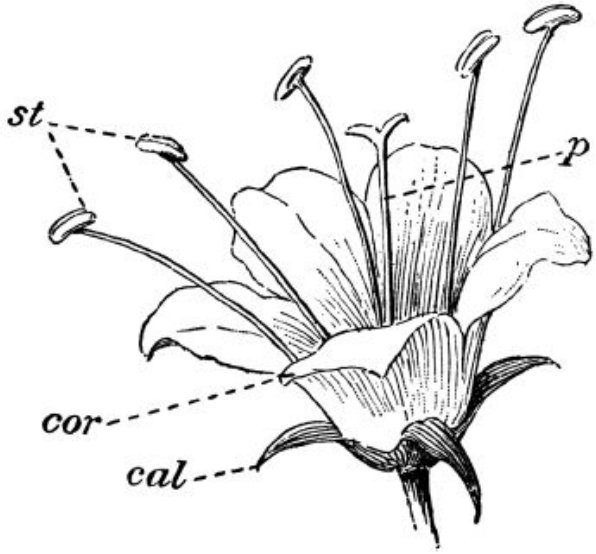
The Flower



FLOWER PARTS

Cross section of a pistil with eggs in the ovary

The stamen (*a* – anther, *f* – filament)



Flower Parts and their Purposes

1. **Calyx** – The outer, protective covering of the flower while it is a bud, which falls to the base of the flower after it opens and encircles the base.

2. **Sepals** – The individual leaf-like structures which together form the calyx. "*Sep*arate pet*als*".

3. **Petals** – The flat, thin, colored structures surrounding the reproductive organs of the flower. The color of the petals often attracts insects and other pollinators to the flower.

4. **Corolla** – The whorl of flower petals as a whole, "crown" shaped.

5. **Stamen** – The male reproductive organ of the flower, composed of an anther and a filament. The stamen "stand" up from the base of the flower and typically surround the pistil.

    a. **Anther** – This upper part of the stamen produces and stores pollen cells, which are the male reproductive cells of the flower.

    b. **Filament** – The "thread-like" stalk that holds up the anthers of a flower.

6. **Pistil** – The female reproductive organ of the flower, centrally located within the flower. During pollination, pollen from a stamen is brought into contact with the pistil and then drawn into it. The pollen cells fertilize one or more ovum (egg), which grows into a new plant.

    a. **Stigma** – The uppermost part of the pistil, often covered with a sticky residue which catches pollen on its surface.

    b. **Style** – The pillar-like stalk that holds up the stigma and connects it to the ovary.

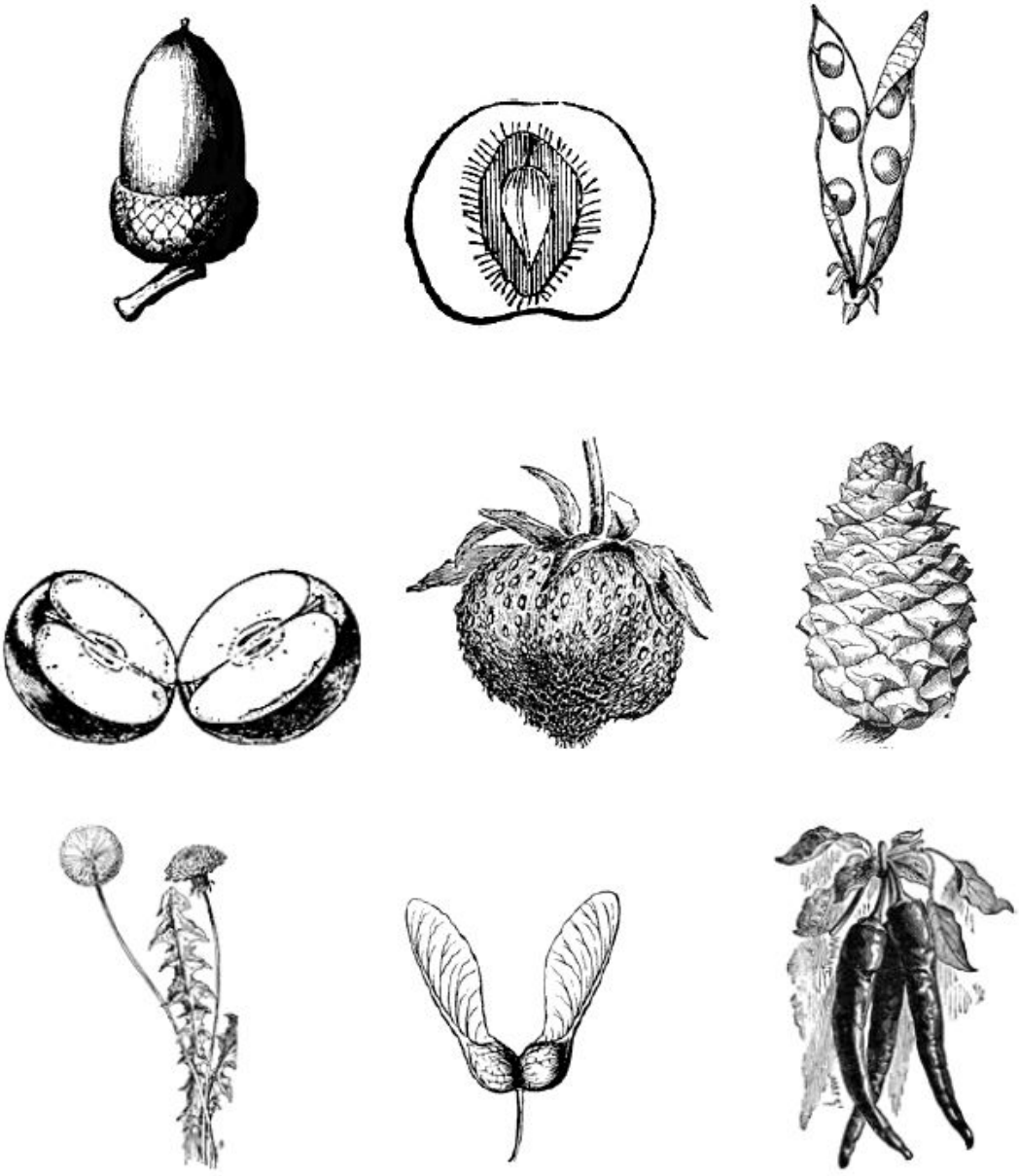
    c. **Ovary** – As the main reproductive part of the pistil, the ovary is a chamber that produces and houses eggs along the inner surface of itself.

