

# Science

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# Chapter 1

## Feibelman, 2011. *A PhD Is Not Enough!: A Guide to Survival in Science*

### Amazon/A PhD Is Not Enough!: A Guide to Survival in Science by Peter J. Feibelman

“Everything you ever need to know about making it as a scientist<sup>1</sup>.

Despite your graduate<sup>2</sup> education<sup>3</sup>, brainpower<sup>4</sup>, & technical<sup>5</sup> prowess<sup>6</sup>, your career<sup>7</sup> in scientific<sup>8</sup> research<sup>9</sup> is far from

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<sup>1</sup>**scientist** [n] a person who studies 1 or more of the natural sciences

<sup>2</sup>**graduate** [n] **1.** a person who has successfully completed a course of study, especially a person who has a 1st university degree; **2.** (*North American English*) a person who has completed their high school studies; [v] **1.** [intransitive, transitive] to get a degree, especially your 1st degree, from a university or college; **2.** [intransitive, transitive] (*North American English*) to complete a course in education, especially at high school; **3.** [intransitive] **graduate (from something) to something** to start doing something more difficult or important than what you were doing before.

<sup>3</sup>**education** [n] **1.** [uncountable, singular] a process of teaching, training & learning, especially in schools or colleges, to improve knowledge & develop skills; **2.** [uncountable] a particular kind of teaching or training; **3.** (**Education**) [uncountable] the institutions or people involved in teaching & training; **4.** (usually **Education**) [uncountable] the subject of study that deals with how to teach.

<sup>4</sup>**brainpower** [n] [uncountable] the ability to think; intelligence.

<sup>5</sup>**technical** [a] **1.** [usually before noun] connected with the use of science or technology; involving the use of machines; **2.** [usually before noun] connected with a particular type of activity, or the skills & processes needed for it; **3.** [usually before noun] (of language, writing or ideas) requiring knowledge & understanding of a particular subject; **4.** connected with the details of a law or set of rules.

<sup>6</sup>**prowess** [n] [uncountable] (*formal*) great skill at doing something.

<sup>7</sup>**career** [n] **1.** the period of time that you spend in your life working or doing a particular thing; **2.** the series of jobs that a person has in a particular area of work, usually involving more responsibility as time passes.

<sup>8</sup>**scientific** [a] [usually before noun] **1.** involving science; connected with science; **2.** done in a careful & organized way, SYNONYM: **methodical**.

<sup>9</sup>**research** [n] [uncountable] careful study of a subject, especially in order to discover new facts or information about it. The plural form **researches** is also sometimes used in British English, but is much less frequent.; [v] **1.** [transitive, intransitive] to study something carefully & try to discover new facts about it; **2.** [transitive] to collect information for an article, a book, etc.

assured<sup>10</sup>. Permanent<sup>11</sup> positions<sup>12</sup> are scarce<sup>13</sup>, science<sup>14</sup> survival<sup>15</sup> is rarely<sup>16</sup> part of formal<sup>17</sup> graduate training<sup>18</sup>, & a good mentor<sup>19</sup> is hard to find.

In *A Ph.D.<sup>20</sup>. Is Not Enough!*, physicist<sup>21</sup> PETER J. FEIBELMAN lays out<sup>22 23</sup> a rational<sup>24</sup> path<sup>25</sup> to a fulfilling<sup>26</sup> long-term<sup>27</sup> research career. He offers sound<sup>28</sup> advice<sup>29</sup> on selecting<sup>30</sup> a thesis<sup>31</sup> or postdoctoral<sup>32</sup> adviser<sup>33</sup>; choosing among

<sup>10</sup>**assured** [a] **1.** certain to happen; **2. assured of something** (of a person) certain to get something; **3.** showing confidence in yourself & your abilities.

<sup>11</sup>**permanent** [a] lasting for a long time or for all time in the future; existing all the time, OPPOSITE: **temporary**.

<sup>12</sup>**position** [n] **1.** [countable] the place where somebody/something is located; **2.** [uncountable] the place where somebody/something is meant to be; the correct place; **3.** [countable, uncountable] (**in/into a position**) the way in which somebody is sitting or standing; the way in which something is arranged; **4.** [countable, usually singular] the situation that somebody is in, especially when it affects what they can & cannot do, SYNONYM: **situation**; **5.** [countable] an opinion on or attitude towards a particular subject; **6.** [countable, uncountable] **position (of somebody/something)** the level of importance of a person, organization or thing when compared with others, SYNONYM: **status**; **7.** [countable] a job, SYNONYM: **post**; **8.** [countable] a place in a race, competition or test, when compared with others; [v] **1.** to put somebody/something in a particular position; **2.** [often passive] to put somebody/something in a particular situation, especially when it affects what they can & cannot do; **3.** to advertise a product, service or business as satisfying the needs of a particular group of customers.

<sup>13</sup>**scarce** [a] (**scarcer, scarcest**) if something is scarce, there is not enough of it & it is only available in small quantities.

<sup>14</sup>**science** [n] **1.** [uncountable] knowledge about the structure & behavior of the natural & physical world, based on facts that you can prove, e.g. by experiments; **2.** [uncountable] the study of science; **3.** [countable, uncountable] a particular branch of science, especially biology, chemistry or physics; **4.** [singular] **science of something** a system for organizing the knowledge about a particular subject; **not an exact science** [idiom] used to describe an activity that is based partly on guessing & opinions, not only on accurate measurements & set rules.

<sup>15</sup>**survival** [n] **1.** [uncountable] the state of continuing to live or exist, often despite difficulty or danger; **2.** [countable] **survival (of something)** something that has continued to exist from an earlier time, SYNONYM: **relic**; **the survival of the fittest** [idiom] the idea that only the people or things that are best adapted to their surroundings will continue to exist.

<sup>16</sup>**rarely** [adv] not often.

<sup>17</sup>**formal** [a] **1.** following strict rules of how to do something; suitable for an official occasion, OPPOSITE: **informal**; **2.** (of speech or writing) suitable for official or series situations, OPPOSITE: **informal**; **3.** (of education or training) received in a school, college or university rather than gained just through practical experience, OPPOSITE: **informal**; **4.** concerned with the form of the structure of something rather than its content; **5.** concerned only with following rules.

<sup>18</sup>**training** [n] [uncountable] the process of learning the skills that you need to do a job.

<sup>19</sup>**mentor** [n] **1.** an experienced person who advises & helps somebody with less experience over a period of time; **2.** an experienced person in a company, university, etc. who trains & advises new employees or students.

<sup>20</sup>**PhD** [n] (*also Ph.D. especially in North American English*) a university degree of a very high level that is given to somebody who has done research in a particular subject (abbr., for 'Doctor of Philosophy').

<sup>21</sup>**physicist** [n] a scientist who studies physics.

<sup>22</sup>**lay out** [phrasal verb] **lay somebody ↔ out 1.** to knock someone unconscious; **2.** to prepare a dead body to be buried; **lay something ↔ out 1.** to spread something out so that it can be seen easily or is ready to use; **2.** [often passive] to plan how something should look & arrange it in this way; **3.** to present a plan, an argument, etc. clearly & carefully, SYNONYM: **set something ↔ out**; **4.** (*informal*) to spend money, SYNONYM: **fork out (for something)**.

<sup>23</sup>**layout** [n] [usually singular] the way in which the parts of something such as the page of a book, a garden, or a building are arranged.

<sup>24</sup>**rational** [a] **1.** (of behavior or ideas) based on reason rather than emotions, OPPOSITE: **irrational**; **2.** (of a person) able to think clearly & make decisions based on reasons rather than emotions, SYNONYM: **reasonable**; OPPOSITE: **irrational**.

<sup>25</sup>**path** [n] (plural **paths**) **1.** a way or track that is built or is made by the action of people walking; **2.** [usually singular] a line along which somebody/something moves; the space in front of somebody/something as they move; **3.** (also **pathway**) a way of achieving something; **4. path (to something)** (*computing*) the logical location of a file or directory.

<sup>26</sup>**fulfil** [v] (*British English*) (*North American English fulfill*) **1. fulfil something** to do or have what is required or necessary; **2. fulfil something** to have a particular role or purpose; **3. fulfil something** to do or achieve what has hoped for or expected.

<sup>27</sup>**long-term** [usually before noun] **1.** that will last or have an effect over a long period of time into the future; **2.** that has lasted a long time & is not likely to change or be solved quickly.

<sup>28</sup>**sound** [n] **1.** [countable] something that can be heard; **2.** [uncountable] continuous movements (called **vibrations**) that travel through air or water & can be heard when they reach a person's or an animal's ear; **3.** [uncountable] what you can hear coming from a television, radio, etc., or as part of a film; [v] (not usually used in the progressive tenses) **1. linking verb** to give a particular impression when heard or read about. In spoken English, people often use **like** instead of **as if** or **as though** in this meaning. This is not correct in academic English. **Like** can be used before a noun phrase but not before a clause.; **2. (-sounding)** (in adjectives) giving the impression of being something; **3.** [intransitive, transitive] to give a signal such as a warning by making a sound; **4.** [transitive] to express a particular opinion about a situation or idea; [a] (**sounder, soundest**) **1.** sensible; that can be relied on & that will probably give good results; **2.** in good condition; not damaged or hurt; **3.** [only before noun] good & thorough.

<sup>29</sup>**advice** [n] [uncountable] an opinion or a suggestion about what somebody should do in a particular situation.

<sup>30</sup>**select** [v] **1.** to choose somebody/something from a group of people or things, usually according to a system; **2. select something (from something)** to mark something on a computer screen for a particular purpose; to choose something on a computer screen, especially from a menu; **select for/against something** (*biology*) (in terms of evolution) [phrasal verb] to be the deciding factor in whether a particular living thing or characteristic of a living thing survives; [a] [only before noun] carefully chosen as the best out of a larger group of people or things.

<sup>31</sup>**thesis** [n] (plural **theses**) **1.** a statement or an opinion that is discussed in a logical way & presented with evidence in order to prove that is true; **2. thesis on something** a long piece of writing completely by a student as part of a university degree, based on their own research.

<sup>32</sup>**postdoctoral** [a] [usually before noun] connected with advanced research or study that is done after a PhD has been completed.

<sup>33</sup>**adviser** [n] (*also advisor*) a person who gives advice, especially somebody who knows a lot about a particular subject.

research jobs in academia<sup>34</sup>, government<sup>35</sup> laboratories<sup>36</sup>, & industry<sup>37</sup>; preparing<sup>38</sup> for an employment<sup>39</sup> interview<sup>40</sup>; & defining<sup>41</sup> a research program<sup>42 43</sup>. The guidance<sup>44</sup> offered<sup>45 46</sup> in *A Ph.D. Is Not Enough!* will help you make your oral<sup>47</sup> presentations<sup>48</sup> more effective<sup>49</sup>, your journal<sup>50</sup> articles<sup>51</sup> more compelling<sup>52</sup>, & your grant<sup>53</sup> proposals<sup>54</sup> more successful<sup>55</sup>.

A classic guide for recent & soon-to-be graduates, *A Ph.D. Is Not Enough!* remains required reading for anyone on the

<sup>34</sup>**academia** [n] (also **academe**) [uncountable] the world of research & education at universities, & the people involved in it.

<sup>35</sup>**government** [n] **1.** [countable + singular or plural verb, uncountable] (often **the Government**) (abbr., **govt**) the group of people & the institutions connected with them that are responsible for controlling a country or state; **2.** [uncountable] a particular system or method of controlling a country; **3.** [uncountable] the activity or manner of controlling a country.

<sup>36</sup>**laboratory** [n] (plural **laboratories**) (also *informal lab*) a room or building containing equipment for scientific experiments, research or teaching, or for making drugs or chemicals.

<sup>37</sup>**industry** [n] (plural **industries**) **1.** [countable] the people & activities involved in producing a particular thing, or in providing a particular service; **2.** [uncountable] the production of goods from raw materials, especially in factories; **3.** [uncountable] (*formal*) the quality of working hard.

<sup>38</sup>**prepare** [v] **1.** [transitive] to make something/somebody ready to be used or to do something; **2.** [intransitive, transitive] to make yourself ready to do something or for something that you expect to happen; **3.** [transitive] **prepare something** to make food ready to be eaten; **4.** [transitive] **prepare something (from something)** to make a medicine or chemical substance, e.g. by mixing other substances together; **prepare the ground (for something)** [idiom] to make it possible or easier for something to happen or to be achieved.

<sup>39</sup>**employment** [n] [uncountable] **1.** work, especially when it is done to earn money; the state of being employed; **2.** the situation in which people have work; the number of people who have work in a country or area, OPPOSITE: **unemployment**; **3.** **employment (of somebody)** the act of employing somebody; **4.** **employment (of something)** the use of something.

