# The Craft of Scientific Writing

## Revised Edition, 2013-2014
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Kimmelman 361

Unit 2
- Capitalization
- Countable and uncountable nouns
- English plurals

# What would atomic theory look like if William the Conqueror's invasion of 1066 had failed, or never been attempted?

## "Uncleftish beholding" by Poul Anderson

For most of its being, mankind did not know what things are made of, but could only guess. With the growth of worldken, we began to learn, and today we have a beholding of stuff and work that watching bears out, both in the workstead and in daily life.

The underlying kinds of stuff are the *firststuffs*, which link together in sundry ways to give rise to the rest. Formerly we knew of ninety-two firststuffs, from waterstuff, the lightest and barest, to ymirstuff, the heaviest. Now we have made more, such as aegirstuff and helstuff.

The firststuffs have their being as motes called *unclefts*. These are mightly small; one seedweight of waterstuff holds a tale of them like unto two followed by twenty-two naughts. Most unclefts link together to make what are called *bulkbits*. Thus, the waterstuff bulkbit bestands of two waterstuff unclefts, the sourstuff bulkbit of two sourstuff unclefts, and so on. (Some kinds, such as sunstuff, keep alone; others, such as iron, cling together in ices when in the fast standing; and there are yet more yokeways.) When unlike clefts link in a bulkbit, they make *bindings*. Thus, water is a binding of two waterstuff unclefts with one sourstuff uncleft, while a bulkbit of one of the forestuffs making up flesh may have a thousand thousand or more unclefts of these two firststuffs together with coalstuff and chokestuff.

# What would atomic theory look like if William the Conqueror had lost in 1066?

At first is was thought that the uncleft was a hard thing that could be split no further; hence the name. Now we know it is made up of lesser motes. There is a heavy *kernel* with a forward bernstonish lading, and around it one or more light motes with backward ladings. The least uncleft is that of ordinary waterstuff. Its kernel is a lone forwardladen mote called a *firstbit*. Outside it is a backwardladen mote called a *bernstonebit*. The firstbit has a heaviness about 1840-fold that of the bernstonebit. Early worldken folk thought bernstonebits swing around the kernel like the earth around the sun, but now we understand they are more like waves or clouds.

In all other unclefts are found other motes as well, about as heavy as the firstbit but with no lading, known as *neitherbits*. We know a kind of waterstuff with one neitherbit in the kernel along with the firstbit; another kind has two neitherbits. Both kinds are seldom. mote of light with most short wavelength comes out as well.

For although light oftenest behaves as a wave, it can be looked on as a mote, the *lightbit*. We have already said by the way that a mote of stuff can behave not only as a chunk, but as a wave. Down among the unclefts, things do not happen in steady lowings, but in leaps between bestandings that are forbidden. The knowledge-hunt of this is called *lump beholding*.

Nor are stuff and work unakin. Rather, they are groundwise the same, and one can be shifted into the other. The kinship between them is that work is like unto weight manifolded by the four side of the haste of light.

# What would atomic theory look like if William the Conqueror had lost in 1066?

By shooting motes into kernels, worldken folk have shifted samesteads of one firststuff into samesteads of another. Thus did they make ymirstuff into aegirstuff and helstuff, and they have afterward gone beyond these. The heavier firststuffs are all highly lightrottish and therefore are not found in the greenworld.

Some of the higher samesteads are *splitly*. That is, when a neitherbit strikes the kernel of one, as for a show deal ymirstuff-235, it bursts into lesser kernels and free neitherbits; the latter can then split more ymirstuff-235. When this happens, weight shifts into work. It is not much of the whole, but nevertheless it is awesome.

