

“美国的事就是做生意。”1925年总统卡尔文·库利吉如是说。当美国全国商业界仔细研读五月七日由参议院金融委员会通过的全面税制改革方案的小字体印刷的细节规定附件时，他们可能感到纳闷，库利吉所指的到底是哪个国家。这个被委员会主席——俄勒冈共和党党员鲍勃·派克伍德重新修改过的新方案一眼看上去似乎是将税务负担从个人转移到工商企业的头上。但是该议案非常微妙，大有讲究，让人不胜意外，它使美国变成了一个会计之国：上星期几百万人伏身于袖珍计算器，算算自己是赚、是亏、还是正好持平。

1 “The business of America is business,” declared President Calvin Coolidge in 1925. As the nation's commercial classes examine the fine print of the sweeping tax-reform bill passed May 7 by the Senate Finance Committee, they may wonder what country Coolidge was talking about. The bill remolded by Oregon Republican Bob Packwood, the committee's chairman, appears at first glance to be a major shift in tax burdens away from individuals and onto the shoulders of business. Yet the proposal is so subtle, so elegant, so freighted with surprises that it is turning America into a nation of accountants: millions of people sat hunched over their pocket calculators last week trying to figure out whether they would win, lose or break even.

为了筹集足够的钱，平均减免6.3%的个人联邦税，委员会的这个议案要向公司额外征收一千亿美元税金。该计划会减少或取消公司很多很重要的优惠，包括公司购买经营设备的投资税款扣除，以及计算所得税时可全部扣除的业务招待费。另外，很多关于个人税法的修改提案，例如对个人退休金账户的控制，都将改变消费者花钱和攒钱的方式，影响到全体美国人。

2 To raise enough money to give individuals an average 6.3% federal tax break, the committee's bill would levy an extra \$100 billion on corporations. The plan would reduce or abolish many cherished business preferences, including the investment tax credit for companies that buy business equipment and the full deductibility of corporate entertainment. In addition, many of the proposed changes in individual tax law, for example, the curbing of individual retirement accounts, will affect corporate America by changing the way consumers spend and save.

好几种产业，包括房地产开发商和餐馆老板已开始愤怒地抗议。他们声称派克伍德的计划单把他们挑出来承担多于他们应承担的税收份额。但大部分的公司经理似乎赞成委员会的这项提案。他们认为这是一个较为公正的计划。此外，从长远的观点来看，它有助于提高美国经济效率和经济增长。例如，议案对“推迟纳税”在实质上的取消，能制止将投资资本流入故意亏损的企业以求减税的行为。普鲁丹歇尔保险公司董事长罗伯特·贝克说：“我能接受这个议案，配合执行。”

3 Several industries, including real estate developers and restaurateurs, have started howling in protest. They claim that Packwood's plan singles them out for more than their share of reform. The majority of corporate leaders, though, appear to be lining up in favor of the committee's proposal. They see it as a relatively equitable plan and, moreover, one that could help by boosting U.S. economic efficiency and growth in the long run. The bill's virtual abolition of tax shelters, for example, could stop the flow of investment capital into ventures that deliberately lose money to create tax breaks. Said Robert Beck, chairman of the Prudential insurance company: “I could take that bill and run with it.”

参议院委员会增收公司所得税的提案没有以前苛刻。比较起来，去年十二月众议院通过的税制改革议案建议增收1,400亿美元的营业税。全国制造商协会税收及财政政策副会长保罗·哈德说：“人们有支持参议院委员会议案的强烈意向，其基本原因主要是损害管理。假如在1,000亿美元和1,400亿美元的税额增收之间选择，你肯定会选1,000亿美元。”

4 The Senate committee's proposed increase in corporate income taxes is less harsh than in

earlier proposals. By comparison, the tax-reform bill passed by the House of Representatives last December would increase business taxes by about \$140 billion. Says Paul Huard, vice president of taxation and fiscal policy for the National Association of Manufacturers: "There will be a strong inclination to support the Senate committee's bill, and the rationale will be largely damage control. If you have to choose between a \$100 billion tax increase and a \$140 billion one, you take the \$100 billion."

为换取堵塞漏洞，参议院委员会议案把最高营业税率从 46% 降低到 33%，作为对公司的回报。曼哈顿查斯银行董事长威勒德·巴切说：“这个议案不同的地方就是相比较而言税率低了。”

5 In exchange for taking away loopholes, the Senate committee's bill would reward businesses by lowering the top business-tax rate, from 46% to 33%. Said Willard Butcher, chairman of Chase Manhattan Bank: "What's different about this tax bill is the very significantly lower rate."

如果抱怨意味着延误议案进程，那么即使实施税改后负担加重的公司可能也不愿意抱怨了。税制改革过程长久，尽管未卜之事甚多，却是战略性的计划。芝加哥 Rubloff 金融服务公司总裁斯蒂芬·辛克莱抱怨道：“从 1984 年以来这个计划一直在进行。如果他们愿意下决心，告诉我们税法到底变成怎样，我们就可以继续做我们的生意了。”这个希望是很可能变为现实的，因为委员会的建议连交好运。上星期里根总统在税改行动联盟 --- 由一些公司和贸易协会组成 --- 的谈话中全力支持了派克伍德计划。

6 Yet even businesses that would carry a larger burden under the committee's plan may be reluctant to make a fuss if it means holding up the bill's progress. The drawn-out process of tax reform, with all its uncertainty, has strategic plans. Complains Stephen Sinclair, president of Rubloff Financial Services in Chicago: "This has been going on since 1984. If they would just make up their minds and tell us what the tax law is going to be, we could go on and do our business. " That prospect seems increasingly probable now that the committee's proposal is on a roll. President Reagan, speaking last week to the Tax Reform Action Coalition, a group of corporations and trade associations, gave the Packwood plan full support.

尽管表面上受到普遍接受，议案仍然存在一些颇有争议的部分。如果议案通过的话，很多公司都不得不做巨大的改革。其中：

7 Despite its apparent mainstream acceptance, the bill nonetheless contains features that will be loudly debated and, if passed, will force businesses to make drastic changes. Among them:

取消投资税款扣除。取消这一项是任何税制改革计划的重要组成因素，因为在未来的五年之内它能为政府节约 1,400 亿美元。但它给从炼钢厂到航空公司等一系列资本密集的产业带来困难，因为这些产业是靠投资税款扣除提供设备的投资经费。对从事制造设备的公司来说，这意味着双重打击，因为它们及它们的客户都将失去投资税款扣除。伊利诺斯州洛克弗德的一家叫 Circle Boring 机床厂的董事长格兰·爱克堡说：“我很惊讶国会已经忘记 1969 年他们取消投资税款扣除时给我们行业造成怎样的灾难”。

8 Repealing the investment tax credit. Eliminating this program is a crucial ingredient of any tax-reform plan because it will save the Government almost \$140 billion over the next five years. Yet it could cause hardship for capital-intensive businesses ranging from steelmakers to airlines,

which have relied on the credits to help finance their investments in equipment. It represents a double whammy for companies that produce manufacturing equipment because both they and their customers will lose the credits. Said Glenn Ekberg, president of Circle Boring, a machine-tool maker in Rockford, Ill.: "I'm surprised Congress has forgotten what a disaster they created for jobs in our industry when they cut [the investment tax credit] off before in 1969."

设立 20% 这一最低公司税。这一条能防止一些赚大钱的公司 在交所得税时逃避交税。以前由于有漏洞，很多大公司都这么干。根据一个消费者和劳工团体<sup>3/4</sup> <sup>3/4</sup> “税收公正公民”所做的调查，波音公司、国际电话电报公司、通用动力公司、灰狗汽车旅游公司、格鲁曼公司，还有其它一些公司，从 1981 年到 1984 年间没有交过税。波音公司董事长 T·A·威尔逊评论说：“人们抱怨我们使用各种手段延期纳税。我宁愿上交最低限度的税款，而不要再听那些指责”。

9 Creating a 20% minimum corporate tax. This would prevent large, profitable companies from getting off scot-free at income-tax time, as many have done in the past because of loopholes. Boeing, ITT, General Dynamics, Greyhound and Grumman, among others, paid no taxes between 1981 and 1984, according to a study by Citizens for Tax Justice, a consumer and labor group. Commented T.A. Wilson, chairman of Boeing: "The complaint is that through various techniques, we defer taxes. I would just as soon have a minimum tax and take a lot less of that flak."

取消个人资本收益减税。委员会的计划取消一项现有条款，即准许纳税人出售股票、房产和其它不动产所得的百分之六十免于课税。相反，这些收益作为平常收入予以课税，这个规定会严重影响企业公司。比如依靠风险资本贷款来筹集经费的硅谷电子工业暴发户们。原因是如果他们的利润税率增高，那些潜在的资金提供者会失去一个重要的优惠。打算反对委员会计划的加州参议员阿兰·克郎斯敦说：“对于那些能创造未来科技的年轻人来说，这无疑是在他们的革新道路上设置了一个巨大的障碍”。

10 Eliminating the capital-gains break for individuals. The committee's plan repeals the current provision that allows taxpayers to exclude from taxation 60% of the long-term profits they make when they sell stocks, real estate and other assets. Instead, such gains would be taxed as ordinary income. Doing away with the capital-gains break could hurt entrepreneurial companies like Silicon Valley's electronics upstarts, which depend on venture-capital financing. Reason: those potential backers would lose an important incentive if their profits were taxed at a higher rate. Says California Senator Alan Cranston, who plans to fight the committee's change: "It would put a tremendous obstacle in the path of the innovative young men and women who can create the technologies of the future."

取消对个人退休金捐帐户赠的税款扣除。尽管纳税人个人能就帐户利息所得延期纳税，但他们不能再以捐款的方式在每年的税款中扣除最高可达 2000 美元的税款。委员会决定免除退休金帐户中的大部分补助费，因为政府为此今年要化去 130 亿美元，而且从来没有证实过这些补助能促使消费者节省下更多的钱。但是在 2500 亿美元个人退休金帐户中持有一大块的银行和互助基金却不想接受这个建议。 11 Eliminating deductions for IRA contributions. Individual taxpayers would no longer be able to deduct up to \$2,000 in annual contributions, though they would still be allowed to defer taxes on the interest they earn on their accounts. The committee decided to wipe out much of the IRA benefit because the accounts are expected to cost the Government some \$13 billion this year, and it has never been proved that they prompt consumers to save more. But banks and mutual funds, which together hold a large chunk of the \$250 billion in IRA accounts, want to shoot down this part of the proposal.

取消业务招待费的扣除。在盛行白葡萄酒和毕雷矿泉水的今天，业务经理们虽然很少再在午

餐时喝三瓶马提尼酒，但他们仍然迅速积欠大笔帐单。委员会的计划只允许企业扣除 80% 的业务招待费而不是全部。餐馆业警告说，税改提案最终会使 130 万服务员、服务员助手和其他工作人员丢掉饭碗。

12 **Curbing the deductibility of business entertainment.** Though few business executives still drink three martinis at lunch in these days of white wine and Perrier, they continue to run up huge bills. The committee's plan would allow businesses to deduct only 80% of entertainment expenses, instead of the full tab. The restaurant industry warns that the tax-reform proposal could eventually cost the jobs of some 1.3 million waiters, busboys and other workers.

