

# Reading Your Way into Technical Writing

■ 叶云屏 邢清清 张 剑 编著

## 科技英语读写 ——方法与实践

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高等教育出版社  
HIGHER EDUCATION PRESS

图书在版编目(CIP)数据

科技英语读写:方法与实践:英文/叶云屏,邢清清,  
张剑编著. —北京:高等教育出版社, 2007. 5  
ISBN 978-7-04-021660-8

I. 科… II. ①叶…②邢…③张… III. ①科学技术—英  
语—阅读教学—高等学校—教材②科学技术—英语—写  
作—高等学校—教材 IV. H31

中国版本图书馆CIP数据核字(2007)第062190号

策划编辑 贾巍巍  
版式设计 孙伟

责任编辑 刘丽燕  
责任校对 刘丽燕

封面设计 王凌波  
责任印制 毛斯璐

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出版发行 高等教育出版社

社 址 北京市西城区德外大街4号

邮政编码 100011

总 机 010-58581000

经 销 蓝色畅想图书发行有限公司

印 刷 北京嘉实印刷有限公司

购书热线 010-58581118

免费咨询 800-810-0598

网 址 <http://www.hep.edu.cn>

<http://www.hep.com.cn>

网上订购 <http://www.landaco.com>

<http://www.landaco.com.cn>

畅想教育 <http://www.widedu.com>

开 本 850 × 1168 1/16

印 张 24.5

字 数 630 000

版 次 2007 年 5 月 第 1 版

印 次 2007 年 5 月 第 1 次印刷

定 价 34.00 元

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本书如有缺页、倒页、脱页等质量问题,请到所购图书销售部门联系调换。

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物料号 21660-00

# 前言

## 一、指导思想

根据《高等学校英语专业英语教学大纲(2000年)》的要求,21世纪英语专业人才应该打好扎实的英语语言基础,牢固掌握英语专业知识,同时要拓宽人文学科知识和科学知识,并具有获取知识的能力、独立思考的能力和创新能力。英语专业基础阶段的课程设置与教学任务主要围绕听、说、读、写、译技能和方法的训练,为进入高年级打下扎实的基础。大纲强调,高年级的主要教学任务之一仍然是打好语言基本功,语言技能的训练应自始至终贯穿四年的教学过程。

那么,英语专业到了高级阶段,如何在有限的学时内继续加强语言技能的训练,又拓宽学生的文化知识和科学知识,同时又在教学中贯彻素质教育的理念,培养学生的独立思考能力和创新能力,提高他们的文化素质和心理素质呢?这一问题直接关系到教学理念的更新、课程设置的调整,及教学内容和方法的改革。

在新世纪英语教学大纲的指导下,我们对英语专业高年级阶段的教学任务与目标进行了认真思考。认为英语教学到了高级阶段,语言技能的训练应该为学生在今后实际工作中用英语进行真正意义上的信息交流和学术交流打下坚实基础。也就是说,高级阶段的英语技能训练不是为学习而学习,而是为了使用而学习,使英语成为信息交流、思想交流和学术交流的有效工具。

出于这一指导思想,我们在北京理工大学教务处的有力支持下,着手编写这本《科技英语读写——方法与实践》一书,作为我校英语专业的特色教材之一,并试图填补英语专业科技英语教材的空白。

编写此教材的主要目的有四个方面:

1. 继续培养学生的英语技能,但语言技能的培养上升到语篇和语体的层面。使学生熟悉科技文章的体裁特征、语篇特征和语体特征,增强英语语体意识,提高语言鉴赏能力。
2. 培养学生用英语获取知识和信息的能力和效率。指导并训练学生阅读原版英语科技期刊文章,从而使他们掌握一套以获取知识和信息为目的的有效阅读方法。
3. 提高学生的英语应用能力和产出能力。引导学生对获取的信息进行分析、思考和运用。
4. 拓宽学生的科技视野和学术视野,扩大知识面。激发学生积极、深入地思考问题,培养科学、严谨和创造性思维方式。