<sup>40</sup>**interview** [n] **1.** a private meeting between people when questions are asked & answered; **2.** a conversation in which somebody, especially a famous person, is asked questions by a journalist in order to find out about their work & opinions & that is printed in a newspaper, shown on television, etc.; **3.** a formal meeting at which somebody is asked questions to see whether they are suitable for a particular job, or for a course of study at a college, university, etc.; **4.** **interview (with somebody)** a formal meeting at which somebody is asked questions about a crime by the police; [v] **1.** [transitive] to ask somebody questions at a private meeting; **2.** [transitive] **interview somebody (about something)** to ask somebody questions about their life, opinions, etc., especially on the radio or television or for a newspaper or magazine; **3.** [transitive] **interview somebody (for something)** to talk to somebody & ask them questions at a formal meeting in order to find out whether they are suitable for a job, course or study, etc.; **4.** [intransitive] **interview (for something)** (*especially North American English*) to talk to somebody & answer questions at a formal meeting in order to get a job, a place on a course of study, etc.

<sup>41</sup>**define** [v] **1.** to describe or show exactly the nature or extent of something; **2.** to say or explain what the meaning of a word or phrase is; **3.** to form or establish the essential character of something; **4.** **define something** to show clearly the outline or position of something.

<sup>42</sup>**program** [n] **1.** (*computing*) a set of instructions in code that control the operations or functions of a computer; **2.** (*North American English*) = **programme**; [v] **1.** to give a computer, etc. a set of instructions to make it perform a particular task; **2.** (*North American English*) = **programme**.

<sup>43</sup>**programme** [n] (*British English*) (*North American English program*) **1.** a plan or things that will be done or included in the development of something; **2.** something that people watch on television or listen to on the radio; **3.** **programme (of something)** an organized order of performances or events; **4.** (*North American English*) a course of study; [v] (*British English*) (*North American English program*) [usually passive] to make a person, an animal, etc. behave in a particular way, so that it happens automatically.

<sup>44</sup>**guidance** [n] [uncountable] **1.** help or advice that is given to somebody, especially by somebody in authority; **2.** the process of controlling the direction or position of something using special equipment.

<sup>45</sup>**offer** [v] **1.** [transitive] to give or provide something; **2.** [transitive] to say that you are willing to give something to somebody or to do something for somebody; **have something to offer** [idiom] to have something available that somebody wants.

<sup>46</sup>**offer** [n] **1.** an act of saying that you are willing to do something for somebody or give something to somebody; **2.** **offer (of something)** an amount of money that somebody is willing to pay for something; **3.** a reduction in the normal price of something, usually for a short period of time; **on offer** [idiom] that can be bought, used, etc.

<sup>47</sup>**oral** [a] **1.** [usually before noun] spoken rather than written, OPPOSITE: **written**; **2.** [only before noun] connected with the mouth.

<sup>48</sup>**presentation** [n] **1.** [countable, uncountable] the act of showing or offering information or ideas for other people to consider; an occasion when this happens; **2.** [countable, uncountable] **presentation of something** the way that somebody/something is shown or described; **3.** [uncountable] the act of giving or showing something to somebody in a formal situation; **4.** [countable, uncountable] (*medical*) the way that a condition or patient is or appears; the occasion when a condition or patient is seen or examined.

<sup>49</sup>**effective** [a] **1.** producing the result that is wanted or intended; producing a successful result, OPPOSITE: **ineffective**; **2.** [only before noun] real or actual, although not official intended; **3.** (of laws & rules) in use.

<sup>50</sup>**journal** [n] **1.** a newspaper or magazine that deals with a particular subject or profession; **2.** a written record of the things you do or see every day.

<sup>51</sup>**article** [n] **1.** a piece of writing about a particular subject in a newspaper, magazine or journal; **2.** (*law*) a separate item in a legal document, agreement or contract; **3.** **article (of something)** (*formal*) a particular item, object or separate thing, especially 1 of a set, SYNONYM: **item**; **4.** (*grammar*) the words *a* & *an* (**the indefinite article**) or *the* (**the definite article**); **article of faith** [idiom] something that you believe very strongly, as if it were a religious belief.

<sup>52</sup>**compelling** [a] **1.** that makes you think it is true or valid; **2.** making you pay attention through being so interesting & exciting; **3.** that cannot be resisted.

<sup>53</sup>**grant** [v] **1.** [often passive] to agree to give somebody what they ask for, especially formal or legal permission to do something; **2.** **grant (that)** ... to admit that something is true, although you may not like or agree with it; [n] **1.** [countable] a sum of money given by a government or other organization for a particular purpose; **2.** [uncountable] **grant (of something) (to somebody)** the action of granting something.

<sup>54</sup>**proposal** [n] **1.** a formal suggestion or plan; **2.** **proposal (that ...)** an explanation suggested for people to consider.

<sup>55</sup>**successful** [a] **1.** achieving your aims or what was intended, OPPOSITE: **unsuccessful**; **2.** having become popular &/or made a lot of money.

threshold<sup>56</sup> of a career in science. This new edition<sup>57</sup> includes 2 new chapters<sup>58</sup> & is revised & updated<sup>59</sup> throughout<sup>60</sup> to reflect<sup>61</sup> how the revolution<sup>62</sup> in electronic communication<sup>63</sup> has transformed<sup>64</sup> the field.”

## Editorial Reviews

### Review

- “It took me over 40 years to learn from experience what can be learned in 1 hour from this guide.” – Carl Djerassi
- “Breezily<sup>65</sup> written, irreverent<sup>66</sup>, & filled with useful information<sup>67</sup>. I wish something like it had been available<sup>68</sup> when I was starting out.” – Michael Weber, Cancer Center Director, University of Virginia, Charlottesville
- “I loved *A PhD Is Not Enough!* I couldn’t put it down. His writing is delightful<sup>69</sup>, & he is on target<sup>70</sup> with virtually<sup>71</sup> all of his advice.” – Steven H. Strogatz, author of *The Joy of X*

### About the Author

“A Senior Scientist at Sandia National Laboratories, PETER J. FEIBELMAN received a Ph.D. in Physics from the University of California at San Diego, did postdoctoral research at the C.E.N. Saclay (France) and the University of Illinois (Urbana), and taught for three years at Stony Brook University. Feibelman lives in Albuquerque, New Mexico.”

## Preface: What This Book Is About

“My scientific career almost never happened. I emerged<sup>72</sup> from graduate school with a PhD & excellent<sup>73</sup> technical skills but with little understanding of how to survive in science. In this, I was not unusual<sup>74</sup>. Survival skills are rarely part of the graduate curriculum<sup>75</sup>. Many professional scientists believe<sup>76</sup> that “good” students find their way on their own, while

<sup>56</sup>**threshold** [n] **1.** [countable] the level at which something starts to happen or have an effect; **2.** [singular] the point just before a new situation or period begins.

<sup>57</sup>**edition** [n] **1.** (abbr., **ed.**) **edition (of something)** the total number of copies of a book, newspaper or magazine published at 1 time; **2.** the form in which a book is published.

<sup>58</sup>**chapter** [n] **1.** (abbr., **chap.**) a separate section of a book, usually with a number or title; **2.** a period of time in history or a person’s life.

<sup>59</sup>**update** [v] **update something** to get or give somebody the most recent information about something; to add the most recent information to something; [n] **update (on something)** a report that gives the most recent information about something; a new version of something containing the most recent information.

<sup>60</sup>**throughout** [prep, adv] **1.** in or into every part of something; **2.** during the whole period of time of something.

<sup>61</sup>**reflect** [v] **1.** [transitive] to show or be a sign of what something is like or how somebody thinks or feels; **2.** [transitive] to throw back light, heat, sound, etc. from a surface; **3.** [intransitive, transitive] to think carefully & deeply about something.

<sup>62</sup>**revolution** [n] **1.** [countable, uncountable] a great change in conditions, ways of working, beliefs, etc. that affects large numbers of people; **2.** [countable, uncountable] an attempt, by a large number of people, to change the government of a country, especially by violent action; **3.** [countable, uncountable] a complete circular movement around a point.

<sup>63</sup>**communication** [n] **1.** [uncountable] the activity or process of expressing ideas & feelings or of giving people information. In business, **communication** often describes the activity or process of giving information to the public, e.g. in commercials.; **2.** [uncountable] (**communications** [plural]) methods of sending information, especially telephones, radio, computers, etc.; **3.** (**communications**) [plural] methods of traveling or transporting goods, such as roads & railways; **4.** [countable] a message, letter, email or telephone call.

<sup>64</sup>**transform** [v] **1.** **transform something/somebody (from something) (into/to something)** to change the form of something/somebody, SYNONYM: **convert**; **2.** **transform something/somebody** to completely change the appearance or character of something/somebody, especially so that it is better; **3.** **transform something (into/to something)** (*mathematics*) to change a shape, expression or function by transformation.

<sup>65</sup>**breezily** [adv] in a cheerful & relaxed way.

<sup>66</sup>**irreverent** [a] (*usually approving*) not showing respect to somebody/something that other people usually respect.

<sup>67</sup>**information** [n] [uncountable] **1.** facts or details about somebody/something that are provided or learned; **2.** data that are stored, analyzed or passed on by a computer; **3.** what is shown by a particular arrangement of things.

<sup>68</sup>**available** [a] **1.** (of things) that you can use or obtain, OPPOSITE: **unavailable**; **2.** **available (for something)** (of a person) free or willing to do something, OPPOSITE: **unavailable**.

<sup>69</sup>**delightful** [a] very pleasant, SYNONYM: **charming**.

<sup>70</sup>NQBH: **targed?**

<sup>71</sup>**virtually** [adv] **1.** almost or very nearly, so that any slight difference is not important; **2.** by the use of computer software that makes something appear to exist; **3.** by means of computers & computer networks.

<sup>72</sup>**emerge** [v] **1.** [intransitive, transitive] (of facts or ideas) to become known; **2.** [intransitive] to start to exist or appear; **3.** [intransitive] **emerge (from something) (into something)** to come out of a dark or hidden place; **4.** [intransitive] **emerge (from something)** to survive a difficult situation or experience.

<sup>73</sup>**excellent** [a] extremely good.

<sup>74</sup>**unusual** [a] different from what is usual or normal, SYNONYM: **uncommon**.

<sup>75</sup>**curriculum** [n] (plural **curricula**) the subjects that are included in a course of study or taught in a school, college or university.

<sup>76</sup>**believe** [v] (not used in the progressive tenses) **1.** [often passive] to think that something is true or possible, although you are not completely certain; **2.** to feel certain that something is true or that somebody is telling the truth; **believe in somebody/something** [phrasal verb] to feel certain that somebody/something exists; **believe in somebody** [phrasal verb] to feel that you can trust somebody &/or that they will be successful; **believe in something** [phrasal verb] to think that something is good, right or acceptable.



the remainder<sup>77</sup> cannot be helped. This justifies<sup>78</sup> neglect<sup>79</sup> &, perhaps not incidentally<sup>80</sup>, reduces work load<sup>81</sup>. There may be some sense<sup>82</sup> to the Darwinian<sup>83</sup> selection<sup>84</sup> process<sup>85</sup> implicit<sup>86</sup> in “benign<sup>87</sup> neglect,” but on the whole, failing to teach science survival results in wasting a great deal of student talent<sup>88</sup> & time, & not infrequently<sup>89</sup> makes a mess of students’ lives.

Because science survival skills are rarely taught in a direct way, most young scientists need a mentor. Some will find one in graduate school, or as a postdoctoral researcher<sup>90</sup>, or perhaps as an assistant<sup>91</sup> professor<sup>92 93</sup>. Those who do not have an excellent chance of moving from graduate study to scientific retirement<sup>94</sup> without passing through a career. The unmentored can only succeed<sup>95</sup> by being considerably<sup>96</sup> more astute<sup>97</sup> than the naive<sup>98</sup>, idealistic<sup>99</sup>, & very bright<sup>100</sup> young persons who generally<sup>101</sup> choose a science major<sup>102</sup>.

<sup>77</sup>**remainder** [n] **1.** (usually **the remainder**) [singular + singular or plural verb] the remaining people, things or time, SYNONYM: **rest**. When **the remainder** refers to a plural noun, the verb is plural.; **2.** [countable, usually singular] (*mathematics*) the numbers left after 1 number has been divided into another.

<sup>78</sup>**justify** [v] to give an explanation or excuse for something or for doing something; to show that somebody/something is right or reasonable; **the end justifies the means** [idiom] used to say that bad or unfair methods of doing something are acceptable if the result of that action is good or positive.

<sup>79</sup>**neglect** [v] **1. neglect somebody/something** to fail to take care of somebody/something; **2. neglect something** to not give enough attention to something; **3. neglect something** to ignore something because it is not important, especially in a scientific experiment, SYNONYM: **disregard**; **4. neglect to do something** to fail or forget to do something that you ought to do, SYNONYM: **omit**; [n] [uncountable] the fact of not giving enough care or attention to somebody/something; the state of not receiving enough care or attention.

<sup>80</sup>**incidentally** [adv] **1.** used to give some extra information, or to introduce a new topic; **2.** in a way that is not planned, or not of central importance, but that is concerned with something else.

<sup>81</sup>**work load** [n] the amount of work that has to be done by a particular person or organization.