取消贷款利息扣除。纳税人不再允许扣除在汽车贷款，信用卡结存和其他非抵押上所得的利息。这也许会给贷方及交通工具、大设备生产商的生意带来损失。库奥柏斯与来布兰德会计事务所“税收政策”主任伊拉·萨皮罗说：“这会改变人们购买高价商品的方式。他们宁可用现金买些便宜货，而不愿借钱买贵重东西。”

13 **Repealing the deductibility of interest on consumer loans.** Taxpayers would no longer be allowed to write off the interest they pay on auto loans, credit-card balances and other nonmortgage financing. This may bring a loss of business for lenders and the makers of vehicles and heavy appliances. Said Ira Shapiro, director of tax policy at the Coopers & Lybrand accounting firm: “It could change the way people buy big-ticket items. They may prefer to buy the cheaper item with cash, instead of borrowin.”

根除减免所得税的合法手段。委员会对减免所得税的手段严加限制，几乎予以根除。例如，个人不能再从其它收入里扣除不动产的投资亏损。这项规定以及其它的规定已经在房地产行业的许多部门中激起强烈反应。委员会的议案将基本上取消减免所得税的合法手段的合伙关系，因为它们经常给购物中心、公寓楼和写字楼提供资金。结果，全国住宅建筑商协会警告说，住房动工数会骤然下降。全国公寓协会预测房租不得不平均增加 32.7% 以弥补不能扣除的那一笔金额。但是石油和天然气开发大都可以幸免于这一新规定，原因是该产业境况不景气以及政治影响。

14 **Eradicating tax shelters.** The committee put enough restrictions on tax shelters to make them all but extinct. Example: individuals will no longer be able to deduct investment losses on real property from other income. That provision, among others, has sparked an angry reaction from many parts of the real estate industry. The committee's bill would largely eliminate the tax-shelter partnerships that often finance shopping centers, apartment complexes and office buildings. As a result, the National Association of Home Builders warns of a sharp decline in housing starts and the National Apartment Association predicts that rents would have to increase an average of 32.7% to make up for lost write-offs. Tax shelters for oil and gas drilling, however, were largely spared because of that industry's dire condition and political clout.

很多公司认为这个新的税改提案利弊参半。例如股票经纪人会失掉很多个人退休金方面的生意，但会赢得本来属于“减免所得税的合法手段”的那一部分投资资本。汽车生产商可能因汽车贷款利息不可再扣除而蒙受一些损失，但却可以由伴随的税收减少，消费者口袋里有了更多的钱而得益：农场主们忧心如焚，因为他们失去了购买拖拉机或其他用具可享受的投资税款减免，但他们不再面对那些依靠“减免所得税的合法手段”的农业企业的竞争。

15 **Most businesses are finding that the new tax proposal is a mixed bag of helpful and hurtful surprises.** Stockbrokers, for instance, would lose IRA business but would pick up investment money that might otherwise have gone into tax shelters. Automakers might suffer a bit because car loans would no longer be deductible, but could expect to benefit from the accompanying tax cut

that puts more money into consumer pockets. Farmers would mourn the loss of the investment tax credit for buying tractors and other gear, yet would no longer face competition from tax-sheltered agricultural ventures.

高税收的影响会通过所谓的过渡法规而得到缓解,该法规决定新法律分期生效的速度。例如,钢铁公司正在游说参议员委员会挪出 55 亿美元减税款中的一部分作为过渡之用。房地产公司也在这样做。全国住宅建筑商协会的顾问费洛伊德·威廉斯说:“我们所需的事情之一就是能有一个平隐的过渡法规,这样我们的同行不会突然大受打击。”

16 The impact of higher taxes will be softened by so-called transition rules, which determine how quickly the new law would be phased into effect. Steel companies, for instance, are lobbying the Senate committee to get some of the \$5.5 billion in tax breaks set aside for the transition. The real estate industry is doing likewise. Says Floyd Williams, tax counsel for the National Association of Home Builders: “One of the things we want is a smooth transition rule so that people in our industry aren't hit all at once.”

从这些改革议案中获益最大的就是经济。在未来的十年间,它每年会以 10% 的速度递增,因为个人税率降低。消费者的消费会刺激经济增长,因为每年每个典型的纳税家庭都多出 600 到 900 美元可自由支配。有些纳税人会得到大得多的增益,特别是那些以前基本上不利用“减免所得税的合法手段”的中、高等收入者。

17 The biggest winner from the reform measure would be the economy, which the Reagan Administration estimates would grow about 10% faster each year over the next decade because of lower personal tax rates. Consumer spending would spur the growth, since each taxpaying household should typically have \$600 to \$900 more disposable income every year. Some taxpayers would reap a much greater gain, particularly middle-and upper-income individuals who have largely avoided tax shelters in previous years.

同等重要的是,改革措施鼓励投资者把他们的决策建立在可靠的经济基础上,而不是单从税法角度来考虑。卡特总统手下的经济顾问委员会主席查尔·舒尔兹说:“该法案会结束很多因为人们竭尽全力利用‘减免所得税的合法手段’、千方百计把普通的收入转变为资本增益而正在出现的扭曲现象。”亚特兰大“公民与南方国家银行”的主要经济学家阿诺德·迪尔也同意道:“看看所有那些通过税收补贴而建造的无人租用的写字楼。”

18 Just as important, the reform measure would inspire investors to base their decisions on sound economic grounds rather than tax-law considerations. Said Charles Schultze, the chairman of the Council of Economic Advisors under President Carter: “It will eliminate a lot of distortions that are going on as people put their energies simply into taking advantage of tax shelters and finding ways to convert ordinary income into capital gains.” Concur Arnold Dill, chief economist at Atlanta's Citizens & Southern National Bank: “Look at all the empty office buildings we've built through tax benefits.”

派克伍德的提案下个月在参议院最后表决通过前,还会受到一些说客的最后时刻的攻击。如果获得通过,该法案将送交给一个协商委员会,使之与众议院的议案协调一致。尽管前面困难重重,立法者们开始相信法案有足够的势头能顺利通过,特别是因为这么多的公司领导人都已经双手赞成。一位资深的华盛顿税收说客查尔斯·沃科预言:到七月或八月,总统桌上将有一份完备的议案待签。果真如此的话,公司上层人物处于悬而未决状态的时间就远比他们原先担心的要短得多。

19 Packwood's proposal will get a lastminute assault from some lobbyists as it heads toward a

final vote in the Senate next month. If approved, the bill will go to a conference committee that will reconcile it with the House's bill. Despite those challenges ahead, legislators are beginning to think the measure has enough momentum to sail right through, especially since so many business leaders are climbing on board. Charls Walker, a veteran Washington tax lobbyist, predicts that a finished bill will be on the President's desk for signing by July or August. If so, business executives will be in suspense for a much shorter time than they had originally feared.

电脑对社会行为有着深刻的影响。计算机处理的触手可及,使得那些在其他方面都被认为是好市民的人发现自己沉迷在不道德行为-甚至是非法行为中。对有版权软件的盗版行为四处可见,而近期大量报道的如黑客入侵、病毒制造、电脑行骗以及侵犯隐私等等事件,使得要求电脑业拥有新道德观和制定保护市民不受电脑化的无政府状态侵害的新法规的呼声越来越高了。 1. Computers are having a profound effect on social behavior. With easy access to processing power, individuals who, in every other respect, could be regarded as good citizens now find themselves indulging in unethical - and even unlawful - behavior. The theft of copyright software is widespread, while recent, well-publicized incidents of hacking, virus creation, computer-based fraud, and invasion of privacy have been followed by a rising chorus of calls for a new morality in computing and new laws to protect citizens from computerized anarchy.

短短的 40 年期间,电脑已成为复杂社会的运转核心,没有电脑和通讯系统,许多生产制造业,工业,商业,运输和销售业,政府部门,军队,公共医疗卫生服务,教育,以及研究工作都会停滞下来。但是随着社会越来越依靠电脑,社会也越来越易受人类滥用电脑的影响。 2. In the short space of forty years, computers have become central to the operation of complex societies. Without computers and communication systems, much of manufacturing, industry, commerce, transport and distribution, government, the military, health services, education, and research would grind to a halt. Yet as society becomes more dependent on computers, it also becomes more vulnerable to the misuse of computers by human beings. to stop gradually and completely to keep sb. prisoner so as to demand payment to make something useless or destroyed ;to make a deep impression on somebody; to make asleep to be broken down 公民自由 (指国家法律给予保证的自由,如言论自由,信仰自由等)。

电脑的存在确实造成了一系列急需我们处理的新的社会问题。这包括软件盗版,电脑行骗,黑客现象,病毒破坏,电脑的不可靠性和社会受系统故障影响的脆弱性,电脑监控和隐私侵犯,电脑业过分宣扬电脑以及电脑化工作环境中生活质量的恶化现象。 3. The very existence of computers has created a new range of social problems or issues with which we urgently need to grapple. These include the theft of software; the use of computers to commit fraud; the phenomenon of hacking; sabotage in the form of viruses; the unreliability of computers and the vulnerability of society to system failure; computerized monitoring and the invasion of privacy; the excessive hyping of computers by the computer industry; and traces of deterioration in the quality life in the computerized workplace.

这些问题中有些是全新出现的,而在其他问题上,电脑的存在只是翻新了那些"旧"的道德问题,如:是(与非),诚实,忠心,负责,信任和公平。 4. Some of these issues are entirely new, but in other respects, computers have merely created new versions of such "old" moral issues as right (versus wrong), honesty, loyalty, responsibility, confidentiality, and fairness.