With enough strength, lightweight unclefts can be made to togethermelt. In the sun, through a row of strikings and lightrottings, four unclefts of waterstuff in this wise become one of sunstuff. Again some weight is lost as work, and again this is greatly big when set beside the work gotten from a minglingish doing such as fire.
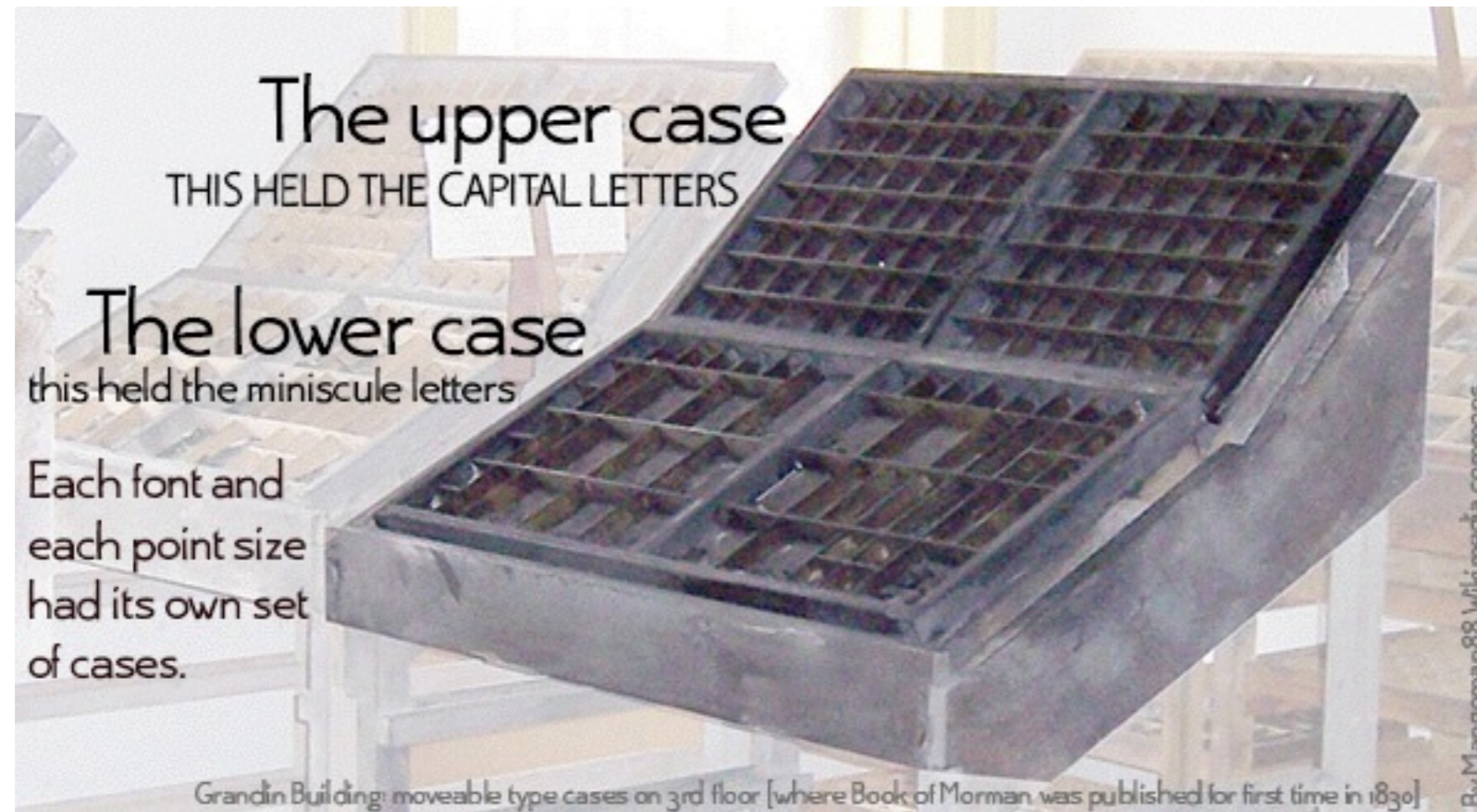
Today we wield both kind of uncleftish doings in weapons, and kernelish splitting gives us heat and bernstoneness. We hope to do likewise with togethermelting, which would yield an unheeded wellspring of work for mankindish goodgain.
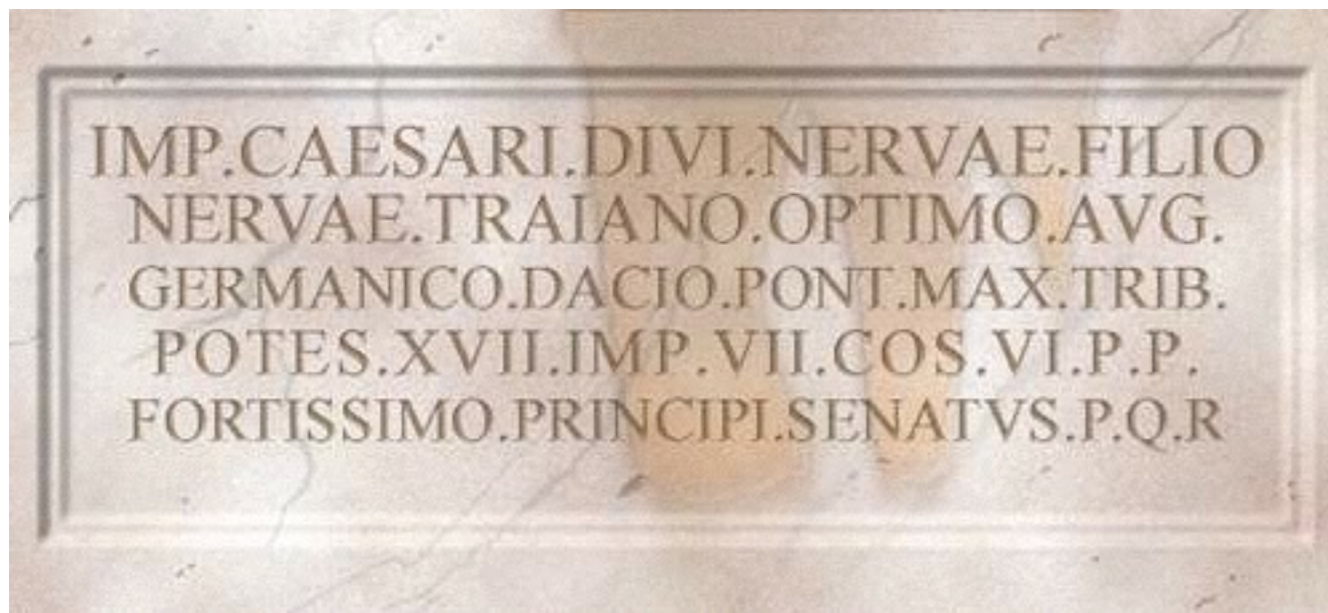
Soothly we live in mighty years!

