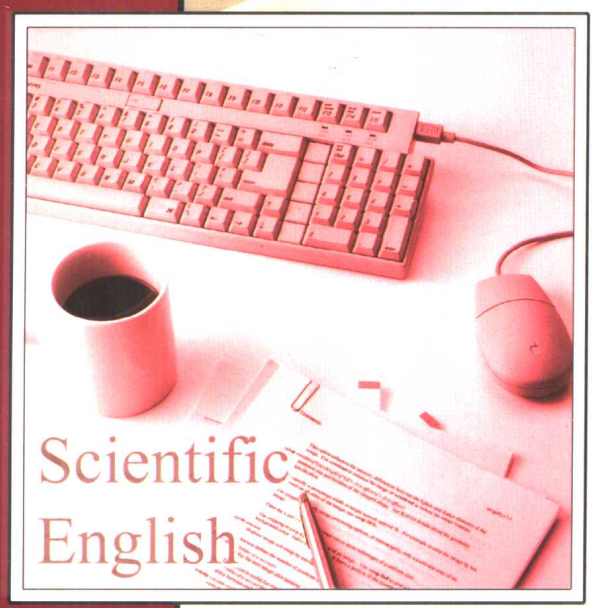
研究生系列教材

科技英语阅读高级教程



秦荻辉　编著

西安电子科技大学出版社
http://www.xduph.com

SELECTED READINGS IN SCIENTIFIC ENGLISH

科技英语阅读高级教程

秦荻辉　编著

西安电子科技大学出版社
2003

内 容 简 介

本书涉及到各类科技文体的文章，有科普性文章、科技书节选、科技杂志文章、产品说明书等，内容广泛，难易兼顾。

本书的特点是，注释详尽，且具有供读者思考的大量问题，所以特别适合于学生自学及教师使用。

本书可作为硕士生、博士生、科技英语专业学生的教材，也可供广大科技人员提高科技英语阅读能力之用。

图书在版编目(CIP)数据

科技英语阅读高级教程/秦荻辉编著. —西安：西安电子科技大学出版社，2003.6

(研究生系列教材)

ISBN 7-5606-1242-3

Ⅰ. 科… Ⅱ. 秦… Ⅲ. 科学技术-英语-阅读教学-研究生-教材 Ⅳ. H319.4

中国版本图书馆 CIP 数据核字（2003）第 034997 号

策　　划　夏大平

责任编辑　李　佳　夏大平

出版发行　西安电子科技大学出版社（西安市太白南路 2 号）

电　　话　(029)8242885　8201467　　邮　编　710071

http://www.xduph.com　　E-mail: xdupfxb@pub.xaonline.com

经　　销　新华书店

印　　刷　陕西画报社印刷厂

版　　次　2003 年 6 月第 1 版　2003 年 6 月第 1 次印刷

开　　本　787 毫米×1092 毫米　1/16　印张 20.625

字　　数　505 千字

印　　数　1~4 000 册

定　　价　25.00 元

ISBN 7-5606-1242-3 / H·0119

XDUP 1513001-1

*** * * 如有印装问题可调换 * * ***

前　言

本书是专门为我校理工科硕士生、博士生以及外语系科技英语专业的学生选编的，目的在于使学生熟悉有一定难度的各类科技英语文章，使他们了解其不同的文体格式，为今后进一步阅读原版科技书刊打下良好的基础，以便毕业后能较快地适应实际工作的需要。

本书选材广泛，难易兼顾。它由五部分构成：第一部分是科普文章；第二部分是各类科技书籍和科技杂志内容节选；第三部分是科技书籍的序言、科技杂志主编所写的社论或评论及科技论文的文摘；第四部分包括各国产品说明书、国际会议通知、科技广告、商品说明等；第五部分是注释和向读者提出的思考题（共 2470 个），以便于学生自学。编者建议，硕士生主要使用本书的第一部分和第二部分前一半的内容；而博士生主要使用第一部分的某些文章、第二部分的后半部分和第三部分的内容；外语系的学生所学内容可由任课教师选用。本教材可供 60 学时左右的教学使用。