由于电脑业是一个相对比较新和开放的领域,所以电脑职业本身既无时间,也无组织能力去建立一套有约束力的道德规范。历史久一些的职业,如医学和法律业,已有差不多几个世纪的时间来形成他们的行为准则。另外还有一个问题是,和医生或律师的开业有所不同,电脑的使用超出了电脑行业本身的范围。我们现在都是电脑用户,在某种程度上,我们都和从事电脑职业的人一样,面临着同样的道德困惑和忠信矛盾。许多的道德困惑--如,是否盗版软件--就是新的"灰色地带",已被接受的准则或社会惯例中很少有这种灰色地带,更不用说已制定的判例法了。 5. Because computing is a relatively new and open field, the computer

profession as such has had neither the time nor the organizational capability to establish a binding set of moral rules or ethics. Older professions, like medicine and the law, have had literally centuries to formulate their codes of conduct. And there is another problem, too: computer usage, unlike the practice of medicine or of the law, goes outside the profession. We are all computer users now, and we are all to some extent faced with the same ethical dilemmas and conflicts of loyalty as computer professionals. Many of these dilemmas - whether or not to copy software, for instance - are new "grey areas" for which there is little in the way of accepted rules or social conventions, let alone established case law. not to mention;not to disturbto be dominated byto realizeto be given withto be subject toto fire somebody;to put something aside;to stop something

电脑用户和电脑专业人员面临的道德问题有很多，其中包括：

- 盗版软件真的是偷盗行为吗？软件开发者应该拥有哪种知识产权？
- 所谓的"不伤害他人"的电脑犯罪（如袭击银行电脑系统），是否有点比伤害他人的犯罪更能让人接受？电脑专业人员是否该因他们在系统中设立的电脑安全措施不严格而被起诉？
- 黑客入侵只是一个无伤大雅的玩笑还是一种等同于擅闯、伪造和(或)偷盗的罪行？抑或黑客是我们公民自由的护卫者？

- 制造病毒是否该被认为是故意破坏而加以惩罚？

- 秘密储存在电脑中的个人信息是否构成让人难以忍受的侵犯隐私？个人和雇员有权受到多少隐私保护？
- 谁对电脑故障或电脑程序中的错误负责？该让电脑公司对软件实行担保吗？

- 追求"智能"这样一个目标是否现实？是否正确？我们是否该把我们的生活托付给所谓的人工智能"专家"系统？

- 如果工作环境全部电脑化会让劳动力技能下降和(或)更加失去个性、更加疲乏和烦闷时，我们是否还该如此呢？

- 电脑专业人员在向公众销售系统或展示电脑时，可以就电脑的能力说谎吗？电脑公司"锁定"客户使用他们的产品，是道德行为吗？

- 电脑专业人员该受行为准则的限制吗？如果是的话，又是些什么准则呢？

6. The ethical questions faced by computer users and computer professionals are numerous, but they include the following:

# Is copying software really a form of stealing? What sort of intellectual property rights should software developers have?

# Are so-called "victimless" computer crimes (against banks, for example) somehow more acceptable than crimes with human victims? Should computer professionals be sued for lax computer security in the systems they build?

# Is hacking merely a bit of harmless fun, or is it a crime equivalent to burglary, forgery, and/or theft? Or are hackers guardians of our civil liberties?

# Should the creation of viruses be considered deliberate sabotage and be punished accordingly?

# Does information on individuals which has been clandestinely stored in a computer constitute an intolerable invasion of privacy? How much protection are individuals and employees entitled to?

# Who is responsible for computer malfunctions or errors in computer programs? Should computer companies be made to provide a warranty on software?



# Is "intelligence" a realistic and a proper goal to pursue? Should we trust our lives to alleged artificially intelligent "expert" systems?

# Should we allow the workplace to be computerized if it de-skills the work force and/or increases depersonalization, fatigue, and boredom?

# Is it acceptable for computer professionals to make false claims about the capabilities of computers when selling systems or representing computers to the general public? Is it ethical for computer companies to "lock-in" customers to their products?

# Should, indeed, computer professionals be bound by codes of conduct, and if so, what should it include?

为电脑行业制定道德规范存在着一个问题，那就是它没有医学或法律业那样的职业地位。正如瑞森拉理工学院的德伯拉·约翰逊在她有关这个问题的各篇文章中说，电脑专业人员更像工程师，在大部分时间他们像雇员一样工作，无权单独行事。他们有专业知识，却通常拥有非常有限的自主权。他们常团队而不是单独运作，只从事大项目中的几个小部分。他们常常远离所做工作产生的效果和影响，也没有一个联合的有制度的行业组织。关于他们对老板、客户、同行人士以及广大社会的责任，通常会引起纷争。7. One problem in developing ethical guidelines for the computer profession is that it does not have the status of professions like medicine or the law. As Deborah Johnson of Rensselaer Polytechnic Institute has argued in her various writings on the subject, computer professional are rather like engineers. Mostly they work as employees rather than in their own right. While they have esoteric knowledge, they typically have quite limited autonomy. They often work in teams rather than alone and on small segments of large projects. They are usually distant from the effects of their work, and they do not have a single unifying and regulating professional organization. Conflicts can occur among their obligations to their employer, their client, their co-professionals, and to the wider society.

尽管电脑专业的社会地位较低，但使用电脑储存重要的金融、市场、人事、健康、研究和军事信息，却让那些专业人员--从低微的操作人员到系统开发总管--手中拥有了新型的权力。这种权力不是被刻意寻求的，但电脑专业人员却发现自己拥有了掌握老板、客户、同行人士和大众的权力。这种权力很容易被那些毫无顾忌或易受诱惑的人滥用。8. Yet despite the lower social status of computer professionals, the use of computers for storing vital financial, marketing, personnel, health, research, and military information puts new forms of power in the hands of those professionals, from the humble operator to the chief systems developer. This power is not specifically sought, but nevertheless computer professionals do find themselves in positions of power over employers, clients, co-professionals, and the general public - and it is power that can be easily abused by those without scruples or those who easily fall victim to temptation.

老板会被心怀不满的员工要挟，这些员工能改变口令或在软件中插入"定时炸弹"或"逻辑炸弹"，它们会在某个给定的时间让整个系统处于瘫痪状态。比如，据新闻报导，明尼阿波利斯一家公司的一位程序员被指控勒索，他曾威胁说，除非公司在他找到另一份工作前每星期付给他 350 美元，否则他将引爆公司电脑系统的"定时炸弹"。一位爱争论的华盛顿特区的政府财政分析员更改了财政部办公室电脑的口令，还拒绝告诉他的上司，因为他不同意他们

的政策。加拿大安大略省一家公司的雇员在公司电脑里植入一个"逻辑炸弹",以使整个系统在某个时间被全部抹掉,因为他对他的加薪被延误不满(分别摘自1985年5月23日《明尼阿波利斯星论坛报》;1986年2月9日《华盛顿邮报》;1987年11月3日《多伦多全球邮报》)。

9. Employers can be held to ransom by disgruntled employees who have the ability to change passwords or insert software "time bombs" or "logic bombs" that can knock out entire systems on a given date. For example, according to press reports, a programmer with Minneapolis company was charged with extortion after threatening to trigger a "time-bomb" in the firm's computer system unless he received \$350 per week until he found another job; a controversial Washington, D.C. government financial analyst changed the password to the Treasurer's office computer and refused to tell his superiors because he disagreed with their policies; and an employee of an Ontario, Canada, company planted a "logic bomb" in the company's computer designed to erase the entire system on a certain date - he was unhappy about a delayed salary increase (Minneapolis star Tribune, 23 May 1985; Washington Post, 9 February 1986; Toronto Globe Mail, 3 November 1987, respectively).

客户完全受控于系统设计师,只有系统设计师知道系统是如何运作的;也受控于那些顾问,其实顾问提供的服务并不是完全有必要的;还受控于那些几乎是自主定价的垄断电脑供应商。总的来说,社会易受电脑专业人员的行为影响,因为大部分公众都不明白专业人员管辖的项目的危险性或潜在的东西。信息是金钱,也是力量,信息技术革命让电脑专业人员处于极大的诱惑中:是否滥用这种能接近机密性宝贵信息的权力是这个新行业人士所面临的最重要的道德困惑之一。10. Clients are at the mercy of systems designers who alone know how a system works, consultants whose services may not strictly be necessary, and monopoly computer suppliers who can virtually write their own bills. Society as a whole is vulnerable to the actions of computer professionals because most in the general public do not understand the dangers or implications of projects under the professionals' command. Because information is both money and power, the revolution in information technology has placed computer professionals under severe temptation: whether or not to abuse this power of access to confidential valuable information is one of the most important ethical dilemmas facing members of the new profession.

电脑业教育家也有特别的责任去确保未来一代的电脑专业人员了解电脑引起的社会问题,尤其是他们将来作为电脑专业人员每天会面临的道德冲突。未来的毕业生也会在某种程度上被认为是"专家"或这个行业的代言人,向更广阔的世界诠释电脑。总的来说,他们将是和各种组织、工场和社会有密切联系的系统的缔造者。11. Computing educators also have a special responsibility to ensure that future generations of computer professionals are aware of the social problems caused by computers and especially aware of the ethical conflicts they will face every day in their future roles as computer professionals. Tomorrow's graduates will also to some extent be considered "experts" or spokespersons for the industry, interpreting computers to the wider world, and they will be creators of systems that will have major implications for organizations, the workplace, and society in general.

电脑业教育家也该培养有口才的信息技术专家,即富有交流技能、"与人交流的技能"和重视信息技术的社会道德关系的技术专家。他们必须让人们有准备地面对这个混乱的现实世界,而不是图像显示终端荧屏中洁净、虚构的世界,因此,他们有责任推动这些问题的讨论,并让我们知道所面临的选择。12. Computing educators should also be producing articulate information technologists - technologists endowed with communication skills, "people skills," and an appreciation of the social and ethical implications of information technology. They must prepare people for the messy real world, not the tidy, imaginary one inside a VDT screen. They,

therefore, have a duty to stimulate discussion about these issues and to generate awareness of the choices available to us.

除了人为滥用造成的问题之外, 社会也开始更容易受到电脑故障的影响。有故障的硬件和软件远比许多人(特别是电脑行业人士)让我们相信的要普遍得多。总的来说, 社会过分地相信这些所谓不会出错的机器。实际上, 电脑不仅不可靠, 还不安全, 他们常完全失控。是否老实承认这些不足之处, 成了电脑专业人员和电脑行业的另一个道德困惑。13. In addition to the problems caused by human misuse, society is also becoming more vulnerable to computer malfunctions. Malfunctioning hardware and software are much more common than many (especially those in the computer industry) would have us believe. Society as a whole tends to put too much faith in these supposedly infallible machines. In fact, computers are not only unreliable, they also tend to be insecure, and they often become completely unmanageable. Whether to admit honestly these failings becomes another ethical dilemma for computer professionals and the computer industry.

#### 电脑的不可靠性 Computers Are Unreliable

电脑几乎渗入我们生活的各个方面, 包括许多先前技术从未涉足过的领域。但不同于其他渗透性技术如电力、电视和汽车的是, 总的来说电脑行为更不可靠, 更不可预测。这是因为他们是处于分离状态的数字电子装置, 容易引起全面的灾难性崩溃。电脑系统一旦发生故障, 就会全面瘫痪, 它不像模拟或电子机械装置那样, 只会发生局部故障, 剩下的部分仍可使用。14. Computers are permeating almost every aspect of our lives, including many areas previously untouched by technology. But unlike such other pervasive technologies as electricity, television and the motor car, computers are on the whole less reliable and less predictable in their behavior. This is because they are discrete state digital electronic devices that are prone to total and catastrophic failure. Computer systems, when they are "down," are completely down, unlike analog or electromechanical devices, which may be only partially down and are thus partially usable.