    d. **Ovum** – One of the many female reproductive cells within the ovary of the pistil, known as the egg.

Pollination, Fruiting, and Germination

Pollination is the process in which pollen is transferred from an anther to a pistil in order to fertilize an ovum. The fertilized egg is called a **seed**, and the seed grows within the ovary of the flower. As the flower petals die, the ovary grows and forms a protective covering around the seed. Typically, it either swells and becomes fleshy or hardens around the seed. This swollen ovary is what is known as botanical **fruit**. In a variety of different ways for different plants, fruits serve as carriers and protectors of their seeds until the seeds find their way into the ground. When a seed becomes buried in the soil and sprouts roots, this is called **germination** – a new life taking root in order to grow into a mature plant.

The Variety of Fruit Forms



CLASSIFICATION OF FRUIT

Although flowers all have the same essential parts, different kinds of flowers vary greatly in shape, size, number and arrangement of parts, and so on. As you might imagine, knowing that every fruit develops from a flower, this variety in flowers leads to a variety in fruit. You already have some experience of this variety simply from being a consumer of fruit; you know, for example, that eating an apple is a very different experience than eating a banana or a blueberry. Looking at all of this variety amongst fruits, natural scientists have classified fruit into nine main groups.

Pomes

Perhaps the most common example of a pome is an apple. In fact, the word "pome" comes from the Latin word meaning "apple." A pome is distinct from other kinds of fruit in that the fruit is mostly formed from the receptacle (under the flower) and includes not *just* the ovary, but also some of the surrounding tissue as well. A pome has a "core" of several small seeds, surrounded by a tough membrane, and the shriveled remains of the sepals, style, and stamens can sometimes be seen at the end of the pome, opposite the stem.

Drupes

Drupes are distinct from other kinds of fruit in that they always have a single seed with a hard outer layer, and that seed is surrounded by fleshy fruit. Think about a very common example of a drupe: the peach. If you have ever eaten a peach, you know that in the center there is a "pit" that you cannot eat. The pit is a hard, outer casing—formed from the wall of the ovary—with one seed inside.

Berries

You might be surprised to know that a tomato, a banana, and a bell pepper are actually berries, and that strawberries and raspberries are actually *not* berries. But do not be too alarmed by this: you have not been *wrong* about berries your whole life, you have just been speaking as an *eater* of fruit, rather than as a *scientist* of fruit. When natural scientists speak about berries, they mean something rather different from what my grandma means when she makes a berry cobbler. When you are cooking or eating, you use berry to mean a small, sweet or tart fruit, and we are not wrong to do so. Speaking as scientists, however, we use the word berry to refer to fruit having a distinctive structure and formation (rather than a particular kind of taste, as we do in the kitchen). Berries, according to the scientist, are fruits that develop from a single ovary and have two or more seeds. If you look at the inside of a tomato, you can see that the tomato fits this definition. There is a special group of berries, called *Hesperidium*, that include citrus fruits, such as an orange or a lemon.

Aggregate Fruits

The strawberry, which you might expect to be a berry because of its name, is actually an aggregate fruit. The reason for this classification is that, unlike berries which develop from a single ovary, strawberries form from many pistils within the same flower. If you looked at a strawberry flower, you would see many pistils. Seeds are produced in each of these pistils, and the fruit grows around all of them, joining together to form a single fruit. All aggregate fruits have this in common, that the fruit comes from a single flower with multiple pistils.

Legumes

Legumes are fruits that are usually dry or hard and that release their seeds by splitting along a seam that runs down the middle. Any kind of "pod" that is long and narrow and has seeds in a single-file line is probably a legume. Some common examples of legumes are beans, peanuts, and peas.