选编本书是编者的主观设想，是否适用尚待实践的检验，恳切希望读者随时提出意见和建议。

此书的出版得到了西安电子科技大学研究生教材建设基金的资助。

编　者

2003 年 1 月

于西安电子科技大学人文学院外语系

Contents

Part Ⅰ Articles on Science and Technology 1
Ⅰ - 1 Safe Sex for Your Computer 1
Ⅰ - 2 Caught in the Web of the Internet 2
Ⅰ - 3 Why Cloning of Humans Must Forever Be Seen as Unethical 5
Ⅰ - 4 The Ancient History of the Internet 7
Ⅰ - 5 The World of E-Books Is Here 10
Ⅰ - 6 Will Your PC Crash on January 1, 2000? 12
Ⅰ - 7 Technology and Its Positive Impacts on Kids 15
Ⅰ - 8 What's New in the Computer World? 17
Ⅰ - 9 Hackers Are Enemy Number One on the Internet 19
Ⅰ - 10 The Secret Hacker Wars 21
Ⅰ - 11 New Evidence Supports Global Warming Theory 23
Ⅰ - 12 Electric Tales—21st Century Books 25
Ⅰ - 13 El Nino, La Nina Cause Floods 27
Ⅰ - 14 Independent NASA Satellite Measurements Confirm El Nino Is Back and Strong 29
Ⅰ - 15 New Efforts to Learn about Planet Mars 31
Ⅰ - 16 Communicating in the New Age 33
Ⅰ - 17 Clothes That Change Colour in the Heat of the Moment 35
Ⅰ - 18 Typing without Keys 37
Ⅰ - 19 The Second Information Revolution 38
Ⅰ - 20 The Fifth Force 40
Ⅰ - 21 Adapting to Global Greenhouse 42
Ⅰ - 22 From Apple Fall to Superstring 45
Ⅰ - 23 Superconductor Search: A Race and an Obsession 47
Ⅰ - 24 Death Rays in Space 49
Ⅰ - 25 The Dazzle of Lasers 51

Part Ⅱ Extracts from Textbooks and Technical Journals 54
Ⅱ - 1 The Internet: Bringing Order from Chaos 54
Ⅱ - 2 Introduction to Data Communications 55
Ⅱ - 3 An Introduction to Computer Aided Circuit Design 59
Ⅱ - 4 Separating Fact from Fiction 61

试读结束：需要全本请在线购买： www.ertongbook.com

II - 5 Telecommunications for the 21st Century 65
II - 6 Study Aids 71
II - 7 A Few Concepts of Mathematics 73
II - 8 Physics 75
II - 9 Basic Electronics 82
II - 10 Communications Systems 89
II - 11 Digital Computer Operation 99
II - 12 Applications of Television 111
II - 13 Basic Principles of Electronic Measurements and Instrumentation 120
II - 14 Concept Formulation 130
II - 15 Connecting to the Internet via ISDN: an Overview 138
II - 16 Protecting Your Information Assets 144
II - 17 Information: Abstraction or Reality? 147
II - 18 Mathematics at Forefront of Gulf War 157

Part III Prefaces, Editorials and Abstracts 159
III - 1 Prefaces 159
III - 2 Editorials 182
III - 3 Abstracts 188

Part IV The Miscellaneous 192
IV - 1 Technical Manuals 192
IV - 2 Conference Information 227
IV - 3 Industry News 238
IV - 4 Bulletin Board 239
IV - 5 Advertisements 240

Part V Notes and Questions 242

Part Ⅰ Articles on Science and Technology

Ⅰ－1 Safe Sex[1] for Your Computer

I hate to sound preachy[2], but if you come down with a computer virus, it's probably your own fault. Dodging most of these electronic infections isn't very hard.

The creations[3] of a small coterie of malicious hackers who invent toxic software for the sheer deviltry of it[4], viruses are short strings of software code that have three properties: First, they conceal themselves in legitimate files or programs; second, they replicate like bacteria to spread from machine to machine; and third, they do things to your computer that make you want to tear your hair out[5].

Viruses have been around[6] longer than PCs, and are not without a certain mathematical and scientific interest. Indeed, not all viruses are malignant. Used properly[7], viral techniques are a valuable programming tool. Used improperly, they are pestilentially destructive.

There's no perfect cure. Like the flu, computer viruses evolve. Last year's immunization isn't any good for this year's disease because every time[8] someone invents a new medication, someone else invents a new malady. Nonetheless, a few simple precautions will buffer you against all but[9] the cleverest hacker.

Rule one: Use good virus-checking software. Outfits like Network Associates-McAfee[10] and Symantec sell strong virus medicine, keeping their cures up-to-date by posting revisions at their Web sites[11]—which you should check often. Further, there are more than a dozen public domain virus checkers[12] that you can download for free. Antivirus.miningco.com is a good place to find them. You can also get virus repellents from services like America Online[13]. But a word of caution[14]: Not every program fixes every virus, and when a new bug hits, the remedy takes a while to reach the market[15].