## 二、选材原则

阅读材料具有高度的科学性、学术性、信息性和实用性。文章选自几种国际的知名科学技术期刊,如 *Scientific American*, *Nature*, *American Scientist*, *New Scientist* 等。为了保持文章的真实性和完整性,一般不作删减或改写,旨在培养学生在有限的时间内读懂一篇3 000字左右的文章、从中获取知识和信息的能力。选材主要考虑以下原则:

### 1. 题材丰富多样,体裁有代表性

所选文章涉及多个学科领域,如能源、建筑设计、交通运输、航空航天、基因工程、生命科学、医学等。更重要的是,这些文章讨论的问题不只是人们一时关心的焦点,而是人们长期关注的问题,值得科技人员研究,学术价值较高。

所选文章代表多种科技文章体裁,如科技报道、科技评述、研究论文、研究报告等。每篇文章的写作目的和特点也不同,学生通过阅读和分析,可了解不同体裁文章的宏观结构模式和写



作特点。

## 2. 文章目的明确, 层次清晰, 写作方法值得借鉴

每单元的标题反映了本单元的学习目的, 也代表本单元所选文章的写作目的。如 Solving a problem, Testing a hypothesis, Explaining a mechanism, Offering a critical review, Presenting and illustrating an argument 等。所选文章写作目的明确, 脉络清晰, 论述方法灵活, 并体现作者对问题的独特见解。而这些见解是通过细密而客观的描述和分析得出的, 反映了科技工作者严谨的逻辑思维方式和治学态度, 值得文科学生借鉴。

## 3. 语言风格既庄重得体, 又丰富生动

人们普遍认为科技英语的语言风格正式、严谨、凝重, 甚至有些刻板。而本教材所选文章除了科技文体所具有的普遍优点外, 还具有真实鲜活、丰富生动的特点, 有的还带有一丝淡淡的幽默。作者在信息传播过程中, 把活生生的读者放在心中, 在科学思想中也适当注入人文精神, 读起来妙趣横生, 值得细细品味。

## 4. 知识性强, 信息量大, 能够激发学生的学习兴趣

所选的文章能够点燃学生智慧的火花, 培养他们对科学的兴趣, 引发他们的创造性思维, 培养他们分析问题和解决问题的能力。

## 三、编写理念

此教材的编写贯彻培养学生综合素质的教育理念, 遵守教师为主导、学生为主体的教学原则, 采用从教师引导到学生完成任务的教学模式, 最大限度培养学生获取知识和信息的能力、创造性思维能力, 及表达思想的能力。

任务的设计采用自上而下的方略, 从把握文章的主旨和宏观结构到理解细节和语言特点, 以训练学生掌握阅读长文章的策略。任务的设计以理解意义为目的, 而不是以学习生词、词组或句型为目的。对语言特点的识别与分析, 是为了培养学生的语言鉴赏能力, 了解语言形式是如何为表达意义服务的。

任务的设计还体现读者与文章的互动关系, 以及从输入到产出的过程, 继续培养和巩固学生的综合英语应用能力, 实现用英语进行信息交流的目的。

## 四、教材结构

此教材分两大部分。第一部分是 Reading your way into technical writing, 由 11 个单元组成, 是教材的主体。第二部分是 Extending your scope of reading, 由 11 篇文章组成, 供学生进行课外阅读。

第一部分每个单元由 Objectives; Preparing for reading; Surveying; Reading; Analyzing macro-structure; Grasping essential points; Understanding language features; Organizing details; Responding to the text 和 Writing 10 大块内容构成。

Objectives 目标: 介绍本单元的主要学习内容和目的, 使学生有目的地学习。

Preparing for reading 阅读准备: 解释本单元阅读材料中的关键词语、术语或概念, 使学生有准备地阅读。

Surveying 纵览: 学生通过标题、副标题、小节标题、文章的开头和结尾等, 预测文章的

主旨、大意、深度和难度,使学生带着问题积极阅读。

**Reading 阅读:**文章选自国际知名科学技术期刊,长度一般在3000单词左右,为了保持文章的真实性,一般不作删减。由于教学目的不再停留在词汇和句子层面,所以文中的生词、词组、难句或其他语言难点只注释,文章后面不编写词句练习。

**Analyzing macro-structure 宏观结构分析:**macro-structure(宏观结构)也叫 schema(构思图式)、rhetorical structure(修辞结构)或 discourse structure(语篇结构),体现了作者为实现其写作目的所采用的谋篇方法和策略。此部分是训练的重点之一。