| Anderson's "Anglic" | English | "Anglic" | English |
| --- | --- | --- | --- |
| Uncleftish | atomic | samestead | isotope |
| Beholding | theory | worldken folk | scientists |
| worldken | science | firstbit | proton |
| workstead | laboratory | forwardladen | positively charged |
| firststuff | chemical element | backwardladen | negatively charged |
| waterstuff | hydrogen | bernstonebit | electron |
| ymirstuff | uranium | neitherbit | neutron |
| aegirstuff | nepturium? | lightbit | photon |
| helstuff | plutonium? | groundwise | fundamentally |
| mote | particle | stuff and work | matter and energy |
| seedweight | mole | splitly | fissionable |
| bulkbit | molecule | lightrottish | radioactive |
| sourstuff | oxygen | togethermelting | nuclear fusion |
| sunstuff | helium | bernstoneness | electricity |
| coalstuff | carbon | | |
| chokestuff | nitrogen | | |
| yokeways | aggregation states? | | |
| kernel | nucleus | | |
| bernstonish | electric | | |

Almost all of Poul Anderson's "Anglic" scientific terms are literal translations from Latin & Greek into "native" Old English words e.g., elektron = amber, also barnstone (cf. German/Yiddish Bernstein)

# Upper and lower case



The upper case
THIS HELD THE CAPITAL LETTERS

The lower case
this held the miniscule letters

Each font and
each point size
had its own set
of cases.