#### 电脑的不安全性 Computers Are Insecure

电脑能够储存、检索和传送大量的信息, 其速度之快是前所未有的。这固然很好, 但这却严重关系到资料的安全性和个人隐私, 因为电脑本质上是不安全的。最近美国、德国、英国的黑客和数据窃贼活动已表明即使是闯入最复杂的金融和军事系统也还是易如反掌。新兴起的高科技罪犯布下的骗局正日益增多, 这些骗局包括做手脚预定机票到重编移动电话中的芯片程序等。15. Computers enable enormous quantities of information to be stored, retrieved, and transmitted at great speed on a scale not possible before. This is all very well, but it has serious implications for data security and personal privacy because computers are inherently insecure. The recent activities of hackers and data thieves in the United States, Germany, and Britain have shown how all-too-easy it still is to break into even the most-sophisticated financial and military systems. The list of scams perpetrated by the new breed of hi-tech criminals, ranging from fraud in airline-ticket reservations to the reprogramming of the chips inside mobile phones, is growing daily.

#### 电脑的失控性 Computers Are Unmanageable

电脑系统常常是复杂得令人难以置信。实际上, 其复杂性就连它们的创造者也不明白(尽管很少有人愿意承认这一点)。这常常使它们完全失控。这种失控的复杂性会造成大量的故障或惊人的预算"失控"。比如杰弗利·罗士费德在《商业周刊》(1988年11月7日和1989年

4月3日)中报导说,1988年美国银行在花了5年时间和6千万美元试图让一个价值2千万美元的电脑系统运转起来后,不得不放弃。全美保险公司眼睁睁地看着其新系统的费用从8百万美元一直涨到差不多1亿美元,预期的完工期从1987年一直推迟到1993年。而且,这个问题似乎越来越严重。1988年美国仲裁协会受理了190个电脑纠纷,其大多数都和有缺陷的系统有关。要求赔偿的总款目从1984年的仅仅3100万美元涨到2亿美元(见1988年2月7日和1988年6月29日《洛杉矶时报》)。16. Computer systems are often incredibly complex - so complex, in fact, that they are not always understood even by their creators (although few are willing to admit it). This often makes them completely unmanageable. Unmanageable complexity can result in massive foul-ups or spectacular budget "runaways." For example, Jeffrey Rothfeder in *Business Week* (7 November 1988 and 3 April 1989) reports that Bank of America in 1988 had to abandon a \$20-million computer system after spending five years and a further \$60 million trying to make it work. Allstate Insurance saw the cost of its new system rise from \$8 million to a staggering \$100 million and estimated completion was delayed from 1987 to 1993. Moreover, the problem seems to be getting worse; in 1988 the American Arbitration Association took on 190 computer disputes, most of which involved defective systems. The claims totaled \$200 million--up from only \$31 million in 1984 (See *The Los Angeles Times* 7 February 1988 and 29 June 1988).

复杂性也会造成灾难:没有哪部电脑是100%可以得到保障的,因为预料到所有的重要用途实际上是不可能的,如拯救生命,驾驶飞机,管理核电站,进行大笔资金转账,还有控制导弹系统--有时会造成悲剧。例如,1982年到1987年,美国空军先进的黑鹰直升机的五次失事中,大约22位空军士兵死于非命,之后,失事原因追溯到电脑控制的"电控飞行"系统。至少有两人死于遭受过量的电脑控制的Therac-25 X光射线机发出的辐射,其他致命的电脑故障的例子还有很多(汤姆·富勒斯特和派瑞·莫里森:《电脑道德:电脑警世故事和道德困惑》,MIT出版社,剑桥,马撒诸塞州,1990,68-87)。17. Complexity can also result in disaster: no computer is 100 percent guaranteed because it is virtually impossible to anticipate all sorts of critical applications, such as saving lives, flying air craft, running nuclear power stations, transferring vast sums of money, and controlling missile systems - sometimes with tragic consequences. For example, between 1982 and 1987, some twenty-two servicemen died in five separate crashes of the United States Air Force's sophisticated Blackhawk helicopter before the problem was traced to its computer-based "fly-by-wire" system. At least two people died after receiving overdoses of radiation emitted by the computerized Therac 25 X-ray machines, and there are many other examples of fatal computer-based foul-ups (Tom Forester and Perry Morrison, *Computer Ethics: Cautionary Tales and Ethical Dilemmas in computing*, MIT Press, Cambridge, Massachusetts, 1990, pages 68-87).

通常在有些领域电脑故障并不非常危及生命,这些领域包括电话开账,电话交换软件,银行结单,银行柜员机,电子资金转让系统,汽车执照资料库等。尽管电脑常在这些场合备受"谴责",然而在大多数情况下,故障的最终原因实际上是人为失误。18. Popular areas for less life-threatening computer malfunctions include telephone billing and telephone switching software, bank statements and bank-teller machines, electronic funds-transfer systems, and motor-vehicle license data bases. Although computers have often taken the "blame" on these occasions, the ultimate cause of failure in most cases is, in fact, human error.

对社会来说,每项新技术都会产生新问题--也有新利益--电脑也不例外。但数字化电脑已使

社会特别易受硬件和软件故障的影响。有时工业机器人会发狂，而心脏起搏器和自动车库门开启器会被销售终端机、个人电脑和电视游戏释放出的电磁射线或电子烟雾损坏。自动柜员机、加油站的加油泵、快餐店终端机会因无法预见的软件错误而崩溃。

19. Every new technology creates new problems - as well as new benefits - for society, and computers are no exception. But digital computers have rendered society especially vulnerable to hard ware and software malfunctions. Sometimes industrial robots go berserk, while heart pacemakers and automatic garage door openers are rendered useless by electromagnetic radiation or "electronic smog" emitted from point-of-sale terminals, personal computers, and video games. Automated teller machines (ATMs), pumps at gas stations, and fast-food outlet terminals are closed down because of unforeseen software snafus.

这所有停工期的费用是巨大的，例如，据报道，英国商业每年约遭受 30 起大灾难，损失达几百万英镑。这些是由机器或人为的失误引起的，还不包括以骗局和破坏形式进行的人为滥用引起的(1986 年 11 月 10 日《卫报》)。单英国国内制作的软件，其故障引起的费用，保守估计大约每年 9 亿美元(1988 年 6 月 13 日《电子工程时报》)。1989 年，英国电脑协会委员会报道说，现在许多软件都太复杂，以致现有的安全估计技能还不充分，因此，人们的安全也得不到保障(1989 年 2 月 21 日《澳大利亚报》)。

20. The cost of all this downtime is huge. For example, it has been reported that British businesses suffer around thirty major mishaps a year, involving losses running into millions of pounds. These are caused by machine or human error and do not include human misuse in the form of fraud and sabotage (The Guardian, 10 November 1986). The cost of failures in domestically produced software in the United Kingdom alone is conservatively estimated at \$900 million per year (Electronics Engineering Times, 13 June 1988). In 1989, a British Computer Society committee reported that much software was now so complex that current skills in safety assessment were inadequate and that therefore the safety of people could not be guaranteed (The Australian, 21 February 1989).

电脑系统也易遭受火灾、水灾、地震、断电，以及外来黑客和内部雇员破坏的影响。例如，1986 年在芝加哥，《大英百科全书》编辑部一位心怀不满的雇员因被辞退而恼怒万分。他按键进入百科全书的资料库，对其内容进行了一些更改，而这些资料原是这部有名的著作的新版内容--例如，他在引言中把耶稣基督和安拉互换一下，又把公司高级职员的名字插到奇怪的地方。正如一位高级职员这样评价："在电脑时代，我们所拥有的恶梦就在于此。"(1986 年 9 月 5 日《圣何塞导信新闻周刊》)。

21. Computer systems are also vulnerable to fires, floods, earthquakes, and power outages, as well as attacks from outside hackers and sabotage from inside employees. For example, in Chicago in 1986, a disgruntled employee at Encyclopedia Britannica, angry at having been laid off, merely tapped into the encyclopedia's data base and made a few alterations to the text being prepared for a new edition of the renowned work - like interchanging Jesus Christ and Allah in references and inserting the names of company executives in odd places. As one executive commented, "In the computer age, this is exactly what we have nightmares about." (San Jose mercury News, 5 September 1986)

一年后，另一个破坏者关闭了整个全国证券协会的自动报价系统。这位破坏者是个爱冒险的怪人，他在康涅迪格州的特朗布尔，即全国证券交易商协会自动报价表的主控电脑所在地，造成了短路(1987 年 11 月 10 日《纽约时报》)。同时，1986 年，丹麦 600 名电脑人员的罢工使该国政府处于瘫痪达 4 个月之久，造成了执政党宣布提前举行大选。1987 年，一位澳大利亚破坏者小心翼翼地切断了悉尼隧道中 24 条电缆，使 3.5 万个电话、传真、销售线路处于瘫痪，让 40 个郊区的几百个商店停业了 48 个小时(1987 年 11 月 23 日《澳大利亚报》)。

22. A year later, another saboteur shut down the entire National Association of Securities'

automated quotation system. The saboteur in question was an adventurous squirrel, which had caused a short circuit in Trumbull, Connecticut, where NASDAQ's main computer is situated (New York Times, 10 December 1987). Meanwhile, over in Denmark, a strike by 600 computer personnel paralyzed that country's government for four months in 1986, causing the ruling party to call an early general election. In 1987, an Australian saboteur carefully severed 24 cables in a Sydney tunnel and knocked out 35,000 telephone, fax, and point-of-sale lines, putting hundreds of businesses in 40 suburbs out of action for up to 48 hours (The Australian, 23 November 1987).

电脑影响了我们的日常行为，造成了一系列新的社会问题，给我们大家带来了道德困惑。同时，总的来说，社会变得越来越易受技术故障的影响，因为电脑常不可靠，不可预测，不安全和无法控制。想到我们的学校和学院正帮助学生更加意识到这一点，而不是不加批判地、一头冲进模糊的、欠考虑的高科技未来，还是令人感到欣慰的。

23. Computers have affected our everyday behavior and have created a new range of social issues that pose ethical dilemmas for all of us. At the same time, society as a whole has become more vulnerable to technological failure because computers are often unreliable, unpredictable, insecure, and unmanageable. It would be nice to think that our schools and colleges are helping make students more aware of this, rather than joining in the uncritical, headlong rush toward an ill-defined and ill-thought-out high-tech future.

你是不是感觉正被往四处拉扯？压力重重？感觉每位老师都认为你仅修他这门课？感觉顷刻之间所有的事情向你压过来，而你却拿不定你能不能，甚至想不想承受这种压力？一切似乎不可驾驭？至少你知道自己一切正常。你若能成功处理生活中的种种压力，自我激励就最有可能到来。压力不仅消耗体力而且让你丧失动力。

1. Does it feel like you're being torn in all directions? Like you're getting stressed out? Like every teacher thinks his or her class is the only one you're taking? Like everything is coming down on you 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? At least you know you're normal! Self-motivation is most likely to occur when you can successfully deal with the stresses in your life. Stress depletes both energy and motivation.