**Grasping essential points 文章要点理解:**学生需要细读文章,抓住文章介绍或论述的主要内容、基本观点或关键问题等。

**Understanding language features 语言特点理解:**分析文章中出现的典型语言特点和这些语言特点在实现作者写作目的中的作用,以提高学生的语言欣赏水平和文体意识,以及对语言的操纵能力。

**Organizing details 组织细节的方法:**分析文章中出现的重要写作技巧、分析问题的方法或组织信息的模式,为学生的写作开阔思路。

**Responding to the text 读后感:**要求学生针对阅读的内容发表感想,表达观点,或进一步论述文章中涉及的问题。在此过程中,学生必然会用到阅读文章中出现的词语、句子和概念,这样可以帮助学生丰富自己的语汇,提高语言表达能力。更重要的是能够培养学生批评性阅读能力和独立思考能力,为今后阅读学术文献奠定基础。

**Writing 写作练习:**此部分是开放式话题写作,但目的很明确,学生可以仿效阅读材料中采用的某种写作技巧、分析问题的方法或组织信息的模式,从而完成从输入到产出的学习过程,实现以读带写的目标。

## 五、学时安排

此教材供一学期使用。每个单元约需要4学时。Preparing for reading; Surveying; Reading; Analyzing the macro-structure 等部分用2学时,Grasping essential points; Understanding language features; Organizing details 用1.5学时,Responding to the text 和 Writing 部分用0.5学时。教师在课堂上主要起导读的作用,指导、鼓励并帮助学生完成每单元设计的9项任务,解决学生完成任务过程中的困难,指导并点评学生的写作。每单元设计的任务均由学生自己完成,但应该鼓励学生在课堂上讨论。通过讨论,学生会发现并解决疑点,对文章有更准确的理解。

此教材虽然定位为英语专业高年级教材,但是,非英语专业的大学生和研究生在达到大学英语四级或六级水平后,学习此教材能够实现从英语学习到英语运用的过渡,填补大学英语教学中的缺口,为完成今后实际工作或科学研究中信息交流或学术交流的任务打下基础。

由于课时限制,没有选修科技英语课的学生,通过自学此教材,定会取得预期的效果。

在此教材的编写工作即将完成之际,我们非常感谢北京理工大学教务处对英语专业建设的重视与支持。同时也非常感谢全国高等学校外语专业教学指导委员会委员秦秀白教授、刘世生教授和孙宏教授为此教材编写提出的宝贵建议。另外,在此教材的编写过程中,我们从期刊里挑选了一些信息量大、语言丰富、表达力强,能够引发学生积极思考的文章,编写成讲义,首先供北京理工大学英语专业学生在课堂上使用。学生对此表现出浓厚的兴趣,不仅觉得开阔了科技视野,更重要的是学会了思考问题和分析问题的方法,并大大丰富了英语语汇,写出来的作文往往

达到 1 000 多字。学生的良好反映和教学效果为我们编写教材建立了信心，在此，我们衷心感谢北京理工大学英语专业 2001 级到 2004 级学生的密切配合。这里我们特别要感谢的是高等教育出版社贾巍和常少华同志，他们对本教材样稿提出了宝贵意见。