<sup>82</sup>**sense** [n] **1.** [countable] the meaning that a word or phrase has; a way of understanding something; **2.** [countable] **sense of something** a feeling about something important; **3.** [singular] an understanding about something; an ability to judge something; **4.** [countable] 1 of the 5 powers (sight, hearing, smell, taste & touch) that your body uses to get information about the world around you; **make sense** [idiom] **1.** to have a meaning that can be understood; **2.** to be a sensible thing to do; **make sense of something** [idiom] to understand something that is difficult or has no clear meaning; [v] (not used in the progressive tenses) **1.** to become aware of something even though you cannot clearly see it, hear it, etc.; **2. sense something** to become aware of something by seeing it, hearing it, etc.; **3. sense something** (of a device) to discover & record or react to something.

<sup>83</sup>**Darwinian** [a] connected with the ideas of Charles Darwin.

<sup>84</sup>**selection** [n] **1.** [uncountable, countable] the process of choosing somebody/something from a group of people or things, usually according to a system; **2.** [countable] a number of people or things that have been chosen from a larger group; **3.** [countable] **selection (of something)** a collection of things from which something can be chosen, SYNONYM: **range**; **4.** [uncountable] (*biology*) (in evolution) a process in which environmental or genetic factors influence which types of living thing are more successful than others.

<sup>85</sup>**process** [n] **1.** a series of actions that are taken in order to achieve a particular result; **2.** a series of things that happen, especially ones that result in natural changes; **3.** a method of doing or making something, especially one that is used in industry; **in process** [idiom] being done; continuing; **in the process** [idiom] while doing something else, especially as a result that is not intended; **in the process of (doing) something** [idiom] in the middle of doing something that takes some time to do; [v] **1.** to treat raw material, food, etc. in order to change it, preserve it, etc.; **2. process something** to deal officially with something such as a document, application or request; **3. process something** to deal with information by performing a series of operations on it, especially using a computer.

<sup>86</sup>**implicit** [a] **1. implicit in something** forming a necessary part of something; **2.** said or written in a way that suggests something without expressing it directly, OPPOSITE: **explicit**.

<sup>87</sup>**benign** [a] **1. (medical)** not dangerous; not likely to cause death, OPPOSITE: **malignant**; **2.** not hurting anyone; not harmful.

<sup>88</sup>**talent** [n] **1.** [countable, uncountable] a natural ability to do something well; **2.** [uncountable, countable] people or a person with a natural ability to do something well.

<sup>89</sup>**infrequent** [a] not happening often, SYNONYM: **rare**. **Not infrequent** is used to mean ‘fairly frequent’., OPPOSITE: **frequent**.

<sup>90</sup>**researcher** [n] a person who does research.

<sup>91</sup>**assistant** [n] a person who helps or supports somebody, usually in their job; [a] [only before noun] (abbr., **Asst**) (often in titles) having a rank below a senior person & helping them in their work.

<sup>92</sup>**professor** [n] (abbr., **Prof.**) **1. (especially British English)** (*North American English* **full professor**) a university teacher of the highest rank; **2. (North American English)** a teacher at a university or college.

<sup>93</sup>**assistant professor** [n] (in the US & Canada) a teacher at a college or university who has a rank just below the rank of an associate professor.

<sup>94</sup>**retirement** [n] **1.** [uncountable, countable] the fact of stopping work because you have reached a particular age; the time when you do this; **2.** [uncountable] the period of your life after you have stopped work at a particular age; **3.** [uncountable] **retirement from something** the act of stopping a particular type of work, especially in sport or politics, etc.

<sup>95</sup>**succeed** [v] **1.** [intransitive] to achieve something that you have been trying to do or get; to have the result or effect that was intended. When somebody/something **only succeeds in doing something**, the opposite of what was intended is achieved.; **2.** [transitive] **succeed somebody/something** to come next after somebody/something & take their/its place or position, SYNONYM: **follow**; **3.** [intransitive] **succeed (to something)** to gain the right to a title, property, etc. when somebody dies.

<sup>96</sup>**considerably** [adv] much; a lot.

<sup>97</sup>**astute** [a] very clever & quick at seeing what to do in a particular situation, especially how to get an advantage, SYNONYM: **shrewd**.

<sup>98</sup>**naive** [a] **1. (disapproving)** lacking experience of life, knowledge or good judgment; **2. (approving)** (of people & their behavior) simple & lacking experience of life.

<sup>99</sup>**idealistic** [a] having a strong belief in perfect standards & trying to achieve them, even when this is not realistic.

<sup>100</sup>**bright** [a] (**brighter, brightest**) **1.** full of slight; shining strongly; **2.** (of a color) strong & easy to see; **3.** intelligent; quick to learn; **4.** giving reason to believe that good things will happen; likely to be successful.

<sup>101</sup>**generally** [adv] **1.** by or to most people, SYNONYM: **widely**; **2.** in most cases, SYNONYM: **usually**; **3.** without discussing the details of something.

<sup>102</sup>**major** [a] **1.** [usually before noun] large, important or serious, OPPOSITE: **minor**; **2.** [only before noun] greater or more important; main, SYNONYM: **main**; [n] (*North American English*) **1.** the main subject or course of a student at college or university; **2.** a student studying a

These thoughts have been on my mind ever since I almost had to tell Mom & Dad that their golden<sup>103</sup> boy was not good enough to find a permanent<sup>104</sup> (or any!) job in physics, a job for which his qualifications<sup>105</sup> included<sup>106</sup> 8 years of higher education<sup>107</sup> & 4 more of postdoctoral work. The agony<sup>108</sup> of those days is not easily forgotten – the boy with the high IQ, who had skipped a grade, graduated from the Bronx High School of Science at 16 & from Columbia summa cum laude<sup>109</sup> at 20, found himself in a muddle<sup>110</sup> at 28. How do you choose a research problem? How do you give a talk? What do you do to persuade<sup>111</sup> a university or a national or industrial<sup>112</sup> lab to hire<sup>113</sup> & keep you? I hadn't a clue<sup>114</sup> until, midway<sup>115</sup> through my 2nd postdoctoral job, I had the good fortune<sup>116</sup> to spend some months collaborating<sup>117</sup> with a young professor who cared whether I survived as a scientist. Although this mentoring<sup>118 119</sup> relationship<sup>120</sup> was brief<sup>121</sup>, it helped me acquire<sup>122</sup> a set of skills that graduate education did not, skills without<sup>123</sup> which my lengthy<sup>124</sup> training in physics would have been wasted.

This book is meant for those who will not be lucky<sup>125</sup> enough to find a mentor early, for those who naively suppose that getting through graduate school, doing a postdoc, etc., are enough to guarantee<sup>126</sup> a scientific career. I want you to see what

particular subject as the main part of their course.

<sup>103</sup>**golden** [a] [usually before noun] **1.** special & wonderful; successful or likely to be successful; **2.** bright yellow in color like gold. In traditional stories, **golden** is also used to say that something is made of gold.

<sup>104</sup>**permanent** [a] lasting for a long time or for all time in the future; existing all the time, OPPOSITE: **temporary**.

<sup>105</sup>**qualification** [n] **1.** [countable] (*British English*) an exam that you have passed or a course of study that you have successfully completed; **2.** [uncountable] the fact of reaching the necessary standard for something, e.g. by passing an exam; **3.** [countable] a skill, type of experience, or quality that is needed for a particular job or activity, or to be a particular thing; **4.** [countable, uncountable] information that you add to a statement to limit the effect that it has or the way it is applied.

<sup>106</sup>**include** [v] **1.** (not used in the progressive tenses) if 1 thing includes another, it has the 2nd thing as 1 of its parts; **2.** to make somebody/something part of something, or part of a group of things, OPPOSITE: **exclude**.

<sup>107</sup>**higher education** [n] [uncountable] (abbr., **HE**) education & training at college & university, especially to degree level.

<sup>108</sup>**agony** [n] [uncountable, countable] (plural **agonies**) extreme physical or mental pain.

<sup>109</sup>**summa cum laude** [adv, a] (*from Latin*) (in the US) at the highest level of achievement that students can reach when they finish their studies at college.

<sup>110</sup>**muddle** [v] (*especially British English*) **1.** to put things in the wrong order or mix them up; **2.** **muddle somebody (up)** to confuse somebody; **3.** **muddle somebody/something (up)** | **muddle A (up) with B** to confuse 1 person or thing with another, SYNONYM: **mix up**; [n] (*especially British English*) **1.** [countable, usually singular] a state in which it is difficult to think clearly; **2.** [countable, usually singular, uncountable] **muddle (about/over something)** a situation in which there is a lack of understanding about arrangements, etc. & things are done wrong; **3.** [countable, usually singular, uncountable] a state in which things are untidy & not in order, SYNONYM: **mess**.

<sup>111</sup>**persuade** [v] **1.** to make somebody do something by giving them good reasons for doing it; **2.** to make somebody believe that something is true, SYNONYM: **convince**.

<sup>112</sup>**industrial** [a] [usually before noun] **1.** connected with industry; **2.** having many industries.

<sup>113</sup>**hire** [v] **1.** **hire somebody** (*especially North American English*) to give somebody a job; **2.** **hire somebody/something (to do something)** to employ somebody for a short time to do a particular job; **3.** **hire something** (*especially British English*) to pay money to borrow something for a short time; **hire somebody/something out** [phrasal verb] (*especially British English*) to let somebody use somebody/something for a short time, in return for payment; [n] **1.** [uncountable] (*especially British English*) the act of paying to use something for a short time; **2.** [countable] (*especially North American English*) a person who has recently been given a job by a company.

<sup>114</sup>**clue** [n] a fact or a piece of evidence that helps you discover the answer to a problem.

<sup>115</sup>**midway** [adv] **1.** in the middle of a period of time; between 2 places, SYNONYM: **halfway**; **2.** with some of the characteristics of 1 thing & some of another; [a] **1.** that is at an equal distance between 2 points; that is in the middle of a period of time; **2.** having some of the characteristics of 1 thing & some of another.

<sup>116</sup>**fortune** [n] **1.** [uncountable] chance or luck, especially in the way it affects people's lives; **2.** [countable] a large amount of money; **3.** [countable, usually plural, uncountable] the good & bad things that happen to a person, family, country, etc.

<sup>117</sup>**collaborate** [v] **1.** [intransitive] to work together with somebody in order to produce or achieve something; **2.** [intransitive] **collaborate (with somebody)** to help the enemy who has taken control of your country during a war.

<sup>118</sup>**mentoring** [n] [uncountable] the practice of helping & advising a less experienced person over a period of time, especially as part of a formal programme in a company, university, etc.

<sup>119</sup>**mentorship** [n] **1.** [uncountable] the advice & help provided by a mentor to a less experienced person over a period of time, especially as part of a formal programme in a company, university, etc.; **2.** [countable] a period of time during which somebody receives advice & help from a mentor.

<sup>120</sup>**relationship** [n] **1.** [countable] the way in which 2 people, groups or countries behave towards each other or deal with each other; **2.** [countable, uncountable] the way in which 2 or more people or things are connected, SYNONYM: **relation**; **3.** [countable] a loving &/or sexual friendship between 2 people; **4.** [countable, uncountable] the way in which a person is related to somebody else in a family.

<sup>121</sup>**brief** [a] (**brief**, **briefest**) **1.** using few words; **2.** lasting only a short time, SYNONYM: **short**, OPPOSITE: **lengthy**; **in brief** [idiom] in a few words, without details; [n] **1.** (*British English*) the instructions that a person is given explaining what their job is & what their duties are; **2.** (*law*) a document giving the facts about a legal case; [v] to give somebody information about something so that they are prepared to deal with it.

<sup>122</sup>**acquire** [v] **1.** **acquire something** to learn or develop a skill, habit or quality; **2.** **acquire something** to obtain something by buying or being given it; **3.** **acquire something** to come to have a particular reputation.

<sup>123</sup>**without** [prep] **1.** not doing the action mentioned; **2.** not having, experiencing or showing something; **3.** not using or taking something.

<sup>124</sup>**lengthy** [a] (**lengthier**, **lengthiest**) very long, & often too long, in time or size.

<sup>125</sup>**lucky** [a] (**luckier**, **luckiest**) **1.** having good luck, SYNONYM: **fortunate**; **2.** being the result of good luck.

<sup>126</sup>**guarantee** [n] **1.** a firm promise that something will be done or that something will happen, SYNONYM: **assurance**; **2.** something that makes something else certain to happen; **3.** a written promise given by a company that something you buy will be replaced or repaired without payment if it goes wrong within a particular period; **4.** a written promise to pay back money that somebody else owes, or do something that somebody else promised to do, if they cannot do it themselves; [v] **1.** to promise to do or keep something; to promise something will happen or exist; **2.** to make something certain to happen; **3.** to agree to be legally responsible for something or for doing something, especially for paying back money that somebody else owes if they cannot pay it back themselves; **be guaranteed to do something** [idiom] to be certain to have a particular result.



stands between you & a career, to help you prepare for the inevitable<sup>127</sup> obstacles<sup>128</sup> before they overwhelm<sup>129</sup> you. In short, I hope to enable<sup>130</sup> you to use your exceptional<sup>131</sup> brainpower in the way that you & those who put you through school have dreamed about.