Hans Selye 是全球最为权威的研究人类压力的教授。他把压力定义为“人体对愉快或不愉快的要求做出的非具体反应”。我们通常看到的非具体反应包括脉搏加快，血压升高，经常生病，特别易受感染。有时会表现为苦思冥想，怒火中烧，大叫大嚷，直至加大酒精、烟草及药物的用量。有些人会出现类似溃疡或心脏病的严重反应，而另一些人，像我的一个女儿，会咬手指头，这点很像她老爸。

2. Professor Hans Selye, the world's foremost authority on human stress, defines stress as "the body's nonspecific response to any demand placed on it, pleasant or not." We often recognize these nonspecific responses in a rapid pulse, increased blood pressure, frequent illness, unusual susceptibility to infection. Sometimes it appears as brooding, fuming, shouting, or even in increased use of alcohol, tobacco, or drugs. In some it's as severe as ulcers or a heart attack; in others, like one of my daughters (who takes after her dad in this) it's fingernail biting.

在身处压力之时你通常需要给自己充电以焕发精神、重振情绪、重建生活的平衡。振作或放松精神的方法的确就是消除--至少是减轻--生活中压力的方法。减轻压力的同时，你会更有可能获得自我激励--重振精神或让自己充足电！至少你能重新控制自己。3. Often, what you need in times of stress is an electrical charge to 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 in your life. With the stress reduced, you are far more likely to be self-motivated — reinvigorated or charged up! At least you can regain some control.

首先你要知道压力并非总是消极的。生活中也有让人感觉良好的积极的压力。就拿我自身经历来做例子吧。要知道，我选择教授这个行当，就是因为这份工作所需的紧张的日程安排颇适合我。我选择过经常带有适度压力的生活。4. 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.

其次你要知道压力是由个人决定的。意义取决于我们，因此，我们确定何为压力。这个认识的有用之处在于：如果我们决定压力，我们就可控制它。是我们确定意义的！我们处在控制这方！

5. 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!

我们都知道为何自己会处于压力之中。我们身处压力之中是为了获得压力带来的回报，获得赞赏、金钱、地位和自尊。由于我们经常身处压力之中，因此我们需要在人生的各个阶段--包括现在--思量一下：回报是否会先于代价出现？当我们看得到隧道尽头的灯光时，这条隧道还值得我们走下去吗？通常，正是回报和目标让我们度过人生的小危机。当然，有时这些小危机会看似大灾大难。可你知道吗？要是我们一帆风顺，我们还有什么可谈的呢？很多时候，危机和天气是我们与他人谈话的重要内容。 6. 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 — this being one of them — 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 keep us going through life's little crises. Sometimes, of course, life's little crises look like gigantic catastrophes! But do you know what? If we didn't have any crises, what would we talk about? In many cases our crises, along with the weather, are the sum and substance of our conversations with others!

我们可以采取对策--或使用具体方法--对付压力,重燃自我激励的火花。这些方法可能会改变压力给我们带来的生理影响，减轻对自身及他人造成的危害。

7. But we can develop strategies — or use specific techniques — to cope with stressful situations and, thus, re-ignite the spark that ignites self-motivation. 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.

我要谈的是一些振奋和放松精神的方法，但我想让你们知道我的谈话有一个主题。自我激励并非来自外部，而只能出于自身。改变必须从自身开始。因此，自我改进或改变的关键在于认识自己的个性并按其行事。适用于某个人的方法不一定适用他人。而且，有些人可能要使用好几种方法，而对另一些人来说，一种就可能奏效。有些人可能使用本文根本没有谈及的方法控制压力。我要谈十种方法。 8. What I want to talk about are some techniques for activating or freeing the spirit, but I want you to know that there is an underlying theme to my remarks. Self-motivation 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.

#### 1、 认出你的压力信号 1. Recognize your stress signals

第一种方法是认出你自身的压力信号。压力可能会暗中降临你--有时出于长期焦虑，有时出于多种原因。如果你在家里麻烦不断；有一些人际问题，或许是与室友的小问题；除此之外，还有几场考试等着你，你该怎么办呢？你是否感到压力加剧了？

9. The first technique is to recognize your own stress signals. Stress can creep up on you insidiously — sometimes as the result of prolonged anxiety or even as a result of multiple causes. What if you're having troubles 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?

压力有其信号，但信号并不总像你希望的那样明显。尝试做自我观察以寻找不健康的压力信



号。常见的信号有脾气易躁,失眠, 体重剧减或剧增, 上文已提及的烟酒用量增大, 犯小过失(身体或大脑所犯的"愚蠢错误"), 肌肉紧绷, 三叉神经痛, 以及呼吸急促。 10. 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, rapid weight loss or gain, increased smoking or drinking, as mentioned before, little errors (physical or mental "dumb mistakes"), physical tension, nervous tics, or tightness of breath.

去年秋季, 开学大约三周后, 有位学生找我谈话。她看到几种症状, 因为以前也曾有过--并到了非去就医不可的地步--她认为尽管知道自己喜欢这门课并会从中受益良多, 也对付得了作业负荷, 但考虑到这些先期症状, 最好还是不修为好。她确实停修了--在症状加重之前。我们要聪明地判断压力信号。这位女学生仔细地观察自身的压力信号。信号一旦出现, 她就逃避了--尤其因为她很容易就能预测信号持续和增强的趋势。这样一来, 她并没有超越她本人正常的抵抗压力的水平。她只不过在自我保护而已!

11. 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 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. She carefully kept watch over her own stress signals, 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. She was simply protecting herself!

## 2、运动及良好的营养 2. Engage in exercise and practice good nutrition.

第二种方法--这对学生尤其重要--就是运动及良好的营养。两者当然是相互联系的。经常有人问我是什么让我不断前进。第二种方法对我非常重要。我的闹钟通常在早上 5:30 或 6:00 响起。起床之后, 我做 20 分钟左右的运动, 花不足 30 分钟的时间跑上 3 英里路程, 我的一天就这样开始! 我在讲上午 9:30 的课时, 已经距离起床有 4 小时了! 12. 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. 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!

不要低估运动对自我激励的重要性。而事实上, 大部分学生通常都疏于运动。运动能使思维敏捷!

13. 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!

过去我很不喜欢跑步; 而如今却心向往之, 视之为计划一天、创新思维和认真反思的机会。要知道, 运动会释放内啡肽, 而内啡肽与信心和自尊有关。运动会让你每日的生活大大变样。拥有更多的信心和自尊, 你会更加振奋。 14. 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. You should know that exercise results in release of endorphins that have to do with confidence and self-esteem. It can make a major difference in your daily life. With more confidence and self-esteem, you will be more motivated.

最近，我遇见了一位看上去像 60 岁的 80 老翁。他告诉我他的闹钟 5 点钟响起，然后起床，做运动，蹬固定式自行车，踩踏板车，再在标准游泳池游上 5 个来回。他说自己不沾烟酒，感觉像 50 岁。这便是我的目标！我们都会衰老，可决定如何走向衰老却大不相同。衰老不是目的，而是过程。 15. 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, gets on a treadmill, and then swims ten lengths of a regulation-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 to decide to approach getting old makes all the difference. It's not the destination; it's the ride!

不要忘记营养。许多学生不吃饭或饿了才吃--而吃得往往又不是很好。要知道，我们每人的习惯不同。要是你远离垃圾食品，用餐规则且高品质，确保每日膳食中含有丰富的新鲜水果、蔬菜和谷类作物，那你就不太可能有严重压力，你会更振奋！良好的营养对激励自我非常重要。

16. 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 vegetables, 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.

日常注意保健能明显减轻压力对身心造成的影响。大多数学校会议在自助餐厅举行。我看到学生们进来吃早餐，将就着吃个乳酪三明治、煎饼，喝杯可乐。这太可怕了！早餐是一天中最重要的一餐。 17. 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.

### 3、找出危险压力的出处 3. Locate the sources of dangerous stress

还有第三种方法。如果你由于生活中的巨大压力而变得一蹶不振的话，那么设法找出危险压力的出处。首先，检察一下与家人、业主或雇员、朋友、室友、恋人、老师及陌生人的关系。通常情况下，各种压力累积起来会变成一种负面的压力反应。

18. 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 relationships with family, employer or employees, friends, roommates, lovers, teachers, and strangers. Often, these forces will accumulate and create a negative stress reaction.

其次，检察一下自己的个性。你是否对自己有不合理的要求？比方说，你是否坚持要拿全 A？我的一位在中学工作的朋友就是因为对自己的要求不合理而变得压力重重。当他太太指出这些要求是不合理时，当他本人认识到它们是过分的、不必要的时，他就轻松了，更好地上他的课。

19. 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 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.

你对自己提出的不合理要求还有其它种种。你想永不犯错？你想永不失败？你必须学会接受这种可能：失败了却并不因此丧失自我价值观。失败不会伤及你的健康，而感觉像失败却会！即使面临失败，你也可以回忆以往的辉煌以增强你的成就感。同时，你还可以通过下述方法让自己度过失败：

——把失败视为探索世界这个过程的一部分

——认定失败是生活的正常部分

——记下要汲取的教训，而后继续前进

20. 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 failures by:

— viewing failure as part of the process of exploring your world

— accepting failure as a normal part of living

— making a note of the lessons to be learned and then moving on

你还有其他种种对自己提出的不合理要求。你想永不迟到，永不失误吗？知道何时该停一停，何时该承认目标不再值得奋斗，何时该接受自身的局限，何时对自己太过意不去，你就会把沮丧引起的压力减至最低并重获全新的热情和动力。这即是经常性的自我检查为何有益健康的道理。我跑步时就是这样做的，它让我有时间做自我评估。

21. There are other unreasonable demands we make on ourselves, too. Do you like never being late? Do you like never being in the wrong? Often, you can minimize the stress of frustration and discover renewed enthusiasm and motivation by learning when to stop something, when to acknowledge that the aim is no longer worth fighting for, when to accept your own limitations, or when you are just plain being unreasonable with yourself! That's why constant self-monitoring is healthy. That's some of what I do when I jog. It gives me time to make some of these self-assessments.

牢记这一条。我们要设法找出生活中危险压力的出处。除了检查人际关系及自身性格外，寻找危险压力的第三种方法是检查一下自身问题。比方说，你是个爱抱怨的人吗？一个沉湎于过去痛苦经历和事件之中的人吗？或许你并不知道，抱怨会消耗本身就很有有限的精力。为了你自己，也为了找回新的推动力，了断不愉快的人际关系，不要沉浸在敌意、对抗或复仇的情绪之中。这一切均会损耗动力。 22. Remember what we're doing here. We're trying to locate the sources of dangerous stress in our lives. A third way we have to locate dangerous stress, in addition to looking at our relationships and looking at our own personality, is to look at our personal problems. For example, are you a person who carries grudges? Are you a person who dwells on past unpleasant experiences and incidents? What you may not realize is that carrying a grudge can deplete your naturally limited energy. For your own sake, and for the sake of finding renewed motivation, end unpleasant relationships, and don't wallow in feelings of hostility, antagonism, or revenge. These deplete and destroy motivation.