Rule two: Back up[16] your data. Anyone who doesn't have a backup drive is begging for trouble[17]—and not just because of viruses. I keep a square 6.2-gigabyte disk drive hooked to my PC, religiously saving redundant copies of everything—but only after performing a virus check. Storage is cheap, and I'd rather be safe than sorry[18].

Rule three: Whenever you load a new file or application software onto your computer, immediately pass it through antivirus software. Most viruses aren't activated—and will not spread —until you use the stuff in which they're hiding. You can catch them and kill them before they do any harm.

Rule four: Don't take candy from strangers—or careless friends. These days most viruses and their cousins[19], network-infecting worms[20], are spread through files attached to e-mail or downloaded from the Web. If you receive mail with a file hooked to it from someone you don't know, then do not open that file. (If your e-mail program automatically opens attachments, get a new e-mail program.) Instead, do what I do: Write a polite note to the sender saying you don't accept downloads, but will be more than happy[21] to look at a plain-text version[22] of the document he or she is trying to send you. Slightly more risky, you can open a file as plain ASCII text[23]; most executable commands within it simply become hieroglyphics on your screen.

By the same token[24], avoid downloading anything from dubious Web sites. Even the most innocuous-seeming document can be a viral carrier. But don't be paranoid, either; Web sites run by reputable outfits (especially the ones that certify they've checked material for downloading with a well-known antivirus program) generally can be trusted.

Rule five: Postpone that upgrade[25]. New versions of the most popular operating systems and application software attract virus writers like[26] sugar attracts flies. I haven't upgraded my e-mail program since 1995 or my word processor since 1996; they work just fine and are too old to attract hackers.

Last rule: Don't panic. If you get zapped by a virus[27] and don't have an uncorrupted spare hard drive to reboot from[28], then use a friend's computer to search the Web[29] for a cure. Odds are, if the virus has exploited a weakness in a major software vendor's product, that vendor will have a remedy at its Web site[30].

Where viruses are concerned, what grandma used to tell you is extremely relevant: An ounce of prevention is worth a pound of cure[31].

I - 2 Caught in[32] the Web of the Internet

It's[33] the equivalent of inviting sex addicts to a brothel or holding an Alcoholics Anonymous[34] (AA) meeting at the pub. Internet addicts tired of[35] their square-eyed, keyboard tapping ways[36] need look no further than[37] the Web for counseling. There is now an online counseling service at www.relate.org.nz for Internet obsessives. Just e-mail the details of your Internet-induced crisis and help comes direct to your inbox. The new breed of cybertherapists see nothing strange about offering help through the very medium that is swallowing their clients' free time and splitting their marriages.

Sue Hine, of Relationship Services, says: "Internet obsession has become a more noticeable problem over the last 18 months. At least this[38] is an area addicts are familiar with and they'll be able to use it as a tool to overcome their obsession." Nor do experts worry that the Relate Website[39] might become a favourite—a place to spend hours online in the name of Internet therapy. Dependency is always a risk with any form of counseling[40]. There are various strategies we can adopt to keep that in perspective[41], says Hine.

Though some may regard Internet addiction as another dubious ailment dreamed up to keep therapists in work[42], Relationship Services says the problem is real.

Internet usage is up to four-and-a-half hours on the Web each week, compared to three-and-a-half hours a year ago. Therapist Robin Paul says there tend to be two scenarios[43]. Some people meet through chatrooms and fall in love. It's like having an affair[44], then they meet and it's like a whirlwind honeymoon. It's devastating for the person left behind[45] and quite often it has no real foundation.

"I saw one couple who were still together but it was very rocky[46]. He met someone on the Net and went overseas to meet the woman. Then he left his wife and children to be with her. In another case I saw recently, a man left his three children to be with a woman (who was) leaving her four children. It's terribly hard on the kids[47] when this happens."

"The second scenario is that a person starts spending more and more time on the Net. They may not meet someone else but they don't spend any time with their partner and of course the relationship suffers."

Such stories may appear to be almost urban legends, so ashamed are Internet addicts and their partners[48]. After all, who wants to admit they have a 100 a day habit (e-mails, that is) or are somehow less alluring than a piece of hardware? But in America, which has long had a love affair with[49] both therapy and the Net, these stories are common.