Grandin Building: moveable type cases on 3rd floor [where Book of Morman was published for first time in 1830]

By Mangoman88 Wikimedia commons

- in the days before typesetting machines, the more common 'minuscule' letters were kept in the lower case of the typesetting rig, and the 'majuscule' (French) or 'capital' (English) letters kept in the upper case

- Upper case letters derive directly from Latin script

IMP.CAESARI.DIVI.NERVAE.FILIO
NERVAE.TRAIANO.OPTIMO.AVG.
GERMANICO.DACIO.PONT.MAX.TRIB.
POTES.XVII.IMP.VII.COS.VI.P.P.
FORTISSIMO.PRINCIPI.SENATVS.P.Q.R

IMP[ERATORI] CAESARI... NERVAE TRAIANO OPTIMO AUG[USTO],
To the most blessed emperor Caesar Nerva Trajan Augustus

DIVI NERVAE FILIO

Son of the "divine" Nerva

GERMANICO DACICO [victor]
[Conquerer] in Germania and Dacia [areas of present-day Germany and Romania, resp.]

PONTIF[ICI] MAX[IMO]
[to the] High Priest (pontifex maximus)

TRIB[UNICIA] POTEST[ATE] XVIII
[Vested with] the power of a Tribune 17 times

IMP[ERATORI] VII
[Declared] Imperator/Emperor [literally: he who commands] seven times

CO[N]S[ULI] VI
["Elected"] consul six times [compare: Caligula's horse only once]

P[ATRI] P[ATRIAE]
[to the] Father of the fatherland

FORTISSIMO PRINCIPI
[to the] strongest Princeps [literally: "First one", hence: "prince"]

SENATUS P[OPULUS]Q[UE] R[OMANUS]

The Senate and the People of Rome [dedicate this arch] .

# Lower case: ultimately from Latin/Roman handwriting

| Trajan | A B C D E F G H I J K L M N O P Q R S T U V W X Y Z |
| Rustic | A B C D E F G K I J K L M N O P Q R S T U V W X Y Z |
| Greek Uncial | ΑΒΓΔΕΖΗΘΙΚΛΜΝΞΟΠΡϹΤΥΦΧΨΩ |
| Uncial | a b c d e f g h i j k l m n o p q r s t u v w x y z |
| Half-Uncial | a b c d e f g h i j k l m n o p q r s t u v w x y z |
| Visgothic | a b c d e f g h i k l m n o p q r r a u x y z |
| Luxeuil | u b c d e f g h i j k l m n o p q r f s t u v w x y z |
| Beneventan | a b c d e f g h i j k l m n o p q r s t u v w x y z |
| Caroline | a b c d e f g h i j k l m n o p q r s t u v w x y z |
| Insular | a b c d e f g h i j k l m n o p q r s t u v w x y z |
| Protogothic | a b c d e f g h i j k l m n o p q r s t u v w x y z |
| Textura quadrata | a b c d e f g h i j k l m n o p q r s t u v w x y z |
| Fraktur | a b c d e f g h i j k l m n o p q r s t u v w x y z |
| Humanist | a b c d e f g h i j k l m n o p q r s t u v w x y z |
| Times | a b c d e f g h i j k l m n o p q r s t u v w x y z |

Types of capitalization

- lowercase only: Not recommended in *any* type of formal writing

- Title Case: used in titles of papers and posters, headlines, etc.