大多数人并不知道，烦恼即精力，烦恼会损耗精力。我们若不再烦恼便会获得更充沛的精力。我知道这点说的比做的容易。但要是你意识到自己被过多的烦恼纠缠，也清楚这样会直接影

响你的精力--让你精疲力竭--那你就可能会开始采取具体措施减轻烦恼。清醒的认识是获得自我控制的第一步。 23. What a lot of people don't realize is that worry is energy. When we worry, we lose energy. So when we stop worrying, we will have increased energy. I know this is easier said than done; however, if you recognize yourself involved in excessive worry, and you know this has a direct effect on your energy level — it wears you out! — then you can begin to take specific steps to reduce the worry. Awareness is the first step to control!

#### 4、把精力转化为计划和行动 4. Turn energy into plans and actions

振奋和放松精神的第4种方法是：把精力转化为计划和行动。把压力看成是极端的积极精神，或未经释放的活跃情绪。因此，当我们着手进行手头工作之时，不管当初有多复杂，多吓人--列计划，而后做些必要工作会大大减轻压力。这样不仅让你完成工作，也给你带来松弛感和满足感。 24. What we need to do, and this is the fourth technique, now for activating or freeing the spirit, is to turn energy into plans and action. Think of stress as a kind of readiness in the extreme. It is an activation without release. So, when we take on the task at hand, however complex or frightening it might seem as we begin it — planning and then doing the necessary work greatly reduces stress. Not only it will get the work done, but it brings about relief and satisfaction as well.

拖延夺走时间、体力和自由！其结果是相当严重的：令你紧张、矛盾、自责、自贬、忐忑不安、焦虑、内疚、惊慌、沮丧、体力衰竭甚至生病。这不是一篇有关拖延的演讲。但要是拖延的确是你产生压力、消耗动力的原因所在，那我告诉你：有关这个话题有很多好书。大多数拖延者对这个建议的反应是：“好，以后再读吧。” 25. Procrastination robs you of time, power, and freedom! And the consequences can be extreme: tension, conflict, self-criticism and deprecation, embarrassment, anxiety, guilt, panic, depression, physical illness! This is not a speech on procrastination. But if this is the problem in your life that creates stress and robs you of motivation, let me tell you there are many good books on the subject. The response of most procrastinators to such a suggestion is, "Great. I'll read them later!"

在这里，让我给你一些快速时间管理方法，作为减轻压力的第4种方法--订计划和采取行动的一部分。

——大脑清晰时干要求最高的活。阅读通常都很累人（你很难自始至终保持清醒），确保在大脑最清晰时从事阅读。

——加倍利用等人、驾车、过校园及完成常规任务——阅读、写信、听演讲录音、笔记和摘要录音、制订日程计划、做化学异构练习——的时间。

——早起半小时，获得特别高效的时间。

——早睡。光是睡眠不足这一点就会夺走你的有效时间。昏昏欲睡时，你谈不上积极振奋。

——控制被人打扰的时间。学习某项重要内容时，不要去接电话；完工之后再回电话。不要去应门，不要在大厅里四处闲逛，寻找聊天的伴儿。

——整理办公区域，知道什么东西搁哪里，并使之各就各位。

——立即采取行动，现在就开始！一拖延，你就会有疲惫不堪和老落于人后那种痛苦不堪的感觉。拖延不会让你节省时间、保存精力，而只会消耗你的时间和精力，让你处于自疑和自欺欺人之中。牢记并不断重复这条箴言：行动起来，今日而非明日。我们需要这种短小的格言来激励自己。

——完成已经开始的工作。把所有的精力集中于成功完成当前主要的任务之上。完工会让你体力大增，并建立自信。

——只看最有启发性、教育性、或专题电视节目。不看肥皂剧。

26. Let me give you some quick time-management techniques here as part of plans and actions
- the fourth technique for reducing stress.
  - Do your most demanding work when you're fresh. Since reading is often tough (hard to stay awake through), then make sure you do it when you're the freshest.
  - Make double use of waiting time, driving time, walking across campus time, or time when you're doing routine tasks: read, write letters, listen to lectures that you've recorded, listen to notes and outlines you've recorded, make schedules, do isometric exercises.
  - Get up a half-hour earlier to gain some especially productive time.
  - Go to bed earlier. Your lack of sleep, alone, robs you of quality time. You can't be self-motivated when you're half asleep!
  - Control interruptions. Don't take phone calls when you're in the midst of important studying. Return calls later during your down time. Don't answer the door. Don't go wandering down the hall looking for someone to talk to.
  - Organize your work area so you know where everything is, where everything belongs, and keep things in their place.
  - Only deal with things once. Do it now! When you procrastinate, you will have this gnawing feeling of being fatigued and always behind. Procrastination does NOT save you time or energy; it drains away both time and energy and leaves you with self-doubt and self-delusion. Memorize and repeat this motto: Action TNT — Action Today, Not Tomorrow! We need these little messages to motivate us.
  - Finish what you start. Concentrate all your energy and intensity on the successful completion of your current major project. Completion builds energy and confidence.
  - Limit your television viewing to mostly enlightening, educational, or special shows. STS — Stop the Soaps!

#### 5、按照适合自己的方式生活 5. Live in your own right way.

振奋精神的第5种方法是按照适合自己的方式生活。有些人需要速度和强度。拿我来说吧，要是我从事一份压力不大、很平静的工作，或去度个与世隔绝的、无所事事的假日的话，我很有可能会渐渐衰老而后死去。我已习惯了高强度的活动。比起保持惯有的快节奏，突然放慢，会给我带来更大的压力。 27. A fifth technique for activating the spirit is to live in your own right way. Some of us need speed and intensity. I, for example, would probably wither away and die under the limited stress of a quiet job or an isolated, do-nothing vacation! For me, because I am accustomed to high levels of activity, there is more stress in suddenly slowing down, than in maintaining my usual frantic pace.

不管哪种方式合适于你，我们需要多样化。多样化让你从一项活动转到另一项。比起彻底休息，这会更让你放松。事实上，生活中要是缺少激励和挑战的话，你马上就会感到沮丧。 28. But no matter which way is your own right way, we all need variety. Variety offers diversions. Moving from one activity to another is more relaxing than complete rest. As a matter of fact, frustration often will follow swiftly when stimulation and challenge are removed from our lives.

#### 6、适应不可改变的情况 6. Adjust to unchangeable situations.

第6种方法是设法做些调整以适应不可改变的情况。换句话说，接受即定事实，着重于你的抉择。虽然为可达到的最高目标奋斗是言之有理的，但把有限的精力浪费在抗拒或抗争不可抗拒之事上，就毫无道理可言了。你无法控制某门课程绝大多数的作业与要求，正如你无法控制高峰时间的交通一样。直面它吧！ 29. The sixth technique is to try to make whatever adjustments you need to make to unchangeable situations. In other words, accept the givens; focus on your options. Although it makes sense to fight for your highest attainable goal, it does not make sense to waste your limited energy by resisting or fighting the inevitable. You don't have control over most of a course's assignments, requirements, or expectations just like you don't have control over rush-hour traffic! So face it!

任何时候，你都有多样选择。也就是说，你有机会展示独特的个性，有各种途径发挥创造力，也可以提些真知灼见。有种种约束与规定也罢，种种条规与限制也罢，有创造力的人总能千方百计发挥创造力。不要着重于即定事实，要接受即定事实并着重你的抉择，千方百计表达出真我来并找出让你拥有自由的空间。 30. But in every situation, you have options. That is, you have opportunities to bring to bear your own unique personality. You have ways to be creative. You have room to offer your own insights. No matter the controls and regulations, no matter the rules and restrictions, the creative person will find ways to be creative. Rather than focusing on the givens, accept those. Focus on the options. Find ways to express the real you! Find the places where you have freedom.

#### 7、设定自己的目标 7. Set your own goals.

第7种方法是开始设定自己的目标。当你设法实现别人为你设定的目标，你几乎都会有一些不堪承受的压力--结果你会一蹶不振。朋友、父母、导师和辅导员都认为他们对你的生活有发言权。听取他们的建议是无害的，但你要设定自己的目标。多少次，当学生们突然找到真正喜爱并愿意从事的专业的时候，我看到他们活力重现，精神焕发，对生活，对学业获得全新的认识。这下这个专业是属于他们的，是他们自己选择并愿意从事的--不为别人--只为自己。顷刻之间，他们拥有了主动权。 31. The seventh technique is to start setting your own goals. There is almost unbearable stress — and the resulting lack of motivation — when you try to live out the goals set for you by others. Friends, parents, advisers, and counselors all think they have some stock in your life. There is no harm in taking advice, but set your own goals. Over and over, I have witnessed renewed invigoration, a refreshed view of life and classes, and a rejuvenated spirit when students suddenly discover a major they really like and want to pursue. The major is now theirs; they have chosen it; they want to pursue it themselves — for themselves — no one else. Suddenly, they're in control!

让你的目标清晰、具体并可以实现。我本人喜欢做事，更喜欢成事。成事是无比重要的。我不断设定新的目标--相信我，这些都是能够完成的目标。 32. And make your goals clear, specific, and achievable. I, personally, like doing things. But I like getting things done, too. Accomplishing is so important, that I am continually setting new goals — but, believe me, they are ones that I can accomplish.

#### 8、必要时立即采取行动 8. Take direct action when needed.

第8种方法是必要时采取行动。无所事事取代不了你认为该做的事。让我来解释这一点。要是身处压力之中并尚能对此做出改变，立即采取行动，根除压力--即使这样做比起接受即定事实要难。毋庸置疑，挣脱出来，处理下述问题通常都不容易。--没有选上理想中的专业 --你的室友从不整理东西 --朋友占用了你太多的时间与精力。 33. The eighth technique is to take direct action when called for. Doing nothing is no substitute for doing what you feel you must. Let me explain. If you are confronted by a stressful situation that you can change, take direct

action to eliminate the source of stress — even if it seems harder to do than accepting things as they are. There is no doubt that it is often hard to come right out and deal with a problem like: — the choice of a major that isn't working out — a roommate who never picks anything up — a friend who is demanding too much of your time and energy.

你若权衡一下上述种种问题及其带来的种种压力，你会发现，若摆脱不了压力，你会活得更累。34. But when you weigh the problem against the stress it creates, it is even harder to live with the unrelieved stress!

#### 9、练习放松方法 9. Practice relaxation techniques.

第9种方法是学会并定期练习放松方法。当身陷压力时，试着坐10或15分钟，集中注意力于呼吸上。注意吸气和呼气。呼气时数一，再呼时数二，直到四，这样可能就更管用了。完了再来一遍。这种方法有助于集中注意力，并能使呼吸规则，还能起到放松和清理作用。35. The ninth technique is to learn and regularly practice relaxation techniques. When you get stressed out sometime, try sitting there for ten or fifteen minutes and just concentrate on your breathing. Notice each breath as it comes in and goes out. It might even help if you count one as you exhale, then as you exhale again, count two, and so on until four. Then start counting all over again. This helps to focus your attention and regularizes your breathing. This has both a relaxing and kind of a cleansing effect.