A recent survey of 17,251 Internet users found nearly 6 per cent had some sort of addiction to the medium[50]. They revealed that their online habit contributed to disrupted marriages, childhood delinquency, crime and overspending. Tap into online addiction sites and[51] you'll find messages such as: "Hello, my name is Bob and I'm a Webaholic."

Witness the plight of Ohio woman Kelli Michetti, who literally became a computer hacker because of her husband's constant online chatting. When she crashed a meat cleaver[52] through her husband's computer terminal that[53] solved the problem, although naturally it led to difficulties with the police.

Or take the classic Internet addiction story of Ingrid Parker, a woman who became such a slave to the Internet—especially chat rooms—that it took over her life[54]. She made do[55] with two hours' sleep a night, had marathon weekend computer sessions[56] of up to 17 hours and fell in love with a married man in the US state of Oregon.

Her computer dream turned to nightmare when she sold up and moved to be with her cyberpal (who had just left his wife), only to be told[57] a week later that the couple were getting back together.

The heart-breaking turn of events gave her the motivation to control her addiction—and write the book *Caught in the Web.*

Dr Kimberly Young, who set up The Center for Online Addiction[58] (www.netaddiction.com) in America, studied 396 people whom she considered were psychologically dependent on the Net. They ranged in age from 14 to 70 and spent an average of 38.5 hours a week on the Web.

Her study, backed by further research in Britain, found that women were more likely to

become addicts. So while the old stereotypical addict was a young man who spent hours playing games, downloading software or reading messages on newsgroups, the new image is of a young woman who fritters away hours e-mailing friends, buying books and CDs online, talking in chatrooms and looking for information for next year's holiday[59].

"I guess I was a typical example of someone hooked on the Internet," says Parker, who now spends just an hour a day online. "I was coming home at lunchtime to get on the computer. At 6 p.m., I'd feed my son and put him to bed but all the time I was going backwards and forwards to the computer. Then I'd stay up until 5 a.m. or 6 a.m., typing away[60] 'chatting' on my computer screen all night."

"I learned from my experience with romance on the Net that people aren't always what they seem. The guy I met, for example, was very nice but also quite mixed up[61]. The trouble is you get[62] lonely housewives talking to someone and they think, 'This guy sounds nice compared to what I've got.'"[63]

But I don't think anyone who is married or in a sound relationship should really be spending hours talking to someone else and ignoring their nearest and dearest. While Parker provided her own therapy by putting her experiences down on paper, she recommends others take up the online counseling offer, or log off from the Worldwide Web gradually.

"It is like smoking. It's not a good idea to suddenly go cold turkey[64]. People often e-mail me about the problem and I tell them to gradually wean themselves off and not to switch to a scheme where you pay per hour for online time[65]. If they break their resolution, all[66] they end up with then is the same old problem plus money difficulties for the long hours they have spent logged in to[67] the Internet."

Computer whizz Steve Phillips grins at the mention of[68] Internet Addiction Disorder (IAD)[69]—he's been there, done that[70]. Now 28, and a seven-year veteran on the Internet[71], he spends a mere 10 to 15 hours "for entertainment" on the Web each week. A few years ago, when he was in the grip of his addiction[72], that was the amount of time—10 to 15 hours—he spent online each day.

"I'd go to polytechnic and log on[73] at 9 a.m. and sometimes I'd stay online until 9 at night. Then I'd go home and plug in the laptop and stay online until 4 or 5 a.m.," says the Internet systems maintenance expert.

You always hear about Internet addicts being isolated but in fact the Web was very social. I wasn't addicted to the Net. I was addicted to the social side of meeting and talking to people every day."

While other Internet junkies spend their hours searching for nuggets[74] of information or downloading MP3 music programmes, the lure for Phillips was the chat service Internet Relay Chat.

"I was doing a computer course and a lot of people on the Net at the time were in computing[75]. It helped a lot."

It didn't help enough, however, for him to pass all his tests. He cheerily admits he failed

exams two years in a row because of his Internet addiction. Later, he also lost a girlfriend who felt the computer was his first love.

"I justified it by saying I was building up a business[76], but in fact I was just too keen on the Internet."

The habit started hitting hard[77] when he finished his studies in the big city and moved back home. Without the support of a school paid computer, he racked up hundreds of dollars in Internet-related toll bills[78]. The huge expense, followed by a few months offline while he searched for a job, was the wake-up call he needed.