- Sentence case: the most common kind: To be discussed here

- CamelCase: used for some brand names, trade marks, service marks,… and in programming. Named after similarity to humps on camel

# Principles of sentence capitalization

1. Always capitalize the first letter of any sentence
   - in some "house styles" of journals (e.g., *Journal of Chemical Physics*), also capitalize the first letter after a colon
2. Always capitalize the first person singular personal pronoun, "I" (unless, of course, you are $\sqrt{-1}$ )
3. Always capitalize proper names and other proper nouns (more on next slide)
4. Days of the week, months of the year, holidays
   1. Would you be able to meet on Monday?
   2. I will teach French this coming December
   3. Exception: the seasons. "We are hoping for heavy rainfall this winter."
5. Titles (professional, nobility,…) are capitalized when referring to a specific person, lowercased when referring to the generic profession(al class), peerage,…
   - Among the professors at the Weizmann Institute, there was one who also happened to be a British peer: Prof. David Samuel (z"l) was also the 3rd Viscount Samuel
   - The lawyers in the United Kingdom come in two kinds: barristers (who plead the case in court) and solicitors (who do everything else). "Sir David Shawcross, QC, is a Barrister."
   - Two prominent English <u>d</u>ukes were Arthur Wellesley, 1st <u>D</u>uke of Wellington, and John Churchill, 1st <u>D</u>uke of Marlborough — although the latter was surely eclipsed by his commoner great[6]-grandson, Sir Winston Churchill
6. Capitalize names of awards, prizes, named lectures, named professorial chairs,…
   - The 2013 Nobel Prize in Chemistry, the 2012 Turing Award,…
   - The Gerhard J. Schmidt Memorial Lecture, the Sir John Kendrew Memorial Lecture
   - The Rebecca and Israel Sieff Professor of Chemistry

# Proper names and other proper nouns (1)

1. People: John C. Slater, Richard P. Feynman, Paul A. M. Dirac
2. Exception: foreign names that contain nobiliary particles or other prepositions: Ludwig van Beethoven, Louis de Broglie, E. I. Dupont de Nemours, Carl Friedrich von Weizsäcker, John von Neumann,…
   - Some names (e.g., Spanish ones) may contain conjunctions: José Ortega y Gasset
   - Many native English speakers violate this rule, since so many are unilingual/monoglot
3. (Real or fictional) countries, continents, celestial bodies,…:
   - Israel, Latvia, Denmark, the United Kingdom, Airstrip One [George Orwell, "1984"], …
   - Oceania, Europe, Antarctica,…
   - Earth, Saturn, Titan, Andromeda, the Galaxy [if our specific one is meant],
   - Middle Earth, the Star Kingdom of Manticore,…
4. Geographic regions: North Texas, Northern Ireland, Holland, the Negev,…
5. geographical features: the Judean Hills, Mount Everest, the Amazon Basin, Lake Michigan, the Caspian Sea, the Sea of Galilee, the Grand Canyon,…
6. Ethnic, religious, or cultural groups of people: Jews, Hindus, Han Chinese, Scotsmen, Basque, … Also toponyms: Londoners, Dubliners, New Yorkers, Berliners, Texans,…
7. Languages: French, English, Russian, Hebrew,…
8. Specific army units or service branches: the US Air Force, the Royal Navy, the Givati Brigade, the 101st Airborne Division. Generic units: lowercase. "Two divisions were sent to the new defense line."

# Proper names and other proper nouns (2)

8. Brand names, trade marks, service marks, model names

   - a Bruker Fourier 60 benchtop NMR, a Perkin-Elmer spectrophotometer, an Intel Haswell CPU, Amazon Prime,…

   - Exception: the registered name/trade mark/service mark/model number includes an idiosyncratic capitalization: iPad, iMac, Mac OS X,

9. Historical eras, political or literary movements, stylistic movements or eras, specific historical events,…

   - the Roaring Twenties, the Levelers, the Pre-Raphaelites, the Renaissance, Neoclassicism, the Boston Tea Party, the Second World War/World War II, the Holocaust/Shoah,…

10. Musical or theatrical performing ensembles: the Ra`anana Shakespeare Theatre, the Berlin Philharmonic, The Beatles, The Who, Deep Purple, Dream Theater, Black Sabbath, Rush