I begin with some brief case histories. This may help to put your own early career in better perspective<sup>132</sup>. At least I hope it will give you a feeling for how important mentoring can be.

Important or not, you are likely to wonder whether an elder who emerged into the scientific marketplace<sup>133</sup> when times were flush<sup>134</sup>, & advanced technology<sup>135</sup> looked very different from today's, can possibly offer you useful advice. Chap. 2 argues<sup>136</sup> that one can.

Succeeding chapters are arranged<sup>137</sup> in parallel<sup>138</sup> with a career trajectory<sup>139</sup>. Please skip<sup>140</sup> ahead<sup>141</sup> to whichever<sup>142</sup> may be relevant<sup>143</sup> to your situation<sup>144</sup>. Chap. 3 deals with choosing a thesis or a postdoctoral adviser<sup>145</sup>. My choice of thesis adviser was based on 2 criteria<sup>146</sup>: Who is the most eminent<sup>147</sup> professor in the department<sup>148</sup>? & whose students

<sup>127</sup>**inevitable** [a] **1.** that you cannot avoid or prevent, SYNONYM: **unavoidable**; **2. (the inevitable)** [n] [singular] something that is certain to happen.

<sup>128</sup>**obstacle** [n] **1.** a situation, event or fact that makes it difficult for you to do or achieve something; **2.** an object that is in your way & that makes it difficult for you to move forward.

<sup>129</sup>**overwhelm** [v] [often passive] **1.** to be so bad or so great that a person, organization or system cannot deal with it; to give too much of a thing to a person or thing; **2.** to have such a strong emotional effect on somebody that is difficult for them to resist or know how to react, SYNONYM: **overcome**; **3. overwhelm somebody** to defeat somebody completely.

<sup>130</sup>**enable** [v] **1. enable somebody to do something** to make it possible for somebody to do something, SYNONYM: **allow**; **2.** to make it possible for something to happen or exist by creating the necessary conditions, SYNONYM: **allow**.

<sup>131</sup>**exceptional** [a] **1.** very unusual; not typical; **2.** unusually good, SYNONYM: **outstanding**.

<sup>132</sup>**perspective** [n] **1.** [countable] a particular attitude towards something; a way of thinking about something, SYNONYM: **viewpoint**; **2.** [uncountable] the ability to think about problems & decisions in a reasonable way without making them seem more serious or more important than they really are; **3.** [uncountable] the art of creating an effect of depth & distance in a picture by representing people & things that are far away as being smaller than those that are nearer the front.

<sup>133</sup>**marketplace** [n] **1. (the/a marketplace)** [singular] the activity of competing with other companies to buy & sell goods or services; **2.** [countable] an open area in a town where a market is held.

<sup>134</sup>**flush** [v] **1.** [intransitive, transitive] (of a person or their face) to become red, especially because you are embarrassed, angry or hot; to make somebody's face become red; **2.** [intransitive, transitive] **flush (something)** when a toilet **flushes** or you **flush** it, water passes through it to clean it, after a handle, etc. has been pressed; **3.** [transitive] to clean something by causing water to pass through it; **4.** [transitive] **flush something + adv./prep.** to get rid of something with a sudden flow of water or other liquid; **5.** [transitive] **flush somebody/something + adv./prep.** to force a person or an animal to leave the place where they are hiding; [n] **1.** [countable, usually singular] a red color that appears on your face or body because you are embarrassed, excited or hot; **2.** [countable, usually singular] a sudden strong feeling; the hot feeling on your face or body caused by this; **3.** [singular] the act of cleaning a toilet with a sudden flow of water; **4.** [countable] (in card games) a set of cards that a player has that are all of the same suit; **(in) the 1st flush of something** [idiom] (*formal*) (at) a time when something is new, exciting & strong; [a] [not before noun] **1. (informal)** having a lot of money, usually for a short time; **2. flush with something** (of 2 surfaces) completely level with each other.

<sup>135</sup>**technology** [n] (plural **technologies**) [uncountable, countable, usually plural] equipment, machines & processes that are developed using knowledge of engineering & science; the knowledge used in developing them.

<sup>136</sup>**argue** [v] **1.** [transitive, intransitive] to give reasons why you think that something is right/wrong, true/not true, etc., especially to persuade people that you are right; **2.** [intransitive] to disagree about something; **3.** [transitive, intransitive] to show clearly that something exists or is true.

<sup>137</sup>**arrange** [v] **1.** [transitive, intransitive] to plan or organize something in advance. An **arranged marriage** is a marriage in which the parents choose the husband or wife for their child.; **2.** [transitive] **arrange something** to put something in a particular order; to make something neat or attractive.

<sup>138</sup>**parallel** [a] **1.** 2 or more lines that are parallel to each other are the same distance apart at every point; **2.** very similar; taking place at the same time; [n] **1.** [countable, uncountable] a person, a situation or an event that is very similar to another, especially one in a different place or time, SYNONYM: **equivalent**; **2.** [countable, usually plural] **parallel between A & B** a comparison between 2 things; **in parallel (with something)** [idiom] with & at the same time as something else; [v] **1. parallel something** to be similar to something; to happen at the same time as something; **2.** to be the same distance apart from something at every point.

<sup>139</sup>**trajectory** [n] (plural **trajectories**) (*specialist*) **1.** the curved path of something that has been fired, hit or thrown into the air; **2.** the way in which a person, an event or a process develops over a period of time, often leading to a particular result.

<sup>140</sup>**skip** [v] **1.** [transitive] **skip something** to not do something that you usually do or should do; **2.** [transitive, intransitive] to leave out something that would normally be the next thing that you would do or read.

<sup>141</sup>**ahead** [adv] **1.** further forward in time or space; in front; **2.** earlier.

<sup>142</sup>**whichever** [determiner, pronoun] **1.** used to say what feature or quality is important in deciding something; **2.** used to say that it does not matter which, as the result will be the same.

<sup>143</sup>**relevant** [a] **1.** closely connected with the subject you are discussing or the situation you are thinking about, OPPOSITE: **irrelevant**; **2.** [not usually before noun] valuable & useful to people in their lives & work.

<sup>144</sup>**situation** [n] **1.** all the circumstances & things that are happening at a particular time & in a particular place; **2.** the area or place where something is located.

<sup>145</sup>**adviser** [n] (also **advisor**) a person who gives advice, especially somebody who knows a lot about a particular subject.

<sup>146</sup>**criterion** [n] a standard or principle by which something is judged, or with the help of which a decision is made.

<sup>147</sup>**eminent** [a] [usually before noun] **1.** (of people) famous & respected, especially in a particular profession; **2.** (of good qualities) unusual; excellent.

<sup>148</sup>**department** [n] (abbr., **Dept**) a section of a large organization such as a government, business or university.

finish soonest? Was this intelligent<sup>149</sup>, or did it represent<sup>150</sup> a 1st mistake<sup>151</sup>? Chap. 4 concerns<sup>152</sup> oral presentation<sup>153</sup> of your work. However brilliant your insights<sup>154</sup>, they will be of little use if you cannot make them appear interesting<sup>155</sup> to others. If no one pays attention<sup>156</sup>, what difference<sup>157</sup> does it make if your results are clever<sup>158</sup>? There are of course Nobel prize<sup>159</sup> – winners<sup>160</sup> whose orations<sup>161</sup> are Delphic<sup>162</sup>, whose visuals<sup>163</sup> look as though they were put together during a particularly<sup>164</sup> turbulent<sup>165</sup> flight<sup>166</sup>, & so on. But you are not 1 of them yet, & if that is how your talks are prepared, you never will be either. There is more to Chap. 4, though, than advice on preparing appealing<sup>167</sup> slides. It contains a range of important ideas on making your oral presentations effective.

In Chap. 5, you will find a discussion<sup>168</sup> of paper writing. Through your scholarly<sup>169</sup> articles, you can make yourself known nationally<sup>170</sup> & internationally<sup>171</sup>. This means that your reputation<sup>172</sup> in science does not just depend<sup>173</sup> on what

<sup>149</sup>**intelligent** [a] **1.** good at learning, understanding & thinking in a logical way about things; showing this ability; **2.** (of an animal) able to understand & learn things; **3.** (*computing*) (of a computer or program) able to use data it has stored in new situations & to react to changes.

<sup>150</sup>**represent** [v] **1.** + **noun** *linking verb* (not used in the progressive tenses) to be something; to be equal to something, SYNONYM: **constitute**; **2.** (not used in the progressive tenses) **represent something** to be a symbol or sign of something, SYNONYM: **symbolize**; **3.** [no passive] **represent something** to be typical of something; **4.** to show or describe somebody/something in a particular way, SYNONYM: **present**; **5.** (not used in the progressive tenses) **represent somebody/something** to include a particular type or number of people or things; **6.** **be represented** + **adv./prep.** to be present to a particular degree; **7.** to act or speak for somebody/something; to attend or take part in an event on behalf of somebody; **8.** **represent somebody/something** to show somebody/something, especially in a picture or diagram, SYNONYM: **depict**; **9.** **represent something** to say or suggest something that you want somebody to believe or pay attention to.

<sup>151</sup>**mistake** [n] **1.** an action or opinion that is not correct, or that produces a result that is not wanted. **Make no mistake** is sometimes used in less formal writing to emphasize that what you are saying is correct. This use is best avoided in more formal writing.; **2.** a word, figure, fact, etc. that is not correct, SYNONYM: **error**; **by mistake** [idiom] by accident; without intending to. **By mistake** is very common in general English, & is also used in academic English. However, in academic English, the more formal **accidentally** & **unintentionally** are more common.; [v] **mistake somebody/something for somebody/something** [often passive] to think wrongly that something/somebody else.

<sup>152</sup>**concern** [v] **1.** [often passive] to affect somebody/something; to involve somebody/something; **2.** to be about something; **3.** to take an interest in something; to cause somebody to take an interest in something; **4.** [usually passive] to make somebody anxious; **5.** (**be concerned to do something**) to think it is important to do something; **as/so far as somebody/something is concerned**; **as/so far as somebody/something goes** [idiom] used to give facts or an opinion about a particular aspect of something; [n] **1.** [countable, uncountable] a feeling of being anxious, especially a feeling that is shared by many people; **2.** [countable] something that is important to a person, an organization, etc.; **3.** [singular, uncountable] **concern (for something/somebody)** a desire to protect & help somebody/something; **4.** [countable, usually singular] **concern (of something/somebody)** something that is your responsibility or that you have a right to know about.

<sup>153</sup>**presentation** [n] **1.** [countable, uncountable] the act of showing or offering information or ideas for other people to consider; an occasion when this happens; **2.** [countable, uncountable] **presentation of something** the way that somebody/something is shown or described; **3.** [uncountable] the act of giving or showing something to somebody in a formal situation; **4.** [countable, uncountable] (*medical*) the way that a condition or patient is or appears; the occasion when a condition or patient is seen or examined.

<sup>154</sup>**insight** [n] **1.** [countable, uncountable] an understanding of a particular situation or thing; **2.** [uncountable] the ability to see & understand the truth about people or situations.

<sup>155</sup>**interesting** [a] attracting your attention because it is special, exciting or unusual.

<sup>156</sup>**attention** [n] **1.** [uncountable] the act of listening to, looking at or thinking about something/somebody carefully; interest that people show in somebody/something; **2.** [uncountable] special care, action or treatment; **3.** [countable, usually plural] things done to try to please somebody or to show an interest in them.

<sup>157</sup>**difference** [n] **1.** [countable, uncountable] the way in which 2 people or things are not like each other; the state of being different, OPPOSITE: **similarity**; **2.** [uncountable, countable, usually singular] the amount by which something is greater or smaller than something else; **3.** [countable] a disagreement between people, SYNONYM: **disagreement**.

<sup>158</sup>**clever** [a] (**cleverer, cleverest**) (You can also use **more clever** & **most clever**) **1.** (*especially British English*) quick at learning & understanding things, SYNONYM: **intelligent**; **2.** **clever (at something/doing something)** (*especially British English*) skilful; **3.** showing intelligence or skill, e.g. in the design of an object, in an idea or somebody's actions.

<sup>159</sup>**Nobel Prize** [n] 1 of 6 international prizes given each year for excellent work in physics, chemistry, medicine, literature, economics & work towards world peace.

<sup>160</sup>**winner** [n] a person, team, animal, etc. that wins something.

<sup>161</sup>**oration** [n] (*formal*) a formal speech made on a public occasion, especially as part of a ceremony.

<sup>162</sup>**Delphic** [a] **1.** relating to the ancient Greek oracle at Delphi (= the place where people went to ask the gods for advice or information about the future); **2.** (*often delphic*) (*formal*) with a meaning that is deliberately hidden or difficult to understand.

<sup>163</sup>**visual** [n] a picture, piece of film, map, etc. used to make something easier to understand or more interesting.