"When I got access again it didn't have the same appeal any more. Now I use it more as a tool, but I would say a lot of my friends are addicts. One friend was talking about a deal with a set rate for 200 hours of Internet access a month. He said that wouldn't be enough. I end up counseling people about it because I've been through it. It definitely isn't worth neglecting real-life relationships for romances on the Net[79]. Often they don't work out."[80]

Phillips should know. A few years ago he became heavily involved with an American woman he had spent a couple of years chatting to. Wisely, they decided not to make any commitment to marriage until they had met face-to-face. Phillips spent a month in the United States before they agreed the relationship wouldn't work. "Because I've been on the Net so long I've got some good friends that I've been chatting to for years. I occasionally meet people I've talked to online at the pub, and I could certainly travel through America on a budget[81]—I know so many people there."

"The Internet is definitely addictive but if you can keep it in control it has advantages, too. Using it can be a steep learning curve so it helps you become very quick at learning. Also there is a huge demand for people in the field of Information Technology (IT) and hours on the Internet are great training."[82]

I - 3 Why Cloning of Humans Must Forever Be Seen as Unethical

In February 1997, my colleagues and I announced the arrival of Dolly the sheep, the first mammal cloned from an adult cell. The reaction of the scientific community was, on the whole, friendly, if[83] somewhat incredulous. In contrast, the public's reaction was extremely negative, primed partly by a media weaned on a diet of cloning scare stories and pulp fiction[84].

The issue was not that this new technology created an abomination, a freak animal; after all, Dolly was, and remains, a rather handsome sheep. It[85] was the fear that the techniques could, and some said would, be applied to humans that provoked the frenzied debate.

The first old chestnut[86] raised was that there would be the cloning of dictators, followed by[87] these possibilities, positive and negative: celebrity cloning, self-cloning, the pre-selection of citizens by the state with its echoes of [88] Aldous Huxley's futuristic novel *Brave New World*, the

试读结束：需要全本请在线购买： www.ertongbook.com

reincarnation of dead loved ones, treatment for infertile couples, a route to avoid parental genetic disease being passed on to children and a way to cure terminal illness.

Enough time has passed since Dolly's arrival for[89] a sober, thorough reassessment of the prospects for human cloning and what it is about such cloning that causes people fear and concern[90].

Many people had a genuine gut reaction to[91] news of Dolly, and that apparently remains undiminished in its intensity. An affront to nature, a blasphemy, man playing God—such comments were often made. But we should recognize that human reproduction is a sensitive topic and a new method that has an impact on human reproduction will always be greeted with fear and revulsion by the majority who have no problems procreating[92].

The techniques of donor sperm insemination and in vitro fertilization, introduced in the 1950s and 1970s respectively, were met with great hostility and threats of criminal legislation[93] in some countries.

That hostility moderated over the years as some early fears evaporated, and great joy was brought to some couples. But controversy remains in the very low success rates in IVF, and in the disputes that can arise over legal paternity between a child's biological and non-biological parents[94]. Although human cloning would further complicate the legal issues, this is not grounds for banning it.

Charges that Man is "playing God" by controlling Nature are easily dismissed because, for as long as[95] he has been able to intervene in nature, Man has been "playing God." Medical practice is just one example.

As to the cloning of dictators and celebrities, or the manufacture of a "super race," we all understand that genetic identity does not guarantee identical personality and behaviour. These uses, along with the cloning of dead loved ones, are unethical: they inevitably diminish the new individual's sense of esteem and identity[96] because may consider themselves to be the product of an assembly line.

I would argue that human cloning denies an individual's right to inherit a unique set of genes; unique because that particular permutation has not appeared before. It is inherently unfair that we should be able to choose the genetics of our offspring. Admittedly, already, through our own genotypes, and by our choice of mate[97], we limit the gene pool[98] available to each child.

Cloning removes the chance element from the lottery of reproduction[99]. A cloned child would be born with a baggage of unrealistic expectations and hopes for his or her development and future achievements. Most parents have hopes for their children, but here the parents' aspirations would be press-ganged by what had transpired in the line of the original clone[100].

Human cloning is unsafe. The process that led to Dolly began with the transfer of the nucleus of an adult cell[101] to an unfertilized egg taken from a donor animal[102] by a process known as cell fusion. The "reconstructed" embryo is cultured[103] and eventually returned to the womb of a foster mother[104] and brought to term[105].