11. Common nouns if used as names for an entire class

12. Specific Divine Names (G-d, The L-rd, …)

# Title capitalization

- Commonly used in titles of papers, posters, abstracts,…
- Capitalize all "content words". Best illustrated by examples:
  - "Rules for Capitalizing the Words in a Title"
  - "The Endochronic Properties of Resublimated Thiotimoline" [chemistry paper parody by science-fiction writer Isaac Asimov, 1948]
  - "How to Win Friends and Influence People" by Dale Carnegie
    - or the parody, "How to Lose Friends and Alienate People"
  - "Stranger in a Strange Land" by Robert A. Heinlein
- *Not to be confused with German capitalization rules*, where only nouns and personal pronouns are capitalized (in addition to proper names)

  *Was glänzt, ist für den Augenblick geboren; das Echte bleibt der Nachwelt unverloren.*
  *(Goethe: What glitters, is born for the moment; the real thing remains unlost to posterity\*

# Indefinite (a/an) and definite (the) articles

- Indefinite article=**"a" or "an"**. Used for
  - **not a specific object**
  - **one of a number of the same** objects (implies they are countable)
  - Use of **"a" vs. "an" follows pronunciation**. One uses "an" before a
    - vowel: <u>an impossible</u> assignment
    - a silent consonant: <u>an honest</u> man
    - an acronym whose pronunciation starts with a vowel: an FBI ("eff-bee-aye") agent
    - otherwise, use "a"
    - <u>plural of indefinite article = no article</u> (impossible assignments, honest men)

- Definite article=**the**. Used for **one or more specific objects.**
  - The rhodium atom in the pincer complex
  - The vanadium atoms in that poly-oxometalate
- No article for:
  - countries/states/provinces/cities: I live in Spain, we will be flying to Seattle
  - lakes/mountains/bays…: He lives in a house on Lake Michigan; she lives in a villa on Puget Sound, with a view of Mount Rainier
  - Exceptions:
    - countries that are (or historically were) federations: the United Kingdom,* the Netherlands, the Russian Federation,… Exception to the exception: Great Britain*
    - supranational bodies: the European Union, the British Commonwealth,…

(*) Wales was officially annexed to England by the Acts of Union of 1536 and 1543 (under Henry VIII of the Tudor dynasty, itself originally from Wales). After Elizabeth I died without offspring in 1603, James VI of Scotland also became James I of England, bringing the two countries in "personal union". The two officially merged into the Kingdom of Great Britain in 1707.
England and Ireland had been in personal union since 1555 (under "Bloody" Mary I); in 1801 they merged into the United Kingdom [of Great Britain and Ireland]. After Irish independence in 1922, the full name changed to United Kingdom of Great Britain and Northern Ireland.

# To use or not to use (an article)?

- Articles are used for:
    - Rivers, seas, and oceans: the Atlantic, the Pacific Ocean,…
    - major forests, mountain ranges,…: the Amazon, the Himalayas, the Grand Canyon

- When speaking about things in general: no article
    - I like Russian tea
    - He plays guitar and keyboards in an Iron Maiden tribute band
        - but: he plays the Hammond organ [a very specific keyboard instrument], he plays a Fender Stratocaster guitar [a very specific model]
    - "She plays violin" but "She plays a Stradivarius violin" [by a specific luthier] or "a Powell flute" [a specific brand]
        - Slang: "She plays a mean guitar" (i.e., she can play very well)