由于编者水平有限，加上时间仓促，教材中难免出现各种错误，请广大师生不吝指正。

编者

2007 年 3 月于北京理工大学

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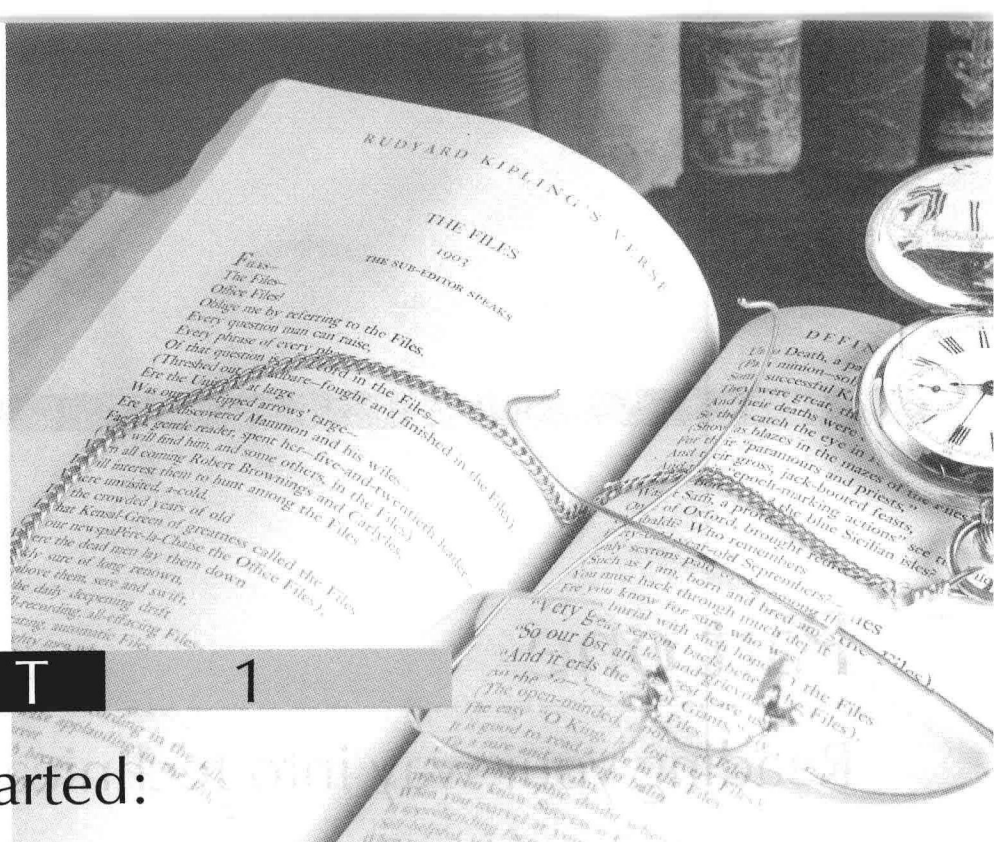
# Part one

## Reading your way into technical writing

- Unit 1 **Getting Started: Identifying and Solving a Problem**
- Unit 2 Examining the Nature of a Familiar Phenomenon
- Unit 3 Analyzing and Preventing a Disease
- Unit 4 Explaining a Mechanism
- Unit 5 Presenting and Illustrating an Argument
- Unit 6 Offering a Critical Review
- Unit 7 Debating a New Technology
- Unit 8 Drawing Inferences and Framing Hypotheses
- Unit 9 Testing a Hypothesis
- Unit 10 Applying a Clean Technology
- Unit 11 Undertaking a Research Project

# UNIT 1

## Getting Started: Identifying and Solving a Problem



### Objectives

Upon completing this unit, you should be able to:

- ✧ Define stress and its signals;
- ✧ Understand and use the techniques for reducing stress;
- ✧ Distinguish which stress-reducing techniques are suitable for you;
- ✧ Recognize the problem-solution macro-structure of the article;
- ✧ Grasp the general principles of explaining how to solve a problem;
- ✧ Recognize sentence structures that explain how to do something;
- ✧ Recognize internal reviews and internal summaries of an article or speech to call the attention of the audience and help them grasp the main points;
- ✧ Understand how to use enumerating devices to organize details;
- ✧ Give your own opinions on how to energize the spirit and reduce stress;
- ✧ Apply the macro-structure and writing skills of this article in your own writing.

**A**t different stages of our life, we may feel plagued by different problems. As university students, many of our problems are rooted in the academic pressure from various courses. They may sometimes plunge us deep into gloom. Fortunately, where there is a problem, there should be a solution, and part of the pleasure and excitement in life also comes from the search for solutions to our problems.

In this unit, Professor Richard Weaver, who understands and knows how to deal with the kind of pressure and stress that often afflict university students, offers ten techniques that can help students to energize and lift their spirit.

## ***Preparing for reading***

The following are key words, phrases, and concepts associated with **stress**. They appear in the article you are going to read. Simple explanations or definitions are given to prepare you to read the article.