From more than 430 attempted fusions, 277 reconstructed embryos were made in this way;

of these[106], only 29 survived to the stage that they could be returned to foster mothers, and only one survived to term. In other experiments, some of the lost fetuses were abnormal. Just think of the huge waste of material and human suffering such a low success rate would imply.

As well, there are grounds for believing that, as we get older, our cellular DNA gradually accumulates mutations and suffers other changes, which account for why we are increasingly likely to develop cancer as we get older. A person cloned from an adult cell might have a higher risk of cancer or premature aging[107], but we wouldn't know that for years[108]. Is society prepared to take that risk?

Not all uncertainties can be wiped from the system by animal experiments. There are too many differences between mammals and their reproductive physiology and embryology to be sure that[109] no deformed foetus or infant would be born. No doctor could take that risk. Cloning would join the unsafe drug Thalidomide in the teratogenic hall of infamy[110]. All new medical advances are potentially unsafe, and no progress would be made if safety alone were the issue[111]. But risk-to-benefit ratios[112] are always considered before new treatments are sanctioned. Their application to new productive treatments is particularly problematic because whose risk are we talking about—that of the egg donor, womb donor or the unborn child?

Perhaps the only reasonable case for human cloning is when the prospective mother suffers from a genetic disease not attributable to main body of genes found in the nucleus, but to genes elsewhere in the cell. With all existing methods of conception, both natural and assisted, all children of such women would inherit the disease causing genes[113].

A case[114] has been made for such women conceiving[115] normally and then allowing a cell from the doomed embryo to be fused to the fertilized egg from a healthy human egg donor. If successful, this would result in a child free from the disease which has a unique genetic blueprint and one[116] made up from equal contributions from the original couple. Using such an early donor cell might avoid the risk of accumulated DNA damage. Even so, with[117] a frequency of mitrochrondrial disease of one in 20,000[118], the procedural risk greatly outweighs the benefit.

So human cloning is, and will, I hope, continue, to be unethical. A child so "manufactured" could be a 21st-century circus act[119]. Even if the child's uniqueness is not compromised[120], the technique is unsafe and inefficient and the risks greatly outweigh any marginal benefit.

The question of whether the research should have been done is often asked. The answer has to be an unequivocal "yes." There is an immense potential for non-human cloning work to provide insight and benefit for the human condition[121].

I - 4 The Ancient History of the Internet

The Internet seems so information-age[122], that[123] its devotees might find the circumstances of its birth hard to grasp. More than anything else, the computer network connecting tens of millions of users stands as a modern—albeit unintended—monument to military plans for fighting

three wars. Specifically, the Net owes its existence to Allied battle strategies[124] during World War II, to the geopolitical pressures of the Cold War, and to preparations for the postapocalypse of nuclear holocaust[125] (the never-fought "final war" with the Soviet Union).

As with[126] most great advances in the history of ideas, there was no one defining[127] Internet event. It began with a modest[128] analytical system, devised early in World War II, that set the stage for[129] the supportive research environment and the key technical developments that produced today's global network.

The analytical system, called operations research[130] (O.R.), applied scientific modeling principles to military planning. The first O.R. was done for the Allies by military scientists and civilian technologists. These boffins conducted statistical studies of antisubmarine tactics that showed how the Allies could increase the U-boat kill rate[131] by setting the charges to explode at a different depth.

Following the victories in Europe and Japan, American military planners turned attention to their new Cold War adversaries, primarily the Soviet Union but also China (known then as Red China). The three U.S. military services[132] contracted out[133] O.R. work to universities and nonprofit corporations. This produced, among others, the Center for Naval Analysis, administered by the Franklin Institute, in Philadelphia, Pennsylvania; the Army-backed Operations Research Office, run by Johns Hopkins University in Baltimore, Maryland; and, perhaps the most effective of all, the RAND Corporation[134], the Air Force's principal advisory organization. The Defense Department created yet another O.R. group, the Advanced Research Projects Agency, and charged it with[135] doling out high-tech research funds.

Among ARPA's first priorities were projects[136] on command, control and communication, known among war planners as C3. The Defense Department wanted to use computers not only in the Pentagon but also in the field. Bulky, balky[137] mainframes of the era were ill suited for the battlefield, so ARPA sought a communications solution. For signals sent from a battlefield terminal to reach a headquarters-based computer[138], they would have to be translated from wire to radio to satellite and back. Nothing like it had ever been done before. In fact, most computer time-sharing[139] then involved transportation rather than communication: Computer scientists keyed their jobs onto paper tapes or punch cards and then shipped them to the closest computing center.