# Related: count nouns vs. mass nouns

- Also known as: "count nouns" vs. "non-count nouns", or "countable nouns" vs. "uncountable nouns". I would have called them: "discrete" vs. "continuous" nouns
- Count nouns refer to objects that come in discrete quantities: fingers, cows, sheep, trees, people, atoms, molecules,…
- Mass nouns refer to objects that come in continuous quantities: water, gas, energy, amounts of substance,…
  - cf. the distinction between countably infinite and uncountably infinite sets in mathematics
  - other mass nouns refer to indivisible entities or abstract concepts (peace, justice)
  - some words have both count and mass usages: civilization as an abstract concept (mass noun) vs. the Greek and Mayan civilizations (specific ones)
- Differences in English:
  - Mass nouns have no plurals
  - No indefinite articles before mass nouns: "I lifted a barbell, which required energy."
  - Different quantifiers: "many" vs "few" for count nouns, "much" or "a lot" vs "little" or "a little"
  - Different quantity nouns: "a number of trees" vs. "an amount of money" or "a quantity of water/energy" (cf. "mispar etzim" vs. "skhum kesef" vs. "kamut mayim")
  - Examples:
    - He owns many cows; they need a lot of grass; irrigation costs too much money.
    - He has few sheep; they bring in little money.
    - Little energy is required to cross the barrier; the catalytic cycle has many applications

# Related: collective nouns

- The 3rd category of English nouns: names for groups of things considered as one whole
  - a flock of sheep
  - a herd of cows
  - a pack of wolves
  - a gaggle of geese
  - a mountain range
  - a soccer team, a team of scientists
  - a government, a cabinet, a town council,…
- Schoenfeld refers to a grammatical ambiguity:
  - "The team is preparing for the game" (US English, sometimes UK English) or "The team are preparing for the game" (UK English only).
  - "The band is rehearsing" (US) vs. "The band are rehearsing" (UK)

# English regular plurals for countable nouns

- Regular nouns: add "-s" to the end (pronounced "z"): cars, houses, dogs, cats,…
  - Exception 1: if the last letter is a "sibilant" (s, z, sh, tch, dzh) then "-es" instead, to avoid awkward "sss": kisses, dishes, witches
  - Exception 2: if the last letter is "-o" add "-es": heroes, potatoes
    - Exception to exception: [recent] foreign loanwords (mostly Italian), such as photos, pianos, pros, porticos, cantos, allegros
      - As a general rule, plurals for recent foreign loan words follow original language (cf. Schoenfeld)
  - Exception 3: if the last letter is a "-y" *after a consonant* then replace "-y" by "-ies": sky -> skies [poetic/literary usage], lady -> ladies, cherry -> cherries, ferry -> ferries, lorry -> lorries
    - Nouns with "-y" after a vowel have regular plurals: days, monkeys
- "Near-regular" plurals:
  - noun ending in "-f", "-fe" or another fricative: "-ves".
    - Knife -> knives, leaf -> leaves, life -> lives

# English irregular plurals for countable nouns

- Irregular plurals:
  - some nouns have identical singular and plural, despite being count nouns: sheep, buffalo, deer, aircraft, species, series, Chinese [and other -ese], Swiss,…
  - some have vowel changes: goose -> geese, tooth -> teeth, man -> men, woman -> women, foot -> feet, mouse -> mice [sometimes mouses if the computing kind]…
  - plurals from Latin and Greek follow the original [common in scientific writing]:
    - alumnus -> alumni, alumna -> alumnae, radius -> radii, syllabus -> syllabi, locus -> loci, focus -> foci
      - but: census -> censuses, caucus -> caucuses
    - axis -> axes, crisis -> crises, vertex -> vertices, apex -> apices, matrix -> matrices, index -> indices  [for the index sections of two or more book, "indexes" is OK], appendix -> appendices
    - datum -> data, medium -> media, addendum -> addenda, memorandum -> memoranda, spectrum -> spectra
    - criterion -> criteria, phenomenon -> phenomena, automaton -> automata
    - genus -> genera, viscus -> viscera
    - both formulas and formulae are correct
    - NOTE: data, media, spectra, and criteria are all plurals! You cannot have "one data/media/criteria/spectra" or "two datas/medias/criterias/spectras" — even if these linguistic abominations are commonly seen in sloppy writing by native speakers (usually unilinguals/monoglots)
      - however, "agendas" [hidden or revealed] is accepted English. Literally, an "agendum" is what we call an "action item" in contemporary English.