- 1) **Dangerous stress:** A level of stress that is more than you can endure and may lead to physical or psychological problems.
- 2) **Good stress:** A fair amount of stress that you think you can endure, which encourages you to achieve or accomplish more in study or work.
- 3) **Motivation:** Eagerness and willingness to do something without needing to be told or forced to do it.
- 4) **Negative stress:** A level of stress that you think you cannot deal with and therefore causes harmful, unpleasant, or unwanted effects on your physical and mental health.
- 5) **Physiological impact:** The influence of something (such as stress) on the function of living organisms.
- 6) **Renewed invigoration:** Vigor, energy, and strength that is recovered.
- 7) **Rejuvenated spirit:** The state of mind in which someone feels young and strong again.
- 8) **Stress:** A demand on physical and mental energy; continuous feelings of worry about work or personal life that prevent someone from relaxing.

**9) Stress signals:** A behavior or symptom that expresses someone's feeling of continuous worry. Example of stress signals are irritability, sleeplessness, rapid weight loss or gain, increased smoking or drinking, foolish mistakes, nervous tension, and tightness of breath, etc.

**10) Support group:** A group of people who meet regularly for the purpose of helping each other often with a particular problem.

**11) Unchangeable situations:** Situations or facts such as rules, regulations, restrictions, etc. that one has no control over and cannot change. If you cannot change them, you should accept them.

**12) Your own right way:** The way of life that suits you best. For example, some people prefer fast paced, high-pressure jobs, while others prefer relaxing or quiet ones. Different people can deal with different amount of stress.

## Surveying

**S**urveying an article means taking an overall view of it or giving it a general consideration. Surveying an article before reading it can reveal useful information about the subject, the main content, and the depth of the article. The title, subtitle, headings, annotations, and visuals (if there are any) can give important clues to such information. Surveying can also remind you of your own experience and common sense related to the subject of the article, which will help you to predict what the article is likely to discuss.

### **Task 1**

*Survey the article and predict what it is likely to discuss. Provide the information in the given spaces or answer the questions. The key words and their definitions above may help you.*

- 1) The title of the article, "Ten Techniques for Activating the Spirit and Reducing Stress" implies that students \_\_\_\_\_.
- 2) From the title of the article, we can assume that it is likely to focus \_\_\_\_\_.



- on \_\_\_\_\_.
- 3) The ten techniques that Professor Weaver explains are \_\_\_\_\_.
- 4) Do you think college students at present are under a great deal of stress due to their studies? If yes, what are the main sources of this stress?  
\_\_\_\_\_  
\_\_\_\_\_.
- 5) What suggestions can you make to college students to reduce their stress?  
\_\_\_\_\_  
\_\_\_\_\_.
- 6) In what way do you expect to benefit from this article?  
\_\_\_\_\_  
\_\_\_\_\_.

<sup>1</sup> © *Vital speeches of the Day* (1 Aug. 1991) 57: pp.620-23

<sup>2</sup> exhausted 精疲力竭

<sup>3</sup> demanding your attention 压在你头上

<sup>4</sup> reduces the amount of something, exhausts 减少, 耗尽

<sup>5</sup> tendency to suffer from a particular illness or be affected by a particular problem 易受疾病感染

<sup>6</sup> being thoughtful and sad 沉思, 忧虑

<sup>7</sup> being angry 发怒

<sup>8</sup> sore areas on your skin or inside your body that may bleed or produce poison 溃瘍

## Reading

### Ten Techniques for Activating the Spirit and Reducing Stress<sup>1</sup>

Richard L. Weaver

- Does it feel like you're being torn in all directions? Like you're getting **stressed out**<sup>2</sup>? Like every teacher thinks his or her class is the *only* one you're taking? Like everything is **coming down on you**<sup>3</sup> all at once, and you're not sure you can, or even want to, withstand the pressure? Do things feel like they are out of control? They will be in control when you can successfully deal with the stresses in your life. Stress **depletes**<sup>4</sup> both energy and motivation.