At the same time, America's command posts[140] were burrowing underground in the name of C3 and "nuclear survivability." NORAD[141], the air defense headquarters, carved a control center into the side of a Colorado mountain[142]. In Washington, nuclear-war plans called for evacuating the president and key officials to supersecret reinforced shelters in the Catoctin Mountains in nearby Maryland, while all 535 members of Congress were supposed to hold up in an elaborate complex under the grounds of the Greenbrier Hotel in White Sulphur Springs, West Virginia. From these subterranean hideouts, federal officials would govern the nation—that is, the parts that survived.

The war-planning needs of the military and the research interests of computer scientists

began to converge. The Pentagon asked RAND to analyze how the military could communicate (by voice telephone as well as data hookups) after a nuclear war. The existing phone network seemed far too fragile for such a task.

RAND's solution, developed by Paul Baran on an Air Force contract, was a network that could route around damage[143] and continue to communicate. In such a system, Baran wrote, "there would be no obvious central command and control point, but all surviving points would be able to re-establish contact in the event of an attack on any one point" through a "redundancy of connectivity." The key to creating this survivable grid[144] was what later came to be called packet switching[145].

Baran, at RAND, did the basic research on packet switching, but many of his reports were classified. Donald Davies of the National Physical Laboratory in Britain independently outlined the same general concept and contributed the word "packet" for the message components[146]. Other researchers also began to focus on the idea of a packet-switching architecture.

It[147] was an idea that appealed to ARPA, particularly its Command and Control Research Office, headed by a computer scientist named J. C. R. Licklider.

As part of its research support, ARPA agreed to fund an experimental computer network. The network, ARPA officials hoped, would demonstrate the feasibility of remote computing from[148] the battlefield as well as test the potential of a post-World War III military communications network. In addition, the network would enable widely dispersed researchers to share the few supercomputers of the era, so that the Defense Department would not have to buy one for every contractor. In 1968, ARPA solicited bids for[149] an expandable network linking four sites already conducting ARPA research: the University of California campuses at Los Angeles (UCLA) and Santa Barbara (UCSB), the Stanford Research Institute (SRI) in Stanford, California, and the University of Utah (Salt Lake City).

The ARPAnet construction contract was awarded to Bolt Beranek & Newman (BBN), a research firm based in Cambridge, Massachusetts, which had close ties to MIT. BBN shipped the new communications software in August 1969 to UCLA and then to SRI in October. At a November demonstration the two California machines exchanged data. The first long-distance packet-switching network was in operation. By the end of the year, all four nodes were online.

At this point, the striking figure of[150] Vinton Cerf, the computer scientist *The New York Times* called the father of the Internet[151], begins to take a leading role in the narrative[152]. Born in 1943 in New Haven, Connecticut, Cerf turned his back on Yale University to do his undergraduate work in mathematics at Stanford University and to get his master's and doctorate in computer science from UCLA. In 1969, Cerf was a graduate student working at UCLA's Network Measurement Center, observing how the new four-node ARPAnet was functioning—and what it would take to make it malfunction.

Soon he was collaborating with Robert Kahn, an MIT math professor on leave to work at BBN[153]. Cerf and Kahn developed a set of software "protocols" to enable different types of computers to exchange packets, despite varying packet sizes and computer clock speeds. The

result[154], TCP/IP was released in 1973 (by which[155] time Cerf was teaching at Stanford). TCP—Transmission Control Protocol—converts messages into packet streams and reassembles them. IP—Internet Protocol—transports the packets across different nodes, even different types of networks. Cerf credits[156] many people, "thousands by now," for helping create the computer-network communications system we have come to know.

In 1977, having left Stanford for ARPA (then called DARPA, the D for "Defense" added in 1972), Cerf worked on a different sort of interconnectivity. From a van cruising along a San Francisco Bay Area freeway, a computer sent messages that traveled, by packet radio, satellite, and landlines, a total of 94,000 miles (150,400 km). "We didn't lose a bit!" Cerf later recalled. The project demonstrated that computers could communicate to and from the battlefield.

Cerf has suffered severely impaired hearing since birth and has worn a hearing aid since he was 14. It is serendipitous but fitting, then, that his TCP/IP made possible[157] the textbased Net communications systems so popular today, including electronic mail (e-mail), discussion lists, file indexing and hypertext. E-mail, of course, is the most widely used of the Net services, the most convenient and the most functional.