另外一种常用的放松法是平躺在地，逐渐绷紧、再放松全身肌肉，可从双足开始，逐渐到下巴和眼部肌肉。想象出一个快活轻松的情景，尽可能使之具体生动。想象自己完全放松地置身其中。要是一天里脑子中能几番出现此种情景，尤其在紧张的时候，会有镇定作用并让你精神振奋。36. Another common relaxation technique is to lie on the floor and progressively tense and relax all the muscles in your body. You can start with your feet and gradually work up to your jaw and eye muscles. Create a pleasant, relaxing scene in your imagination. Make it as vivid and detailed as possible. Visualize yourself in the scene, completely relaxed. If you can turn that scene on in your mind several times a day, especially when you feel tense, it will have a calming effect and give you renewed motivation.

#### 10、找一个好的支援团 10. Find a good support group.

第10种减轻压力、增强自我激励的方法是给自己找一个好的支援团。当你认为自己对他人是不可或缺的，当你获得他人的好感和支持时，当你因为助人而获得个人成就感时--他人会让我们心安气定，与人保持联系，成为对人有用的正常人。朋友、家人、同学、兄弟会的兄弟，姐妹会的姐妹都会令我们的生活有价值。37. The tenth technique for reducing stress and increasing self-motivation is to find yourself a good support group. When you feel necessary to others, when you have earned the goodwill and support of others, when you feel personal satisfaction in helping others — others offer a stabilizing effect that keeps us in touch, needed, and normal. Friends, family, classmates, fraternity brothers or sorority sisters can serve as those who keep your life worthwhile.

你们要弄明白几件事。第一，自我激励与减轻压力是直接相关的。第二，并非所有的压力都是负面的。第三，既然我们创造了压力，我们就能控制它。第四，控制压力有一些有用、可行的方法。如果我们不愿尽最大的努力减轻压力、增强动力，我们就会给自己及他人带来无限的痛苦。真正的英雄是那些每一天都能矢志不渝、乐此不疲地让自己成为充满爱心并发挥自我潜能的人。没有一蹴而就的成功。如果我们能够成功处理生活中的压力，我们才最有可能获得自我激励。你的个人成长取决于努力--取决于你愿意把振奋和放松精神的方法付诸实践。38. Several things, now, should be clear to you. First, self-motivation is directly related to stress-reduction. Second, stress is not always negative. Third, we are the makers of our own stress;

thus, we can control it. Fourth, there are some useful, workable techniques for controlling it. We can create a great deal of distress for ourselves and others through our reluctance to make some all-out commitment to reducing stress and thus increasing our self-motivation. The real heroes are those who doggedly and joyfully work at becoming more loving and self-actualizing on a daily basis. There are no easy triumphs. Self-motivation is most likely to occur when we can successfully deal with the stresses in our lives. Your personal advance hinges on effort — your willingness to put into practice techniques for activating or freeing the spirit.



一直以来,公司的决策者和军事策划者在举棋不定时经常会使用发展趋势一词作为决策的有力辅助手段。现在,这一手段可用于更广泛的社会目的,并可用于制订在社区、国家及国际水平上的维护公共利益政策。

1. Scenarios have long been used by corporate strategists and military planners as powerful tools to aid in decision making in the face of uncertainty. It is now time for these tools to be used for wider social purposes and incorporated into public policy processes at the community, national, and international levels.

人们试图去预测世界发展路线或寻求过分简化及单向的解决方法,对此我们都应保持怀疑态度,因为世界形势极其复杂。发展趋势分析则在我们展望未来时提供了一种更为错综复杂的观点,使我们集中注意所要面临的决策选择。 2. The world is exceedingly complex, and we should view attempts to predict its course or to offer simplistic and one-dimensional prescriptions for solutions with great skepticism. Scenarios provide a way of incorporating more complexity into our view of the future and of focusing attention on the strategic choices that we face.

几种发展趋势的分析被用在最近由世界资源学会、布鲁金斯学会及圣达非学院共同承担的"2050 计划"中。该计划为本文所概括的模式提供了一种知识基础。进一步的知识支持来自"全球发展趋势分析团体"正在进行的研究工作,这是一个由斯德哥尔摩环境协会主办的独立的国际性学术团体。我提出的发展模式还基于对经济、社会、环境及人口趋势的长期分析,以及从世界银行、联合国机构及世界资源协会所搜集的各国资料。

3. Scenarios were used in the recent 2050 Project undertaken by the World Resources Institute, the Brookings Institution, and the Santa Fe Institute. The 2050 Project provided one of the intellectual underpinnings of the scenarios summarized here. Further support came from the on-going work of the Global Scenario Group, an independent international group of scholars hosted by the Stockholm Environment Institute. My scenarios are also supported by an analysis of long-term economic, social, environmental, and demographic trends and based on country-by-country data from the World Bank, UN agencies, and the World Resources Institute.

本文所论及的几种发展模式表明了三种互相矛盾的观点,并为下半个世纪全球及七大洲分别确定了三条不同的发展路线。

4. These scenarios reflect three conflicting world views and set out three different trajectories for the next half century for the globe as a whole and, separately, for each of seven major continental-scale regions.

市场世界模式 The Market World Scenario

人们相信市场和私营企业能创造繁荣,为人类带来幸福安康,对未来的一种看法正是基于此信仰。这种观点认为美国长期的经济繁荣表明自由市场政策、公司改组和企业精神为世界各地树立了榜样。 5. One view of the future is rooted in a belief in the power of markets and of private enterprise to create prosperity and improve human welfare. This view maintains that the extended U.S. economic boom shows that free-market policies, corporate restructuring, and entrepreneurship offer a model for the rest of the world.

市场世界的发展模式也意味着进一步的全球市场统一、当代史无前例的技术革新、民主的全球性传播以及全球各地文化水准的提高。其论点是：启动市场、给予社会经济中的私营部分充分自由、打破贸易壁垒进行自由贸易，这样一切都会变好。在世界的每个地区，经济迟早会快速增长，日益繁荣。

6. The Market World scenario also points to increasing global market integration, the unprecedented technological innovation of our time, the worldwide spread of democracy, and rising literacy in virtually all parts of the globe. The thesis is: Let markets work, turn loose the private sector break down barriers to free trade, and all will be well. Sooner or later, rapid economic growth and increasing prosperity will happen in virtually every region of the world.

市场世界模式及支持这种论述的世界观点都不易消除。这些观点可在《经济学家》及《华尔街日报》上看到。其拥护者控制着公司的董事会议，其魅力激发着无数的企业家。正如石油分析员丹尼尔叶尔津所说：市场支配一切。自由市场改革正促使各地政府缩小规模,解除管制,搞私有化。革新的步伐以惊人的速度带来新机遇--人们亲眼目睹了因特网的出现、电子商务的展开以及生物技术的不断突破。全球化的进程势不可挡：仅在 20 年内，国际货币的每日交易量已由 200 亿美元猛增至 1.25 万亿美元以上；尽管亚洲爆发了金融危机，海外投资总量仍大幅度增加。

7. The Market World scenario and its supporting worldview are not easily dismissed. Its voice can be heard in the pages of The Economist and the Wall Street Journal. Its adherents dominate corporate board rooms, and its allure motivates countless entrepreneurs. Markets are in the ascendancy, as oil analyst Daniel Yergin has argued. Free-market reforms have moved governments everywhere to downsize, deregulate, and privatize. The pace of innovation breeds new opportunities at astonishing speed - witness the rise of the Internet, the spread of electronic commerce, and proliferating breakthroughs in biotechnology. And globalization proceeds inexorably: In just 20 years, international currency transactions have swelled from \$ 20 billion per day to more than \$ 1.25 trillion per day, and corporate investments abroad have soared despite the Asian financial crisis.

#### 堡垒世界模式 A Fortress World

市场并不是万能的。市场不能革除贫穷等社会弊端，也不能阻止环境恶化，反而使之愈演愈烈。另外，全球金融市场的近况表明，真正自由的、不受制约的市场是极不稳定的。全球性的市场繁荣仍然高度集中：只有少数二十几个发展中国家从私营企业投资中获益较大，而七十多个国家的收入低于 1980 年的水平。 8. Markets cannot do everything. They do not necessarily redress social wrongs such as poverty or prevent environmental disasters; they often make them worse. Moreover, truly free, unregulated markets can be very unstable, as shown by recent events in the global financial markets. The global market boom remains highly concentrated: Fewer than two dozen developing nations benefit to any significant degree from private investment, while in more than 70 countries incomes are lower now than they were in 1980.

这种较为悲观的堡垒世界观点植根于两种信仰：大部分人将无法从市场所带来的繁荣中受益；缺乏约束的市场及普遍存在的贫穷将会破坏森林和渔场，侵蚀土壤，污染水源，改变地

球气候。富垒世界模式认为，这些弊病将最终破坏很多地区市场和经济增长所依赖的自然资源和社会体系。世界局势则好比一片贫穷和失败的汪洋大海中飘着几座繁荣的小岛。当几个繁荣富裕的地区将更多的资源用于维持稳定时，经济萧条会越来越普遍；在一些发生冲突或社会秩序遭到破坏的地区，经济出现分裂。结果是苦难和绝望日益深重，贫富矛盾激化，未来充满暴力动荡。 9. The more-pessimistic Fortress World vision of the future is rooted in two convictions: that large portions of humanity will be left out of the prosperity that markets bring and that unconstrained markets and widespread poverty will devastate forests and fisheries, erode soils, pollute water supplies, and alter the earth's climate. The Fortress World scenario argues that these failures will eventually destroy the natural resources and social framework on which markets and economic growth depend, at least in many places. This will lead to a world in which islands of prosperity coexist with an ocean of poverty and frustration. Economic stagnation will spread as wealthy enclaves devote more resources to maintain security and stability; economic fragmentation will occur where conflict dominates or the social order breaks down. The result is deepening human misery and desperation, growing conflict between rich and poor, and a future of violence and instability.

富垒世界的观点也不易抛开。在贫富国家越来越悬殊的收入差距中，在工业化的亚洲的一些血汗工厂和骇人听闻的污染中，全球资本主义的阴暗面简直太明显了。我们还可以从以下几方面看到富垒世界模式的阴影：如非法移民潮日益严重；私人保安队伍不断壮大--在世界范围内其人数以 4 比 1 超过警察队伍，而在南非和俄罗斯，该比例则高达 10 比 1；美国家庭纷纷安装保安门。全球犯罪组织违了法却似乎可以不受惩罚，它们使很多发展中国家政府腐败，而更危险的新的恐怖活动此起彼伏。政局不稳的形势笼罩着俄罗斯和其他很多发展中国家。科学界普遍认为全球气候变暖、生物资源巨大的、不可逆转的流失是很危险的。

10. The Fortress World scenario, too, cannot be easily set aside. The dark side of global capitalism is all too evident in the sweatshops and horrendous pollution of industrializing Asia, in the widening income gaps between rich and poor countries. We can see other shadows of Fortress World in the rising tide of illegal migration; in the growth of private security forces, which now outnumber the police by four to one worldwide and 10 to one in South Africa and Russia; and in the expanding popularity of gated communities in the United States. Global criminal organizations operate with seeming impunity, corrupting many developing countries, while new and more-deadly forms of terrorism proliferate. Instability threatens Russia and stalks a number of developing countries. There is growing scientific consensus about the risk of global warming and massive, irreversible losses to the earth's biological resources

#### 改良世界模式 The Transformed World

第三种也是更鼓舞人心的发展模式虽欠缺信仰却颇有道理。改良世界模式认为社会和政治改革--甚至价值观和文化准则的改变--将促进开明政策和自愿行动的出现，这些政策和行为能够建立或完善市场。这表明文明社会能够规定社会和政治行为事项；也表明少数开明的全球性公司随之应运而生且不断增多；还表明新技术的创造性使用可以拓展全球性信息和服务产业。这种发展模式认为，所有这些趋势将会导致一个更为和平、公正，以及环境更为稳定的世界。 11. A third and more-hopeful scenario is also plausible, although it requires a leap of faith. The Transformed World vision of the future assumes that social and political change--and perhaps even changed values and cultural norms--will give rise to enlightened policies and voluntary actions that shape or supplement market forces. It points to the power of civil society to shape social and political agendas, to the "greening" of a small but growing band of enlightened global

corporations, and to the potential for imaginative uses of new technologies to expand access to information and services worldwide. The Transformed World scenario argues that these trends together could lead to a more peaceful, equitable, and environmentally stable world.