- We often recognize stress in a rapid pulse, increased blood pressure, frequent illness, unusual **susceptibility to infection**<sup>5</sup>. Sometimes it appears as **brooding**<sup>6</sup>, **fuming**<sup>7</sup>, shouting, or even in increased use of alcohol, tobacco, or drugs. In some it's as severe as **ulcers**<sup>8</sup> or a heart attack; in others like one of my daughters (who takes after her dad in this) it's fingernail biting.

- Often, what you need in times of stress is an electrical charge to  
15 boost your spirits, reinvigorate your emotions, and to reestablish

balance in your life! The techniques that activate or free the spirit are precisely those techniques that you can use to eliminate—or at least reduce—the stress of life. With the stress reduced, you are far more likely to be reinvigorated or **charged up**<sup>9</sup>! At least you can regain some control.

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What you need to know first is that stress is not always negative. Good stress occurs in life situations toward which you feel positively. I know, from my own personal experience, for example, that I chose this kind of work — being a professor — because the high-pressure schedule it demands seemed to be right for me. I *chose* to live under a fair degree of constant stress.

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What you need to know second is that stress is individually determined. Meaning lies in us; thus, we are the ones who determine what is stressful. The useful part of this understanding is that if we determine it, then we can control it. We determine meaning! We are in control!

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We all know why we stay in stressful situations. We stay in them for the rewards they offer, for approval, money, status, or self-esteem. Because we so often find ourselves in these stressful situations, what we need to do is to decide at various points in our life: are the rewards keeping ahead of the costs? Can we see a light at the end of the tunnel that is still worth pursuing? Often the rewards or the goals are precisely what keeps us going through life's little crises. Sometimes, of course, life's little crises look like gigantic catastrophes!

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But we can develop strategies — or use specific techniques — to cope with stressful situations and, thus, **rekindle the spark that ignites self-motivation**<sup>10</sup>. These techniques can alter the physiological impact that stress has on us, and they can reduce the harm that we do to ourselves and others in these situations.

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What I want to talk about are some techniques for activating the spirit, but I want you to know that there is an underlying theme to my remarks. Improvement does not come from outside of us. It can only come from inside. Change must begin from within. The key, then, to improvement and change is in recognizing and working with our individuality. What works for one person may not work for another. Also, for some people, it may involve the use of a number of techniques; for others just one may work. Some may have stress under control in ways not mentioned here at all. I will mention ten techniques.

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The first technique is to recognize your own stress signals. **Stress**

<sup>9</sup> filled with enthusiasm 充满热情

<sup>10</sup> make someone interested in something, or eager to do something again [比喻]再次点燃能够激起兴趣的火花

<sup>11</sup> Stress can gradually increase without your knowing it. 压力可能悄然而至, 日渐增加。insidiously: in a cunning or deceitful way 不知不觉地

<sup>12</sup> What will happen if..., what will be the result if...

<sup>13</sup> increase gradually, build up 增加

<sup>14</sup> foolish errors, feeling worried, twitching, unable to breathe properly 犯傻错误, 神经紧张, 神经性抽筋, 憋气等

<sup>15</sup> recognizing and interpreting these symptoms 识别征兆

<sup>16</sup> normal ability to deal with stress 一个人应付压力的正常能力范围

<sup>17</sup> what gives me strength to carry on or keeps me in high spirits 是什么给我力量, 给我旺盛的精力

<sup>18</sup> think about something seriously and deeply 认真地反思一些问题

<sup>19</sup> [biochemical] a chemical produced by the body that reduces pain and can make you feel happier [生化] 内啡肽

<sup>20</sup> a good opinion of oneself 自尊

**60** can creep up on you insidiously<sup>11</sup> — sometimes as the result of prolonged anxiety or even as a result of multiple causes. **What if**<sup>12</sup> you're having trouble at home, then you're having some relationship problems, and maybe some small problems with a roommate and then a couple of exams on top of that? Can you feel the pressure begin to **mount**<sup>13</sup>?

**65** Stress has its signals, but they may not always be as clear as you would wish. Practice monitoring yourself for the signs of unhealthy pressure. Common signs include irritability, sleeplessness (even when sleepy), rapid weight loss or gain, increased smoking or drinking, as mentioned before, **dumb mistakes, nervous tension, nervous tics, or tightness of breath**<sup>14</sup>.