<sup>164</sup>**particularly** [adv] especially; more than usual or more than others.

<sup>165</sup>**turbulent** [a] [usually before noun] **1.** (of air or water) changing direction suddenly & violently; **2.** in which there is a lot of sudden change; confusion, disagreement & sometimes violence.

<sup>166</sup>**flight** [n] **1.** [uncountable] the act of flying; **2.** [countable] a journey made by air, especially in a plane; a plane making a particular journey; **3.** [uncountable, singular] the act of running away from a dangerous or difficult situation; **4.** [countable] **flight (of stairs/steps)** a series steps between 2 floors or levels.

<sup>167</sup>**appealing** [a] attractive or interesting.

<sup>168</sup>**discussion** [n] [countable, uncountable] **1.** a speech or a piece of writing that discusses many different aspects of a subject; **2.** a conversation about somebody/something; the process of discussing somebody/something. If something is **under discussion**, it is being talked about so that a decision can be made.

<sup>169</sup>**scholarly** [a] **1.** involving or connected with serious academic study, SYNONYM: **academic**; **2.** having or showing a lot of knowledge as a result of serious academic study.

<sup>170</sup>**nationally** [adv] connected with a country as a whole; connected with a particular country.

<sup>171</sup>**internationally** [adv] in, by or between 2 or more countries.

<sup>172</sup>**reputation** [n] the opinion that people have about what somebody/something is like, based on what has happened in the past.

<sup>173</sup>**depend** [v] **depend on/upon something** (not used in the progressive tenses) to be affected or decided by something; **depend on/upon somebody/something (for something)** (not used in the progressive tenses) to need money or help from somebody/something else for a

your boss<sup>174</sup> says about you but also on documentation<sup>175</sup> that is readily<sup>176</sup> available<sup>177</sup> on the Internet<sup>178</sup>. You should therefore<sup>179</sup> view<sup>180</sup> publishing<sup>181</sup> as a means to attaining<sup>182</sup> job security<sup>183 184</sup> & take the task<sup>185</sup> of writing compelling<sup>186</sup> journal articles very seriously<sup>187</sup>.

Chap. 6 is devoted<sup>188</sup> to career choices, mainly<sup>189</sup> the merits<sup>190</sup> & defects<sup>191</sup> of positions in academia & in government or particular purpose.

<sup>174</sup>**boss** [n] **1.** a person who is in charge of other people at work & tells them what to do; **2.** (*informal*) a person who is in charge of a large organization; **show somebody who's boss** [idiom] to make it clear to somebody that you have more power & authority than they have; [v] **boss somebody (about/around)** to tell somebody what to do in an aggressive &/or annoying way; [a] (*especially North American English, slang*) very good.

<sup>175</sup>**documentation** [n] [uncountable] **1.** the documents that are required for something, or that give evidence or proof of something, or information about it; **2. documentation (of something)** the act of recording something in a document.

<sup>176</sup>**readily** [adv] **1.** quickly & without difficulty, SYNONYM: **freely**; **2.** in a way that shows that you do not object to something, SYNONYM: **willingly**.

<sup>177</sup>**available** [a] **1.** (of things) that you can use or obtain, OPPOSITE: **unavailable**; **2. available (for something)** (of a person) free or willing to do something, OPPOSITE: **unavailable**.

<sup>178</sup>**Internet** [n] (also **internet**) (usually **the Internet**) [singular] an international computer network which is used for finding & sharing information & for email.

<sup>179</sup>**therefore** [adv] used to introduce the logical result of something that has just been mentioned.

<sup>180</sup>**view** [n] **1.** [countable] a personal opinion about something; an attitude towards something; **2.** [singular] a way of understanding or thinking about something; **3.** [uncountable, singular] used when you are talking about whether somebody/something can be seen from a particular place; **4.** [countable] what you can see from a particular place, especially beautiful countryside; [v] **1. view somebody/something + adv./prep.** to think about somebody/something in a particular way; **2.** to look at something; **3. view something** to watch television, a film, etc.

<sup>181</sup>**publishing** [n] [uncountable] the profession, business or activity of preparing books, articles, etc. & selling them or making them available to the public.

<sup>182</sup>**attain** [v] **1. attain something** to succeed in achieving something, usually after a lot of effort; **2. attain something** to reach a particular age, size or level.

<sup>183</sup>**security** [n] (plural **securities**) **1.** [uncountable] the activities involved in protecting a country, building or person against attack or danger; **2.** [uncountable] protection against something bad that might happen in the future; the degree to which something is safe & protected; **3. (securities)** [plural] (*finance*) documents that can be bought & sold giving somebody the rights no money earned from a particular business or venture; **4.** [uncountable] the fact of agreeing that a valuable item, such as a house, will be given to somebody if you are unable to pay back the money that you have borrowed from them; **5.** [uncountable] the state of feeling happy & safe from danger or worry.

<sup>184</sup>**job security** [n] [uncountable] the state of having a job that is secure.

<sup>185</sup>**task** [n] a piece of work that has to be done; **take somebody to task (for something/for doing something)** [idiom] to criticize somebody for something.

<sup>186</sup>**compelling** [a] **1.** that makes you think it is true or valid; **2.** making you pay attention through being so interesting & exciting; **3.** that cannot be resisted.

<sup>187</sup>**seriously** [adv] **1.** to a degree that is important & worrying; **2.** carefully & sincerely; **take somebody/something seriously** [idiom] to think that somebody/something is important & deserves attention & respect.

<sup>188</sup>**devote** [v] **devote yourself to somebody/something** to give most of your time, energy or attention to somebody/something, SYNONYM: **delicate**; **devote something to something** to give an amount of time, attention or resources to something.

<sup>189</sup>**mainly** [adv] **1.** more than anything else, SYNONYM: **chiefly, primarily**; **2.** in most cases; used to talk about the largest part of a group of people or things; **3.** concerning the greater part of something.

<sup>190</sup>**merit** [n] **1.** [countable, usually plural] a good feature that deserves praise, reward or admiration, SYNONYM: **strength**; **2.** [uncountable] the quality of being good & of deserving praise, reward or admiration, SYNONYM: **worth**; [v] (not used in the progressive tenses) **merit something** to do something to deserve praise or attention, SYNONYM: **deserve**.

<sup>191</sup>**defect** [n] something that is wrong with or missing from somebody/something; [v] **1.** [intransitive] **defect (from something) (to something)** to leave a political party, country, etc. to join another that is considered to be an enemy; **2.** [intransitive] **defect (from something) (to something)** to leave a group, an arrangement or a relationship & join or start another.

industrial labs. The focus<sup>192</sup> is on being reflective<sup>193</sup> & rational<sup>194</sup> rather than naive or romantic<sup>195</sup> about key<sup>196</sup> decisions<sup>197</sup> in your scientific life. In Chap. 7, I discuss job interviews. There is more to an interview than wearing your Sunday best & having a firm<sup>198</sup> handshake<sup>199</sup>. Doing your homework<sup>200</sup> & persuading<sup>201</sup> your potential<sup>202</sup> employers<sup>203</sup> that you have a sense of direction<sup>204</sup> are the most important issues<sup>205</sup>. Incidentally<sup>206</sup>, this is not a matter<sup>207</sup> of deception<sup>208</sup> – knowing who your colleagues<sup>209</sup> will be & developing an idea of what you want to know, scientifically<sup>210</sup>, are keys to having a productive<sup>211</sup>

<sup>192</sup>**focus** [v] **1.** [intransitive, transitive] to give attention or effort to a particular thing (or to just a few things), rather than to many things. Although **focus** is most commonly used with **on** on this meaning, it is sometimes used without **on** or **upon**; **2.** [intransitive, transitive] (of a person or their eyes, or a camera, etc.) to adjust or be adjusted, so that things can be seen clearly; **3.** [transitive] (*physics*) to condense a beam of light or other energy; [n] (plural **focuses**, **foci**) **1.** [uncountable, countable, usually singular] attention or effort that is given to a particular thing (or to just a few things), rather than to lots of things. **Shift & change** are used as a verb & noun with **focus**; **2.** [countable, usually singular] the main thing that people are interested in or are working on; **3.** [uncountable, countable, usually singular] the quality or state of being seen with clear edges; a device (e.g., on a microscope) that allows this; **4.** [countable] (*physics*) = **focal point**; **5.** [countable] (*earth sciences*) the point below the earth's surface where an earthquake starts; **6.** [countable] **focus (for something)** (*medical*) the part of somebody's body in which a disease starts or is most developed; **bring something into focus** [idiom] to make something very clear, SYNONYM: **highlight**; **come into focus** [idiom] to become very clear.

<sup>193</sup>**reflective** [a] **1.** thinking carefully about things, especially about your work or studies; **2. reflective of something** typical of a particular situation or thing; showing the state or nature of something; **3.** reflective surfaces send back light or heat.

<sup>194</sup>**rational** [a] **1.** (of behavior or ideas) based on reason rather than emotions, OPPOSITE: **irrational**; **2.** (of a person) able to think clearly & make decisions based on reason rather than emotions, SYNONYM: **reasonable**, OPPOSITE: **irrational**.

<sup>195</sup>**romantic** [a] **1.** involving love between 2 people who are sexually attracted to each other; **2.** connected with love, especially in a way that is too obvious or perfect; **3.** having an attitude to life in which imagination & the emotions are especially important; not looking at situations in a realistic way; **4. (Romantic)** [usually before noun] used to describe literature, music or art, especially of the 19th century, that is concerned with strong feelings, imagination & a return to nature, rather than reason & order.

<sup>196</sup>**key** [a] most important; essential, SYNONYM: **critical**, **vital**; [n] **1.** a specially shaped piece of metal used for locking a door, starting a car, etc.; **2.** [usually singular] a thing that provides a means of achieving or understanding something, SYNONYM: **secret**; **3.** any of the buttons that you press to operate a computer or telephone; **4.** a word or system for solving a code; **5.** a set of answers to exercises or problems; **6.** a list explaining the symbols used in a map, plan, table, etc.

<sup>197</sup>**decision** [n] **1.** [countable] a choice or judgment that you make after thinking & talking about what is the best thing to do; **2.** [uncountable] the process of deciding something.

<sup>198</sup>**firm** [n] a business or company, especially one involving a partnership of 2 or more people; [a] (**firmer**, **firmest**) **1.** fairly hard; not easy to press into a different shape, OPPOSITE: **soft**; **2.** [usually before noun] not likely to change; that you can rely on; **3.** strongly fixed in place, OPPOSITE: **unstable**; **4.** showing that you are strong & in control of a situation; **5.** (of somebody's voice or hand movements) strong & steady; **stand fast/firm** [idiom] **1.** to refuse to change your opinions; **2.** to refuse to move back.

<sup>199</sup>**handshake** [n] an act of shaking somebody's hand with your own, used especially to say hello or goodbye or when you have made an agreement.

<sup>200</sup>**homework** [uncountable] **1.** work that is given by teachers for students to do at home; **2. (informal)** work that somebody does to prepare for something.

<sup>201</sup>**persuade** [v] **1.** to make somebody do something by giving them good reasons for doing it; **2.** to make somebody believe that something is true, SYNONYM: **convince**.

<sup>202</sup>**potential** [a] [only before noun] that can develop into something or be developed in the future, SYNONYM: **possible**; [n] **1.** [uncountable] the possibility of something happening or being developed or used; **2.** [uncountable] qualities that exist & can be developed; **3.** [uncountable, countable] (*physics*) the difference in voltage between 2 points in an electric field or circuit.

<sup>203</sup>**employer** [n] a person or company that pays people to work for them.

<sup>204</sup>**direction** [n] **1.** [countable, uncountable] the general position that somebody/something moves or points towards; **2.** [countable, uncountable] the general way in which somebody/something develops; **3.** [countable] the general position a person or thing comes or develops from; **4.** [uncountable] a purpose; an aim; **5. (directions)** [plural] instructions on how to do something or how to teach a place; **6.** [uncountable] the art of managing or guiding somebody/something; **pull in different/opposite directions** [idiom] to have different aims that cannot be achieved together without causing problems.

<sup>205</sup>**issue** [n] **1.** [countable] an important topic that people are discussing or arguing about; **2.** [countable] (often **issues** [plural]) a problem, concern or difficulty; **3.** [countable] 1 of a regular series of magazines or newspapers; **4.** [countable, uncountable] something that is supplied or made available for people to buy or use; the act of supplying or making available things for people to buy or use; **5.** [uncountable] (*law*) children of your own; [v] **1.** to make something known formally; to make something available publicly; **2.** [often passive] to give something to somebody, especially officially; **3. issue something** to start a legal process against somebody, especially by means of an official document; **4. issue something** to produce new stamps, coins, shares, etc. for sale to the public; **issue from something** (*formal*) [phrasal verb] to come out of something.

<sup>206</sup>**incidentally** [adv] **1.** used to give some extra information, or to introduce a new topic; **2.** in a way that is not planned, or not of central importance, but that is connected with something else.