By the mid-1980s, TCP/IP was linking ARPAnet to other networks, including the NSFnet of the National Science Foundation, another federal agency, and Usenet, a network created by graduate students at the University of North Carolina and Duke University, also in North Carolina. The result was first called ARPA-Internet and then simply the Internet. ARPAnet split in two, with military communications going onto MILNET and the computer researchers finally taking over ARPAnet in name as well as in practice. ARPAnet shut down in 1990, and NSFnet went off-line last April, the most heavily traveled routes of the information superhighway now are in private hands. Nearly all the various networks used the TCP/IP language. "I take great pride in the fact that the Internet has been able to migrate itself on top of[158] every communications capability invented in the past twenty years," Cerf told *Computerworld* in 1994. "I think that's not a bad achievement."

I - 5 The World of E-Books Is Here

Alan Brooker and Loren Teague are authors who have a book due out[159] soon. You probably won't find their titles on the shelves of your local book store. Their prose is published in computerized, digital bits. They are authors publishing e-books (short for "electronic books" or[160] books published only on the Internet, and not in paper form).

They're not getting big fat advances[161] from publishers. Not even a small cheque. Instead, Brooker will get 35 per cent of each e-book sold[162], and Teague will get 30 per cent. That's way[163] above what either could expect in royalties[164] if their titles were published in the familiar book format, as beautifully bound bits of trees[165].

The usual author royalty is anywhere between ten and fifteen percent of a book's selling

price. But the large percentage royalty for an e-book will come from a much smaller price—e-books sell online for somewhere between $ US 2.50 and $ US 7 a copy, compared to the bookstore retail price of between $ US 10 and $ US 90 depending on the size and quality of the publication.

But how many e-book copies can authors expect to sell in an electronic market which is still in its infancy? The best-selling e-author of 1999, Leta Nolan Childers, sold just over 6,000 copies of her book *The Best Laid Plans*. "I'm expecting to sell more than I would in the traditional market, simply because the US market is so much bigger," says Teague, whose novel, *Jagged Greenstone*, was runner-up in the UK Romantic Novelists Association New Writers Award.

E-mail, e-commerce, e-authors, e-books ... eeeargh! The whole world is on a technological treadmill. Surely not books?[166] The pleasure of reading isn't just in the way it allows escape into other worlds[167]. Physical[168] books are a tactile, visual experience. There's nothing like the anticipation of a new book in your hands, the appeal of a cover, and the smell of ink and paper, not to mention a small frisson of guilt at all those murdered trees[169]. You can curl up in an armchair, or in bed, with a good book. But surely it will not be the same with a small electronic device, even if it is the size of a paperback[170] and the weight of a hardback, and has a simple button that turns the page.

Even if you like the idea, you first have to have SoftBook and the Rocket e-book—hand-held electronic readers[171] with high resolution screens, the ability to store several books at once, and a page by page text display. You can download e-books from various US web sites, but unless you have the small reading devices, that means reading books on a large computer screen, and that definitely doesn't lend itself to[172] a late-night reading experience in bed.

So far, those are the two forums[173] for e-publishing, a field still the focus of the technologically infatuated[174]. Teague still meets responses such as that of the librarian in her home town of Nelson. "When I told her about them (e-books), she just looked at me blankly," says Teague, laughing. Or the response of the unnamed executive from a top publishing house who said of e-book publishing: "Isn't that for failed authors?"

But the Bigs[175] are moving in[176]. Fatbrain.com, which has partnered with Adobe, will let anyone sell digital books on its website and is negotiating with publishers such as Macmillan and McGraw-Hill to find new ways of packaging their titles. Best-selling authors like mystery thriller writers Patricia Cornwell and Jonathan Kellerman are now posting electronic titles on the Internet. The website www.originalsonline.com also displays only e-books that have never been published in paper form.

Recently, top-selling horror story author Stephen King wrote and published his first e-book, *Riding the Bullet*, a 66-page "ghost-story in the grand manner." It was published only on the Internet on the website of American publishers Simon & Schuster who charges visitors $ US 2.50 to download it. In the first week, 450,000 people visited the site, before other sites copied it and made it available without charge—it's typical of the Internet, that[177] something will always be copied for free. Computer giant Microsoft and leading US bookstore chain barnesandnoble.com

试读结束：需要全本请在线购买： www.ertongbook.com