Nuts

Like the word berry, the word nut has both a culinary meaning and a scientific meaning. You have probably referred to peanuts and almonds as nuts, but, although that is true enough when you are cooking or eating, these do not fit the scientific meaning of the word *nut*. A nut, according to the scientific definition, is a dry fruit in which the ovary wall becomes a hard shell and the seed inside is unattached to it. An acorn is a good example of a nut—if you have ever shaken an acorn, you have heard and felt the seed moving around inside the hard outer shell.

Grains

Grains are fruit in which the fruit and seed are joined closely together. These fruits are typical of grass-like plants. Wheat and rice are good examples of grains.

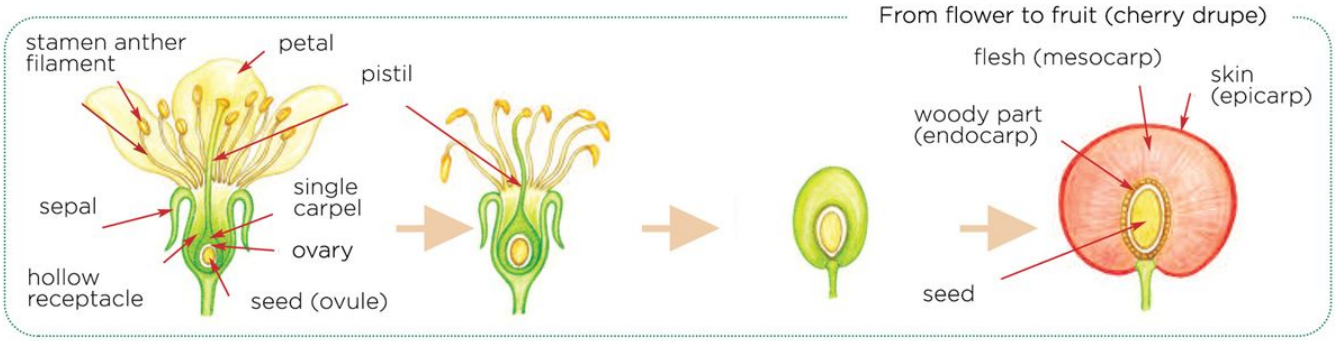
Capsules

Capsules are actually the most common kind of fruit, although we probably do not think of them as fruit because we do not eat them. Capsules are dry fruit that form from pistils with compound ovaries, and which split open to release the seeds. Orchids, Cotton, Eucalyptus, and Horse Chestnut all have capsules.

Multiple fruits

All the fruits that you just read about above form from a single flower; multiple fruits are distinct from these because they actually form from multiple different flowers joined together. The most common example of a multiple fruit is the pineapple.

Illustration: From Flower to Fruit in Cherries



Cumulative Review (Chapters 1–10)

Exercises

Perform the indicated operations.

1. $36 \times 14 \div 4$

2. $(88 + 79)7$

3. $(137 - 21) \div 4$

4. $0.39 \times 4.2 \times 5$

5. $15.2 \div 3.8 \times 1.06$

6. $25.5 \div 1.7 \div 0.05$

7. $(2.48 + 4.92)1.1$

8. $(7.021 - 1.021)0.21$

9. $(2.879 + 5.249) \div 2.54$

10. $\frac{1}{8} + \frac{3}{10} + \frac{13}{20}$

11. $\frac{49}{50} - \frac{2}{5} - \frac{1}{2}$

12. $6\frac{2}{3} - 2\frac{1}{4} + 1\frac{5}{8}$

13. $\frac{11}{7} \times \frac{42}{33} \times \frac{5}{2}$

14. $3\frac{1}{8} \times 2\frac{2}{3} \times 1\frac{1}{2}$

15. $\frac{27}{16} \times \frac{10}{39} \div \frac{3}{13}$

Evaluate the following for $x = 0.24$, $y = 15$, and $z = 3$.

16. $xy + yz$

17. xy^2

18. $4xyz$

19. z^2x

20. $2xyz + y^2z$

21. $2(x + y) + z^2$

Find the area. Use $\pi \approx 3.14$ and round to three digits.

22. square
side: 14 cm

23. circle
radius: 3.5 ft

24. rectangle
length: 18 mm
width: 11 mm

25. trapezoid
bases: 30 m, 46 m
height: 12 m

Solve.

26. $7x = 266$

27. $y - 106 = 29$

28. $4a - 59 = 33$

29. $3c + 71 = 173$

30. $r + 2.463 = 8.401$

31. $3.21x = 21.507$

32. $0.31z - 4.09 = 1.6512$

33. $2.4y + 3.79 = 19.534$

34. $\frac{2}{3}r - \frac{5}{12} = \frac{7}{8}$

35. $\frac{5}{9}c + \frac{3}{4} = \frac{81}{10}$

36. 42% of 125 is what number?

37. 2.5% of 32 is what number?

38. 48 is 6% of what number?

39. 39 is what percent of 52?

40. 3 is what percent of 120?

41. 17 is 20% of what number?