<sup>207</sup>**matter** [n] **1.** [uncountable] a substance of a particular sort; **2.** [uncountable] physical substance in general that everything in the world consists of; **3.** [countable] a subject or situation that you must consider or deal with; **4. (matters)** [plural] the present situation; the situation that you are talking about, SYNONYM: **thing**; **5.** [singular] **matter of something** a situation that involves something or depends on something, SYNONYM: **question**; **6.** [uncountable] written or printed material; [v] [intransitive, transitive] (not used in the progressive tenses) to be important or have an important effect on somebody/something.

<sup>208</sup>**deception** [n] **1.** [uncountable] the act of deliberately making somebody believe something that is not true, SYNONYM: **deceit**; **2.** [countable] something that you say or do that is intended to make somebody believe something that is not true.

<sup>209</sup>**colleague** [n] a person that you work with, especially in a profession or business.

<sup>210</sup>**scientifically** [adv] **1.** in a way that is connected with science; **2.** in a careful & organized way.

<sup>211</sup>**productive** [a] **1.** making goods or growing crops, especially in large quantities, OPPOSITE: **unproductive**; **2.** doing or achieving a lot,



career. There are also a few choice words in this chapter about negotiations<sup>212</sup>, once you do get an offer<sup>213</sup>. Negotiating<sup>214</sup> for what you will need when your leverage<sup>215</sup> is maximal<sup>216</sup> can make a large difference to your happiness & to your success<sup>217</sup>.

In Chap. 8, I discuss what – to many – is the bane of scientific life, namely, getting money<sup>218</sup>. This used to be the exclusive<sup>219</sup> headache<sup>220</sup> of those in academia, but nowadays<sup>221</sup> it is also a significant<sup>222</sup> part of the lives of government & industrial scientists. I suggest<sup>223</sup> that you view the preparation<sup>224</sup> of a proposal<sup>225</sup> as an important scientific exercise<sup>226</sup>. Coming to see & being able to articulate<sup>227</sup> how your work fits into “the big<sup>228</sup> picture<sup>229</sup>” is essential<sup>230</sup> not only to winning

SYNONYM: **fruitful**; **3. productive of something** resulting in something or causing something; **4. (linguistics)** connected with producing language or information that you have learned, in speech or writing; **5. (medical)** (of a cough) that produces mucus.

<sup>212</sup>**negotiation** [n] [countable, usually plural, uncountable] formal discussion between people who are trying to reach an agreement.

<sup>213</sup>**offer** [v] **1.** [transitive] to give or provide something; **2.** [transitive] to say that you are willing to give something to somebody or to do something for somebody; **have something to offer** [idiom] to have something available that somebody wants; [n] **1.** an act of saying that you are willing to do something for somebody or give something to somebody; **2. offer (of something)** an amount of money that somebody is willing to pay for something; **3.** a reduction in the normal price of something, usually for a short period of time; **on offer** [idiom] that can be bought, used, etc.

<sup>214</sup>**negotiate** [v] **1.** [intransitive] to try to reach an agreement by formal discussion; **2.** [transitive] to arrange or agree something by formal discussion; **3.** [transitive] **negotiate something (+ adv./prep.)** to successfully get over or past a difficult part on a path or route; **4.** [transitive] **negotiate something (+ adv./prep.)** to successfully solve a problem that is preventing you from achieving something.

<sup>215</sup>**leverage** [n] **1.** the ability to influence what people do; **2. (finance)** the relationship between the amount of money that a company owes & the values of the assets used as security for that debt; [v] **leverage something (business)** to get as much advantage or profit as possible from something that you have.

<sup>216</sup>**maximal** [a] [usually before noun] (*specialist*) as great or as large as possible.

<sup>217</sup>**success** [n] **1.** [uncountable] the fact that something/somebody achieves a good result, OPPOSITE: **failure**; **2.** [uncountable] **success (as something)** the fact that somebody achieves a high position in a particular activity; the fact of becoming rich or famous; **3.** [countable] a thing or person that has achieved a good result & been successful, OPPOSITE: **failure**.

<sup>218</sup>**bane** [n] [singular] **the bane of somebody/something** something that causes trouble & makes people unhappy.

<sup>219</sup>**exclusive** [a] **1.** limited to 1 particular person, group or area; only given to 1 particular person, group or area; **2.** not including or allowing other things; complete; **3.** (of a group of society) not very willing to allow new people to become members, especially if they are from a lower social class, OPPOSITE: **inclusive**; **4.** that cannot exist or be a true statement at the same time as something else; **5.** of a high quality & expensive & therefore not often bought or used by most people; **6. exclusive of something** not including.

<sup>220</sup>**headache** [n] a continuous pain in the head.

<sup>221</sup>**nowadays** [adv] at the present time, in contrast with the past.

<sup>222</sup>**significant** [a] **1.** large or important enough to have an effect or to be noticed, OPPOSITE: **insignificant**; **2.** having a particular meaning; **3. (statistics)** having statistical significance, OPPOSITE: **insignificant**.

<sup>223</sup>**suggest** [v] **1.** to put forward an idea or a plan for other people to consider, SYNONYM: **propose**; **2.** to put an idea into somebody's mind; to make somebody think that something is true, SYNONYM: **indicate**; **3.** to recommend somebody/something for a particular job or purpose, SYNONYM: **recommend**. You cannot ‘suggest somebody something’; **4.** to state or express something in an indirect way, SYNONYM: **imply**; **5. suggest itself (to somebody)** (of an idea) to come into somebody's mind; **(this) is not to suggest that ...** [idiom] used to give added information that corrects or changes slightly something you have just said.

<sup>224</sup>**preparation** [n] **1.** [uncountable] the act or process of making something/somebody ready or of getting ready for something; **2.** [countable, usually plural] things that you do to get ready for something or to make something ready; **3.** [countable] a substance that has been specially prepared for use as a medicine, cosmetic, etc.

<sup>225</sup>**proposal** [n] **1.** a formal suggestion or plan; **2. proposal (that ...)** an explanation suggested for people to consider.

<sup>226</sup>**exercise** [n] **1.** [uncountable] physical or mental activity that you do to stay healthy or become stronger; **2.** [countable] a set of movements or activities that you do to stay healthy or develop a skill; **3.** [countable] a set of questions in a book that tests your knowledge or practices a skill; **4.** [uncountable] **exercise of something** the use of power, a skill, a quality or a right to make something happen; **5.** [countable] an activity that is designed to achieve a particular result; **6.** [countable, usually plural] a set of activities for training soldiers; [v] **1.** [transitive] **exercise something** to use your power, rights or personal qualities in order to achieve something; **2.** [intransitive] to do sports or other physical activities in order to stay healthy or become stronger; **3.** [transitive] **exercise something** to give a part of the body the movement & activity it needs to keep strong & healthy.

<sup>227</sup>**articulate** [v] **1.** [transitive] to express or explain your thoughts or feelings clearly in words; **2.** [transitive] **articulate (something)** to speak or pronounce something in a clear way; **3.** [intransitive, transitive] (*specialist*) to be joined to something else by a joint, so that movement is possible; to join something in this way; **4.** [intransitive] **articulate (with something) (formal)** to be connected with something so that together the 2 parts form a whole; [a] **1.** (of a person) good at expressing ideas or feelings clearly in words; **2.** (of speech or writing) clearly pronounced or expressed.

<sup>228</sup>**big** [a] (**bigger, biggest**) **1. (rather informal)** large in degree, size, amount, etc.; **2.** [only before noun] (*informal*) important; serious; **the big picture** [idiom] something considered as a whole.

<sup>229</sup>**picture** [n] **1.** a painting or drawing, etc. that shows a scene, person or thing; **2.** a photograph; **3. picture (of somebody/something)** an image on a television screen; **4. picture (of somebody/something)** a description that gives you idea in your mind of what somebody/something is like; **5. (usually the picture)** [singular] the general situation concerning somebody/something; **the big picture** [idiom] something considered as a whole; [v] **1.** to imagine somebody/something; to create an image of somebody/something in your mind; **2.** [usually passive] to describe to present somebody/something in a particular way, SYNONYM: **portray**; **3.** [usually passive] to show somebody/something in a photograph or picture.

<sup>230</sup>**essential** [a] **1.** completely necessary; extremely important in a particular situation or for a particular activity, SYNONYM: **vital**; **2.** [only before noun] connected with the most important aspect or basic nature of somebody/something, SYNONYM: **fundamental**; **3.** (of an amino acid or fatty acid) required for normal growth but not produced in the body, & therefore necessary in the diet; [n] [usually plural] **1.** something that is needed in a particular situation or in order to do a particular thing; **2. essential (of something)** an important basic fact or piece of knowledge about a subject.



financial<sup>231</sup> support<sup>232</sup> but also to being a 1st-class<sup>233 234</sup> researcher. Learning to distinguish<sup>235</sup> extravagant<sup>236</sup> “pie in the sky” from promises<sup>237</sup> that you have a chance<sup>238</sup> of fulfilling<sup>239</sup> is also very valuable<sup>240</sup>.

The most difficult<sup>241</sup> problem in being a scientist is selecting what to work on, & it is even more difficult when you are just launching<sup>242</sup> your career. Therefore, in Chap. 9, I venture<sup>243</sup> a few comments<sup>244</sup> on establishing a research program. Jumping into the hottest research area may not be a very good idea, nor is taking on a project<sup>245</sup> that you have no realistic<sup>246</sup>

<sup>231</sup>**financial** [a] [usually before noun] connected with money & finance.

<sup>232</sup>**support** [v] **1. support something** to help to show that something is true or correct, SYNONYM: **corroborate**; **2.** to agree with & encourage an idea, plan, person, group, etc., SYNONYM: **back**; **3.** to help or encourage somebody to do something; **4. support somebody/something/yourself** to provide money so that somebody can buy what they need; **5. support something** to help or encourage something to be successful by giving it money, SYNONYM: **sponsor**; **6. support something** to produce enough food & water for somebody/something; to provide a good environment for somebody/something to live in; **7. support somebody/something** to hold somebody/something in position; to prevent somebody/something from falling; [n] **1.** [uncountable, countable] approval, encouragement, help or comfort that is given to somebody/something; a person or thing that provides this; **2.** [uncountable] money or items that are provided to a person or organization that needs them; **3.** [uncountable] evidence that helps to show that something is true or correct; **4.** [uncountable] the act of holding something firmly in position or preventing it from falling; **5.** [countable] a thing that holds something in position or prevents it from falling.

<sup>233</sup>**first-class** [a] **1.** [usually before noun] in the best group; of the highest standard, SYNONYM: **excellent**; **2.** [only before noun] connected with the best & most expensive way of traveling on a train, plane or ship; **3.** [only before noun] (in the UK) connected with letters, packages, etc. that are delivered most quickly, or that cost more to send; **4.** [only before noun] used to describe a university degree of the highest class from a British university.

<sup>234</sup>**first class** [n] [uncountable] **1.** the best & most expensive seats or accommodation on a train, plane or ship; **2.** (in the UK) the class of mail that is delivered most quickly; **3.** (in the US) the class of mail that is used for letters; **4.** the highest standard of degree given by a British university.

<sup>235</sup>**distinguish** [v] **1.** [intransitive, transitive] to recognize or show the difference between 2 people or things, SYNONYM: **differentiate**; **2.** [transitive] (not used in the progressive tenses) to be a characteristic that makes 2 people, animals or things different, SYNONYM: **differentiate**; **3.** [transitive] **distinguish A (from B)** to make something different or seem different from other similar things, SYNONYM: **differentiate**; **4.** [transitive] to do something so well that people notice & admire you; **5.** [transitive] (not used in the progressive tenses) **distinguish something** to be able to see or hear something, SYNONYM: **make somebody/something out**.

<sup>236</sup>**extravagant** [a] **1.** spending a lot more money or using a lot more of something than you can afford or than is necessary; **2.** costing a lot more money than you can afford or is necessary; **3.** (of ideas, speech or behavior) very extreme or impressive but not reasonable or practical, SYNONYM: **exaggerated**.

<sup>237</sup>**promise** [n] **1.** [countable] a statement in which you say that you will definitely do something, or that something will definitely happen; **2.** [uncountable] the quality of being likely to be excellent or successful, SYNONYM: **potential**; **3.** [uncountable, singular] a sign or a reason for hope that something may happen, especially something good; [v] **1.** [intransitive, transitive] to tell somebody that you will definitely do something, or that something will definitely happen; **2.** [transitive] to make something seem likely to happen; to show signs of something.

<sup>238</sup>**chance** [n] **1.** [countable, uncountable] a possibility of something happening, especially something that you want; **2.** [countable] a suitable time or situation when you have the opportunity to do something; **3.** [countable, usually plural] used to refer to the opportunities that somebody has in their life; **4.** [uncountable] the way that some things happen without any cause that you can see or understand.

<sup>239</sup>**fulfil** [v] (*British English*) (*North American English fulfill*) **1. fulfill something** to do or have what is required or necessary; **2. fulfil something** to have a particular role or purpose; **3. fulfil something** to do or achieve what was hoped for or expected.