**70** Last fall a student in one of my classes came in to talk to me about three weeks after the semester began. She recognized a number of these symptoms, and because she had them before—to the extent of having to see a doctor—she realized that even though she knew she would enjoy the class, that she would get a great deal out of it, and that she could handle the workload, that it would be best for her, considering these early symptoms, to drop the class. And she did—before they became severe. We have to be wise in **reading the signals**<sup>15</sup>, and she withdrew when they appeared—especially because she could easily anticipate the signals continuing and increasing in intensity. In this way, she did not exceed her **normal, individual stress endurance**<sup>16</sup>. She was simply protecting herself!

**80** The second thing we need to do—and this is especially important for students—is to engage in exercise and practice good nutrition. The two, of course, are related. I often get asked **what keeps me going**<sup>17</sup>. This second technique takes on major importance in my life. Normally, my alarm goes off at 5:30 or 6:00 a.m. I get up and run through about 20 minutes of exercises. Then I run 3 miles, it takes me just under 30 minutes. And that starts my day! When I deliver a 9:30 a.m. lecture, I have already been up for four hours!

**85** Don't underestimate the importance of exercise to self-motivation. What happens to students is that many of them forget about exercise. Exercising the body keeps the mind sharp.

**90** It used to be that I hated jogging; now, I look forward to it as an opportunity to plan my day, create ideas, and **do some serious reflective thinking**<sup>18</sup>. You should know that exercise results in release of **endorphins**<sup>19</sup> that have to do with confidence and **self-esteem**<sup>20</sup>. It can make a major difference in your daily life. With more confidence

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and self-esteem, you will be more motivated.

100 Recently, I met an 80-year-old man who looked like 60. He told me his alarm goes off at 5. He gets up, exercises, rides a **stationary bike**<sup>21</sup>, gets on a **treadmill**<sup>22</sup>, and then swims ten lengths of a regular-size pool. He said that he doesn't drink or smoke, and he feels like fifty! That's my goal! We all have to get old, but **how we decide to approach getting old makes all the difference. It's not the destination; it's the ride**<sup>23</sup>!

105 And don't forget the nutrition. Many students skip meals or only eat when they are hungry — and then, not very well. We all have different patterns, but I can tell you this. If you stay away from junk food, eat regular meals of high quality, and make certain fresh fruits, fresh vegetable, and grains are well represented in your daily diet, you are far less likely to experience severe stress — and you will be more motivated as well! Good nutrition can play a major role in motivation.

110 Daily attention to health care can significantly decrease the effect of stress on both body and mind. Many of my campus meetings occur in the cafeteria. I watch students coming in for their first meal of the day and making a cheeseburger, fries, and a Coke their breakfast. This is horrendous! Breakfast is one of the most important meals of the day.

115 There is a third technique, too. If you are a person who stays unmotivated because of high levels of stress in your life, try to locate the sources of dangerous stress in your life. Take a look, first, at your personal relationship with family, friends, roommates, lovers, teachers, and strangers. Often, these forces will accumulate and create a negative stress reaction.

120 Second, take a look at your own personality. Are you making unreasonable demands on yourself? Do you, for example, insist on getting all "A's"? One of my friends who is in **seminary**<sup>24</sup> became stressed-out because of this demand on himself. When his wife pointed it out as unreasonable, and when he was able to see it as excessive and unnecessary, he was able to relax and better enjoy his classes.

125 There are other unreasonable demands you make on yourself. Do you like never making a mistake? Do you like never failing? You must learn to accept the possibility of failure without losing your sense of self-worth. Failing will not hurt your health; feeling like a failure will! Reinforce your sense of accomplishment, even in the face of failure, by recalling past achievements. Also, you can **talk yourself through**

<sup>21</sup> fixed exercise machine resembling a bike (锻炼用的) 固定脚踏车

<sup>22</sup> a piece of exercise equipment that has a large belt around a set of wheels, that you can walk or run on (锻炼用的) 踏车, 跑步机

<sup>23</sup> the attitude we take towards old age makes our life different. It's better to accept we are going to get old and prepare for it. 决定以何种方式对待年老, 会使生活大不一样。重要的不是目标, 而是过程。

<sup>24</sup> a college for training priests or ministers 神学院