<sup>240</sup>**valuable** [a] **1.** very useful or important; **2.** worth a lot of money, OPPOSITE: **worthless**.

<sup>241</sup>**difficult** [a] **1.** not easy; needing effort or skill to do or to understand, SYNONYM: **hard**, OPPOSITE: **easy**; **2.** [only before noun] full of problems; causing a lot of trouble, SYNONYM: **hard**; **3.** (of people) not easy to please; not helpful, SYNONYM: **awkward, demanding; make life difficult (for somebody/something)** [idiom] to cause problems for somebody/something.

<sup>242</sup>**launch** [v] **1. launch something** to start an activity, especially an organized one; **2. launch something** to make a product available to the public for the 1st time; **3. launch something** to send something such as a satellite, weapon, etc. into space, into the sky or through water; **4. launch something** to put a ship or boat into the water, especially one that has just been built; **launch into something** [phrasal verb] to begin something in an enthusiastic way, especially something that will take a long time; [n] the action of launching something; an event at which something is launched.

<sup>243</sup>**venture** [n] **1.** a business project or activity, especially one that involves taking risks, SYNONYM: **undertaking**; [v] **1.** [intransitive] + **adv./prep.** to go somewhere or do something even though it involves risks; **2.** [transitive, intransitive] (*formal*) to say or do something in a careful way, especially because it might upset or offend somebody.

<sup>244</sup>**comment** [n] [countable, uncountable] something that you say or write that gives an opinion on or explains; [v] [intransitive, transitive] to express an opinion about something.

<sup>245</sup>**project** [n] **1.** a planned piece of work that is designed to find information about something, to produce something new or to improve something; **2.** a piece of research work done by a school or college student; **3. project (of something/of doing something)** a set of aims, ideas or activities that somebody is interested in or wants to bring to people's attention; [v] **1.** [transitive, usually passive] to estimate what the size, cost or amount of something will be in the future, based on what is happening now, SYNONYM: **forecast**; **2.** [transitive, usually passive] **be projected (for something)** to plan an activity, a project, etc. for a time in the future; **3.** [transitive] to present somebody/something/yourself to other people in a particular way, especially one that gives a good impression; **4.** [intransitive] + **adv./prep.** to stick out beyond an edge or surface; **5.** [transitive] **project something/somebody (+ adv./prep.)** to throw something or make something move forward or away; **6.** [transitive] **project something (on/onto something)** to make light, an image, etc. fall onto a flat surface or screen; **project something onto somebody** [phrasal verb] to imagine that other people have the same feelings, problems, etc. as you, especially when this is not true.

<sup>246</sup>**realistic** [a] **1.** sensible & appropriate; possible to achieve, SYNONYM: **feasible, viable**, OPPOSITE: **unrealistic**; **2.** accepting in a sensible way what is actually possible to do or achieve in a particular situation, OPPOSITE: **unrealistic**; **3.** representing things as they are in real life, OPPOSITE: **unrealistic**.

hope<sup>247</sup> of completing before your short-term<sup>248</sup> employment comes to an end. The main idea is to establish a program that simultaneously<sup>249</sup> maximizes<sup>250</sup> your chances of continuing employment & of scientific achievement<sup>251</sup>. The focus is on strategic<sup>252</sup> thinking<sup>253</sup>.

As this book is written, economic<sup>254</sup> times are tough<sup>255</sup> worldwide<sup>256</sup>, & funding<sup>257</sup> for scientific research is contracting<sup>258</sup>. I hardly<sup>259</sup> need to emphasize<sup>260</sup> that when resources<sup>261</sup> become scarce<sup>262</sup>, competition<sup>263</sup> intensifies<sup>264</sup> for what remains<sup>265</sup> available. To win a permanent position in scientific research, & the funds<sup>266</sup> to carry on<sup>267</sup> serious<sup>268</sup> work, you will have to be exceptionally<sup>269</sup> thoughtful<sup>270</sup> about your career choices. My hope is that this “pocket<sup>271</sup> mentor” will help you to become more introspective<sup>272</sup> about what it will take to succeed.

– ALBUQUERQUE, NM, Aug 1993 (updated in Jan 2010)

<sup>247</sup>**hope** [v] [intransitive, transitive] to want something to happen & think that it is possible. **Hope** can be used in the passive in the form **it is hoped that** ... In other passive sentences, **hope** must always be followed by **for**; [n] **1.** [uncountable, countable] a belief that something you want will happen; **2.** [countable] something that you wish for; **3.** [countable, usually singular] a person, a thing or a situation that will help you get what you want; **hold out (the) hope (of something/that ...)** [idiom] to hope & expect that something will happen.

<sup>248</sup>**short-term** [a] [usually before noun] lasting a short time; designed only for a short period of time in the future. **Short-term memory** is the ability to remember things that happened a short time ago.

<sup>249</sup>**simultaneously** [adv] at the same time as something else.

<sup>250</sup>**maximize** [v] (*British English also maximise*) **1.** **maximize something** to make something as large or as great as possible, **OPPOSITE:** **minimize**; **2.** **maximize something** to make the best use of something.

<sup>251</sup>**achievement** [n] **1.** [countable] a thing that somebody has done successfully, especially using their own effort & skills; **2.** [uncountable] the fact or process of achieving something; **3.** [uncountable] a child's or student's progress in a course of learning, especially as measured by standard tests.

<sup>252</sup>**strategic** [a] [usually before noun] **1.** done as part of a plan that is meant to achieve a particular purpose or to gain an advantage; **2.** connected with gaining an advantage in a war or other military situation; **3.** (of weapons, especially nuclear weapons) intended to be fired at an enemy's country rather than used in a battle.

<sup>253</sup>**thinking** [n] [uncountable] **1.** the process of thinking about something; **2.** ideas or opinions about something.

<sup>254</sup>**economic** [a] **1.** [only before noun] connected with the trade, industry & development of wealth of a country, an area or a society; **2.** producing enough profit to continue; not consisting much money, **SYNONYM:** **profitable**.

<sup>255</sup>**tough** [a] (*tougher, toughest*) **1.** (of a thing) not easily damaged; strong; **2.** (*rather informal*) having or causing problems, **SYNONYM:** **difficult**; **3.** (*rather informal*) having or causing problems, **SYNONYM:** **difficult**; **3.** (*rather informal*) demanding that laws be obeyed, & not accepting any reasons for not obeying them, **OPPOSITE:** **soft**; **4.** (*rather informal*) (of a person) strong enough to deal successfully with difficult conditions or situations. **Tough** can sometimes suggest that somebody may be violent. The more formal word **resilient** does not suggest this.

<sup>256</sup>**worldwide** [a] [usually before noun] affecting all parts of the world; [adv] in or to all parts of the world.

<sup>257</sup>**funding** [n] [uncountable] money provided by an organization or government for a particular purpose; the act of providing such money.

<sup>258</sup>**contract** [n] an official written agreement, especially one concerned with employment or selling something; [v] **1.** [intransitive, transitive] to become less or smaller; to make something become less or smaller, **OPPOSITE:** **expand**; **2.** [transitive] to get an illness; **3.** [transitive, often passive, intransitive] to make a legal agreement with somebody for them to work for you or provide you with a service; **4.** [intransitive] **contract to do something** to make a legal agreement to work for somebody or provide them with a service; **5.** [transitive] **contract a marriage/an alliance (with somebody)** to formally agree to marry somebody or form an alliance with somebody; **contract out (of something)** (*British English*) [phrasal verb] to formally agree that you will not take part in something; **contract something out (to somebody)** [phrasal verb] to arrange for work to be done by another company rather than your own.

<sup>259</sup>**hardly** [adv] **1.** used to suggest that something is not likely or not reasonable; **2.** almost no; almost not; almost none; **3.** used especially after ‘can’ or ‘could’ & before the main verb, to emphasize that it is difficult to do something.

<sup>260</sup>**emphasize** [v] (*British English also emphasise*) to give special importance to something, **SYNONYM:** **stress**.

<sup>261</sup>**resource** [n] **1.** [countable, usually plural] a supply of something that a country, an organization or a person has & can use; **2.** [countable] something that can be used to help achieve an aim, especially as a part of work or study; **3.** (**resources**) [plural] personal qualities that help you deal with a situation.

<sup>262</sup>**scarce** [a] (*scarcer, scarcest*) if something is scarce, there is not enough of it & it is only available in small quantities.

<sup>263</sup>**competition** [n] **1.** [uncountable] (used especially about the world of business) a situation in which somebody/something tries to be more successful than somebody/something else, or tries to get something rather than let somebody/something else get it; **2.** (**the competition**) [singular] a person or business that is trying to be more successful than others; goods or services that are intended to be more successful than others; **3.** [uncountable, countable] (*ecology*) a situation in which animals, plants or other living things try to get resources, with the result that other animals, plants, etc. may not be able to get them; **4.** [countable] a contest to find out who is the best at something.

<sup>264</sup>**intensify** [v] [intransitive, transitive] to increase in degree or strength; to make something increase in degree or strength, **SYNONYM:** **heighten**.

<sup>265</sup>**remain** [v] (not usually used in the progressive tenses) **1.** *linking verb* to continue to be something; to be still in the same state or condition; **2.** [intransitive] **remain (of something)** to still be present after the other parts have been removed or used; to continue to exist; **3.** [intransitive] to still need to be done, said or dealt with; **4.** [intransitive] + **adv./prep.** to stay in the same place; to not leave; **it remains to be seen (whether/what, etc.), somethin remains to be seen** [idiom] used to say that you cannot yet know something.

<sup>266</sup>**fund** [n] **1.** (**funds**) [plural] money that is available to be spent; **2.** [countable] an amount of money that has been saved or has been made available for a particular purpose; **3.** [countable] a financial organization that invests money in a range of shares, etc. for a large number of people; **4.** [singular] **fund of something** a supply of something; [v] to provide money for something, usually something official, **SYNONYM:** **finance**.

<sup>267</sup>**carry on** [phrasal verb] (*especially British English*) to continue moving; **carry on (with something)** | **carry something on** [phrasal verb] to continue doing something.

<sup>268</sup>**serious** [a] **1.** important & worrying because of possible danger or risk; **2.** that must be treated as important & thought about carefully; **3.** thinking about things in a careful & sensible way; **4.** **serious about (doing) something** sincere about something.

<sup>269</sup>**exceptionally** [adv] **1.** used before an adjective or adverb to emphasize how strong or unusual the quality is; **2.** only in unusual circumstances.

<sup>270</sup>**thoughtful** [a] showing signs of careful thought.

<sup>271</sup>**pocket** [n] **1.** a small area or group that is different from its surroundings; **2.** a small empty space inside something; **3.** (*rather informal*) used to talk about the amount of money that you have to spend.

<sup>272</sup>**introspective** [a] tending to think a lot about your own thoughts, feelings, etc.

The past 17 years have seen revolutionary<sup>273</sup> changes in how we communicate<sup>274</sup> information. Virtually<sup>275</sup> all journals are available electronically<sup>276</sup>. Preprints can be published on the Internet before or without ever being refereed<sup>277</sup>. Overhead<sup>278</sup> projectors<sup>279 280</sup> have disappeared<sup>281</sup> from scientific meetings in favor<sup>282</sup> of LCD<sup>283</sup> projectors & laptop<sup>284</sup> computers<sup>285</sup>. Résumés are often distributed<sup>286 287</sup> electronically. This update of *A PhD Is Not Enough!* comes abreast<sup>288</sup> of these changes, though<sup>289</sup> the basic content of the 1993 original<sup>290</sup> remains timely<sup>291</sup>. The communications revolution cannot be ignored<sup>292</sup> but has not made it less important to be thoughtful<sup>293</sup> about choosing your career path or to respect<sup>294</sup> audiences<sup>295</sup> &

<sup>273</sup>**revolutionary** [a] **1.** [usually before noun] connected with political revolution; **2.** involving a great or complete change; [n] (plural **revolutionaries**) a person who starts or supports a revolution, especially a political one.

<sup>274</sup>**communicate** [v] **1.** [intransitive, transitive] to exchange information, news, ideas, etc. with somebody; **2.** [intransitive, transitive] to make your ideas, feelings, thoughts, etc. known to other people so that they understand them; **3.** [intransitive] to have a good relationship because you are able to understand & talk about your own & other people's thoughts, feelings, etc.; **4.** [transitive, usually passive] **communicate something** to pass a disease from 1 person or animal to another.

<sup>275</sup>**virtually** [adv] **1.** almost or very nearly, so that any slight difference is not important; **2.** by the use of computer software that makes something appear to exist; **3.** by means of computers & computer networks.

<sup>276</sup>**electronically** [adv] in an electronic way; using a device that works in an electronic way.

<sup>277</sup>**referee** [v] **1.** (*also informal ref*) [intransitive, transitive] to act as the referee in a game; **2.** [transitive] **referee something** to read & check the quality of an academic article before it is published.

<sup>278</sup>**overhead** [adv] above your head; in the sky; [a] **1.** above your head; raised above the ground; **2.** [only before noun] connected with the general costs of running a business or an organization, e.g. paying for rent or electricity; [n] (*especially North American English*) (*also overheads especially in British English*) [uncountable] regular costs that you have when you are running a business or an organization, such as rent, electricity, wages, etc.

<sup>279</sup>**projector** [n] a piece of equipment for projecting photographs, films or computer slides onto a screen.

<sup>280</sup>**overhead projector** [n] (abbr., **OHP**) a piece of equipment that projects an image onto a wall or screen so that many people can see it.

<sup>281</sup>**disappear** [v] **1.** [intransitive] to stop existing, SYNONYM: **vanish**; **2.** [intransitive] to become impossible to see, SYNONYM: **vanish**; **3.** [intransitive] to become lost or impossible to find, SYNONYM: **vanish**.

<sup>282</sup>**favour** [n] (*US favor*) **1.** [countable] a thing that you do to help somebody; **2.** [uncountable] approval or support for somebody/something; in favor (of somebody/something) [idiom] **1.** supporting & agreeing with something/somebody; **2.** likely to produce a particular result, often in an unfair way; **3.** in exchange for another thing (because the other thing is better or you want it more); [v] **1.** to prefer 1 thing to another, especially a particular system, plan or way of doing something; **2.** to treat somebody/something better than others, especially in an unfair way; **3.** **favor something** to provide suitable conditions for something; to make it easier for something to happen.

<sup>283</sup>**LCD** [n] **1. liquid crystal display** (a way of showing information in electronic equipment. An electric current is passed through a special liquid & numbers & letters can be seen on a small screen.); **2.** lowest common denominator.

<sup>284</sup>**laptop** [n] (*also laptop computer*) a small computer that can work with a battery & be easily carried.

<sup>285</sup>**computer** [n] an electronic machine that can store, organize & find data, do calculations & control other machines.

<sup>286</sup>**distribute** [v] **1.** [transitive, often passive] to give something, or a share of something, to a large number of people; **2.** [transitive] **distribute something** to send goods to shops & businesses so that they can be sold; **3.** [intransitive, transitive] to spread or spread something in a particular way.

<sup>287</sup>**distributed** [a] (+ **adv./prep.**) spread over a particular area; existing in a particular way. In computing, a **distributed system** is any system in which a number of individual computers are linked into a network & can work together.

<sup>288</sup>**abreast** [adv] next to somebody/something & facing the same way; **keep abreast of something** [idiom] to make sure that you know all the most recent facts about a subject.

<sup>289</sup>**though** [conjunction] **1.** despite the fact that, SYNONYM: **although**; **2.** used to add a fact or an opinion that makes the previous statement less strong or less important, SYNONYM: **but**; **as if/as though** [idiom] in a way that suggests something; [adv] however; used to add a fact or an opinion that contrasts with a statement that has been made or makes it less true or important. In spoken English, **though** as an adverb is often used at the end of a sentence. However, this can sound very informal & is best avoided in academic writing. Unlike 'however', **though** cannot be used as an adverb at the beginning of a sentence.

<sup>290</sup>**original** [a] **1.** [only before noun] present or existing from the beginning; 1st or earliest; **2.** new & interesting in a way that is different from anything that has existed before; able to produce new & interesting ideas; **3.** [usually before noun] painted, written, etc. by the artist rather than copied; [n] **1.** the earliest form of something, from which copies are later made; **2.** a book, text or play in the language in which it was 1st written; **in the original** [idiom] in the language in which a book, etc. was 1st written, before being translated.

<sup>291</sup>**timely** [a] happening at exactly the right time.

<sup>292</sup>**ignore** [v] **1. ignore something** to deliberately pay no attention to something, SYNONYM: **disregard**; **2. ignore something** to fail to consider an important aspect of something.

<sup>293</sup>**thoughtful** [a] showing signs of careful thought.

<sup>294</sup>**respect** [n] **1.** [countable] a particular aspect or detail of something; **2.** [uncountable, singular] polite behavior towards or reasonable treatment of somebody/something; **3.** [uncountable, singular] a feeling of admiration for somebody/something because of their good qualities or achievements; **in respect of something** [idiom] (*formal*) **1.** concerning; **2.** in payment for something; **with respect** [idiom] used when you are going to disagree, usually quite strongly, with somebody; **with respect to something** [idiom] concerning; [v] **1. respect something** to agree not to break a law or principle; **2.** to be careful not to do something that people would consider to be wrong; to treat somebody in a way that shows that you think they are important; **3.** [often passive] (not usually used in the progressive tenses) to have a good opinion of somebody/something; to admire somebody/something.

<sup>295</sup>**audience** [n] **1.** [countable + singular or plural verb] the people who are watching or listening to a play, concert, somebody speaking, etc.; **2.** [countable] a number of people or a particular group of people who watch, read or listen to the same thing; **3.** [countable] **audience with somebody** a formal meeting with an important person.

readers<sup>296</sup>. I still attend<sup>297</sup> talks<sup>298</sup> that make me squirm<sup>299</sup> & struggle<sup>300</sup> to read sleep-inducing scientific articles. I hope attentive<sup>301</sup> readers of this book will reap<sup>302</sup> the rewards<sup>303</sup> of doing better.

– ALBUQUERQUE, NM, Jan 2010” – Feibelman, 2011, Preface: What This Book Is About, pp. xi–xvii

## Acknowledgments

“... numerous constructive<sup>304</sup> criticisms<sup>305</sup> of the 1st draft<sup>306</sup>.” [...] “... critical<sup>307</sup> readings<sup>308</sup> of the manuscript<sup>309</sup>.” [...] “... many editorial<sup>310</sup> improvements<sup>311</sup>.” – Feibelman, 2011, Acknowledgments, p. xix

## 1.1 Do You See Yourself in This Picture?

“A set of nonfiction vignettes illustrating some of the ways that young scientists make their lives more unpleasant than necessary or fail entirely to establish themselves in a research career.”

<sup>296</sup>**reader** [n] **1.** a person who is reading something; **2.** a person who reads a particular newspaper, magazine, etc.; **3.** (*computing*) an electronic device that reads data stored in 1 form & changes them into another form so that a computer can perform operations on them; **4.** (usually **Reader**) **reader (in something)** a senior teacher at a British university just below the rank of a professor.

<sup>297</sup>**attend** [v] **1.** [intransitive, transitive] to be present at an event; **2.** [intransitive, transitive] to go regularly to a place; **3.** [intransitive] (*formal*) to pay attention to something; **4.** [transitive] **attend something** (*formal*) to happen at the same time as, or as a result of, something; **5.** [transitive] **attend somebody** to be with somebody & help them; **attend to somebody/something** [phrasal verb] to deal with somebody/something; to take care of somebody/something.

<sup>298</sup>**talk** [v] **1.** [intransitive] to say things or have a conversation with somebody; to use words in order to give information or to express feelings or ideas; **2.** [intransitive, transitive] to use words; to say words in a language; [n] **1.** [countable] an informal speech or lecture on a particular subject; **2.** (**talks**) [plural] formal discussions between governments or organizations; **3.** [uncountable] (often in compounds) conversation or a way of speaking; **4.** [uncountable] stories & statements that suggest a particular thing might happen in the future; **5.** [countable] **talk (with somebody)** a conversation or discussion; **6.** [uncountable] words that are spoken, but without the necessary facts or actions to support them.

<sup>299</sup>**squirm** [v] **1.** [intransitive] to move around a lot making small twisting movements, because you are nervous, uncomfortable, etc., SYNONYM: **wriggle**; **2.** [intransitive] to feel very embarrassed or ashamed.

<sup>300</sup>**struggle** [n] **1.** [countable] a hard fight in which people try to obtain or achieve something, especially something that somebody else does not want them to have, SYNONYM: **battle**; **2.** [singular] **struggle to do something** something that is difficult for you to do or achieve, SYNONYM: **effort**; **3.** [countable] a physical fight between 2 people or groups, especially when 1 of them is trying to escape, or to get something from the other, SYNONYM: **fight**; [v] **1.** [intransitive] to try very hard to do something when it is difficult or when there are a lot of problems; **2.** [intransitive] to fight against somebody/something in order to prevent a bad situation or result; **3.** [intransitive] to compete or argue with somebody, especially in order to get something.

<sup>301</sup>**attentive** [a] **1.** reading, listening or watching carefully & with interest; **2.** helpful; making sure that people have what they need.

<sup>302</sup>**reap** [v] **reap something** to obtain something, especially something good, as a direct result of something that you have done.

<sup>303</sup>**reward** [n] **1.** [countable, uncountable] a thing that you are given, or something good that happens, because you have done something good, worked hard, etc.; **2.** [countable] an amount of money that is offered to encourage people to do something, such as help the police find a criminal, find something that is lost, etc.; [v] [often passive] to give something to somebody because they have done something good, worked hard, etc.

<sup>304</sup>**constructive** [a] having a useful & helpful effect rather than being negative or with no purpose.

<sup>305</sup>**criticism** [n] **1.** [uncountable, countable] the act of expressing disapproval of somebody/something & opinions about their faults or bad qualities; a statement showing disapproval; **2.** [uncountable] the work or activity of analyzing & making fair, careful judgments about somebody/something, especially books, music, etc.

<sup>306</sup>**draft** [n] **1.** [countable] a rough written version of something that is not yet in its final form; **2.** (**the draft**) [singular] (*US*) = **conscript**; [v] (also **draught** especially in *British English*) **1.** **draft something** to write the 1st rough version of something such as a letter, speech or book; **2.** [usually passive] **be drafted + adv./prep.** to choose people & send them somewhere for a special task; **3.** [usually passive] **be drafted (into something)** (*US*) = **conscript**.

<sup>307</sup>**critical** [a] **1.** extremely important, e.g. because a future situation will be affected by it, SYNONYM: **crucial**; **2.** involving making fair, careful judgments about the good & bad qualities of somebody/something, OPPOSITE: **uncritical**; **3.** challenging traditional ideas in the study of society, literature, etc.; **4.** (of a text) containing detailed notes & analysis by an expert; **5.** **critical (of somebody/something)** expressing disapproval of somebody/something & saying what you think is bad about them/it; **6.** used to describe a situation that is serious & uncertain & in which bad things could happen; **7.** [only before noun] according to the judgment of people whose job is to write or broadcast their opinions about art, music, plays, etc.

<sup>308</sup>**reading** [n] **1.** [uncountable] books or articles that are intended to be read; **2.** [singular, uncountable] an act of reading something; **3.** [uncountable] the activity of somebody who reads; **4.** [countable] **reading (of something)** the particular way in which you understand something, such as a book or a situation, SYNONYM: **interpretation**; **5.** [countable] 1 of the stages during which a bill must be discussed & accepted by a parliament before it can become law; **6.** [countable] the amount or number shown on an instrument used for measuring something; **7.** [countable] **reading (of something)** an event at which something is read to an audience for entertainment; a piece of literature that is read at such an event.

<sup>309</sup>**manuscript** [n] (abbr., **MS**) **1.** [countable, uncountable] a copy of a book, piece of music, etc. before it has been printed; **2.** [countable] a book, document or piece of music written by hand rather than typed or printed, especially a very old one.

<sup>310</sup>**editorial** [a] [usually before noun] connected with the task of preparing something such as a newspaper, a book, or a television or radio programme, to be published or broadcast; [n] an important article in a journal or a newspaper, that expresses the editor's opinion about an issue.

<sup>311</sup>**improvement** [n] **1.** [uncountable] the act of making something better; the process of something becoming better; **2.** [countable] a change in something that makes it better; something that is better than it was before.



## 1.2 Advice from a Dinosaur?

“Can you expect someone to be an effective mentor who emerged into the scientific marketplace in a world that looked very different?”

## 1.3 Important Choices: A Thesis Adviser, a Postdoctoral Job

“A discussion of what to consider: young adviser versus an older one, a superstar versus a journeyman, a small group versus a “factory.” Understanding & attending to *your* interests as a postdoc.”

; 4.

## 1.4 Giving Talks

“Preparing talks that will make people want to hire & keep you & that will make the information you present easy to assimilate.”

## 1.5 Writing Papers: Publishing Without Perishing

“Why it is important to write good papers. When to write up your work, how to draw the reader in, how to draw attention to your results.”

## 1.6 From Here to Tenure: Choosing a Career Path

“An unsentimental comparison of the merits of jobs in academia, industry, & in government laboratories.”

## 1.7 Job Interviews

“What will happen on your interview trip; the questions you had better be prepared to answer.”

## 1.8 Getting Funded

“What goes into an effective grant proposal; how & when to start writing one.”

## 1.9 Establishing a Research Program

“Tuning your research efforts to your own capabilities & your situation in life; e.g., why not to start a 5-year project when you have a 2-year postdoctoral appointment.”

## 1.10 A Survival Checklist

“Do not attempt a takeoff before being sure the flaps are down.”

## 1.11 Afterthoughts

“A behaviorist approach to professional success.”



# Bibliography

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# Bibliography

Feibelman, Peter J. (2011). *A PhD Is Not Enough!: A Guide to Survival in Science*. Basic Books, p. 176.