实际上,改良世界模式展望的是这样一个社会:信息更开放,权力广泛共享,新兴的群众联盟规约机构和政府所为,社会管理方式呈现多样化。这样的未来不仅可以利用市场和私营企业的力量,而且还可以将市场发展动力与社会和环境的目标统一起来。改良世界模式允许经济竞争,同时做出慎重的社会选择,满足人们的基本需求。

12. In effect, Transformed World envisions a society in which information is more accessible, power is more widely shared, and new grass-roots coalitions shape what institutions and governments do, broadening the forms of governance. It is a future that makes use of the power of markets and private enterprise, but aligns market incentives with social and environmental goals. The Transformed World accepts economic competition, but does not lose sight of the need for making deliberate social choices and meeting basic human needs.

尽管被大量骇人听闻的丑闻、危机和灾难报道所淹没,这种朝着良好势头转变的证据已越来越多。请注意,在美国过去的10年中,由于人们对吸烟的态度有了惊人的转变而导致工作和公共场所禁烟;同时期在波兰和捷克突然发生了政治和经济改革。其他的例子还有南非正由种族主义的少数派统治向多种族民主共处的转变,中国逐渐开展了以村为单位的民主生活;很多发展中国家快速发展了许多小额贷款机构。

在过去几十年里,大多数发展中国家的人民文化水平得到了提高,寿命大大延长;几乎在所有地方,妇女的地位在逐步提高。一个由电子邮件联结的全球公民同盟,倡议并起草了最新的禁止地雷条约,并劝说大多数政府来签署该条约。越来越多的环保组织与私营企业一起努力并产生了惊人的效果:最近已有二十多家大公司决定签署全球气象条约。

13. Evidence of such change is already accumulating, although it is often buried by lurid headlines telling of scandal, crisis, and disaster. Note the startling reversal in U.S. attitudes toward smoking that has led to smoking bans in workplaces and public buildings over the past 10 years, or the abrupt political and economic transformation that has taken place during the same period in Poland and the Czech Republic. Other examples include the remarkable transformation from racist minority rule to a multiracial democracy now under way in South Africa, the introduction of village-level democracy in China, and the explosion of micro-loan networks in many developing countries. Literacy and life spans have risen dramatically in most developing countries over the past few decades, and the status of women is slowly improving nearly everywhere. It was a global coalition of citizens' groups linked by e-mail that initiated and largely drafted the recent treaty to ban land mines and persuaded most of the world's governments to sign it. And increasingly, environmental groups are working with private corporations, often to startling effect: Witness the recent decision of some two dozen major companies to endorse the global climate treaty.

#### 地区差异 Regional Variations

如果在世界几个主要地区开展并比较上述的这三种发展模式以及持续趋势的基本分析,会产

生一些重大的意想不到的地区差别。

14. When these three scenarios and the underlying analysis of persistent trends are developed and compared for each major region of the world, significant differences-and some surprises-emerge.

例如，尽管目前存在问题，东南亚地区仍然具备一切曾促使它早期成功的根本因素。虽然该地区正面临着严重的环境问题，“亚洲四小龙”仍将重新崛起，使东南亚获得任何发展中地区所需的最佳机会，迎来充满希望的未来。

15. For example, despite its current problems, Southeast Asia still possesses all of the underlying factors that propelled its earlier success. Although the region faces serious environmental problems, rapidly growing "Asian Tigers" are likely to reemerge, giving Southeast Asia the best chance of any developing region for a hopeful future.

中国的前途也似乎很有保障，尽管目前她仍面临一些严重的社会不稳定的威胁--如空前的民工大潮涌入城市，越来越多的人下岗，大面积的污染，日益严重的不平等现象以及一些地区即将发生的水资源和耕地匮乏。中国的中央政府能否处理好这些问题，保持快速经济增长来满足人民不断上升的需求，尚待以后见分晓。

16. China's future may seem assured too, but the country faces a variety of serious threats to social stability. These include unprecedented levels of rural-to-urban migration, rising unemployment, massive pollution, growing inequity, and impending shortages of water and farmland in some regions. It remains to be seen whether or not China's central government will manage these challenges and sustain the rapid economic progress required to meet the rising expectations of its people.

拉丁美洲的未来难以预料。一方面，该地区已做好发展的准备：大多数民主政府已投入经济改革，人口已大部分城市化，相当可观的工业基础，极为丰富的自然资源。另一方面，拉丁美洲仍是全球最不平等的地區：土地所有权高度集中，大多数人不具备接受良好的教育及其他社会服务的机会，一些国家仍有高达 40% 的赤贫人口。腐化的毒品交易和持久的暴力活动都是当地普遍存在的问题。拉丁美洲国家可能在实行社会及经济改革，但是由于社会局势紧张，人们无法广泛享受发展带来的好处，因此该地区前景暗淡，并会引发新一轮的动荡局面和经济萧条。

17. Latin America's future is uncertain. On the one hand, the region is poised for growth, with mostly democratic governments committed to economic reform, an already largely urbanized population, a substantial industrial base, and vast quantities of natural resources. On the other hand, Latin America remains the most unequal region on earth, with highly concentrated ownership of land, limited access to good education and other social services for many, and as much as 40% of the population in dire poverty in some countries. The corruption of the cocaine trade and persistent violence are endemic problems. Latin American countries may pursue social as well as economic reform, but social tensions and the failure to share the benefits of growth more widely could undermine the region's prospects and initiate a new cycle of instability and economic stagnation.

印度似乎也已作好发展的准备。充满活力的民主制度和受过良好教育的中产阶级似乎使印度领先于许多发展中地区。但是，从收入、文盲人数或生活基本需求无法满足等方面来衡量的话，印度大多数人民都生活在贫困之中，情况甚至比非洲更为严重。而且，印度人口可能超过中国。印度中央集权政府的官僚作风抑制了改革，不同宗教和种姓之间的冲突也日益严重。有限的经济改革已经开始，那么社会改革会随之启动吗？会及时进行吗？同样的问题在南亚的另一主要国家--巴基斯坦显得更为紧迫。 18. India, too, seems poised for growth. With a vigorous democracy and a well-educated middle class, it has a seeming head start over many developing regions. But most of its people still live in poverty even more desperate than Africa's-whether measured by income, illiteracy, or lack of access to basic needs-and its population is likely to surpass that of China. India's centralized governmental bureaucracy tends to stifle innovation and change, and conflicts based on religion and caste are rising. Limited economic reform has begun, will social reform follow, and will it come in time? The same question can be asked, with greater urgency, for the other major country in South Asia, Pakistan.

远远看来，非洲及其问题似乎是无望的。虽然非洲大陆人口密度低于美国。即使人口翻一番，人均矿产、土地和水的占有量仍将高于中国或印度。但不可否认的是，非洲发展极其缓慢（曼哈顿区的电话拥有量比撒哈拉沙漠以南所有非洲地区的总和还要多），而且当地政府无法合理利用自然资源来提高人民的福利。非洲需要建立能使之充满希望的社会管理机构，从而使之超越二三十年前就已结束的殖民主义时期。南非政府在种族隔离制后试行的自治和尼日利亚暂时的民主重现都是改革的重要前兆。

19. From a distance, Africa and its problems may seem hopeless. Yet the continent has a lower population density than the United States, and, even after its population doubles, the region will have more minerals, fertile land, and water per person than either China or India. But there is no denying Africa's lack of development-there are more telephones in Manhattan than in all of sub-Saharan Africa-or the failure of the region's governments to manage their natural resources in ways that improve their people's welfare. Africa's challenge is to transcend its colonial period, which ended scarcely a generation ago, by building the governance institutions that will allow it to emerge as a continent of promise. The hopeful experiment of post-apartheid self-rule now under way in South Africa and the tentative reemergence of democracy in Nigeria is potentially important harbingers of transformation.

北非和中东的前途也不确定。该地区石油丰富却闹水荒。社会压力日益加重，人口快速增长又使之激化，这样很可能导致动乱。而信奉原教旨主义的伊斯兰教组织便成为惟一能取代当地独裁政府的团体。中东地区持续的动荡和冲突可能对越来越依赖该地区石油产量的世界造成巨大的影响。

20. Prospects for North Africa and the Middle East are also uncertain. The region is rich in oil but faces a growing water crisis. Rising social pressures, fueled by rapidly growing populations, could make revolutionary upheavals more likely and leave fundamentalist Islamic groups as the only alternative to the area's mostly authoritarian governments. The prospect of continued instability and conflict in the Middle East may have a major impact on a world increasingly dependent on the region's oil.

任何人都无法肯定地预测北美、欧洲和日本在未来会扮演怎样的角色。由于拥有巨大的经济和社会优势并掌握着资本和技术，他们的潜在领导力和影响力大大提高。但是，保守的社会和政治反动势力可能导致一种不很乐观的发展趋势，那就是这些强大的地区采取更加狭隘、闭关自守的发展战略。另外，无法确定的是，这些较为富裕的国家能否持有相同观点。 21. No one can forecast with certainty the precise roles that North America, Europe, and Japan will play in the future. Their potential capacity for leadership and influence is bolstered by the enormous economic and social advantages they enjoy, as well as their command of capital and technology. But reactionary social and political tendencies could lead to a less-optimistic scenario in which these powerful regions forge a narrower, inward-looking strategy. It is not at all certain that the more-affluent nations will share a single outlook.

#### 我们的未来紧密相连 Our Futures Are Linked

一些国家或地区失败了，另外一些却成功了，这问题重要吗？我认为答案是肯定的。世界已非常紧密地联结在一起，没有一个国家可以独自存在，没有一个地区的未来可以完全与其他地区分割开来。这种关联的例子数不胜数：如最近由东南亚事件引发的全球金融危机。过去 20 年来出现了三十多种疾病，这些新疾病大多数出现在发展中国家，这些国家与地球上的任何一个地方的距离都已变得很近，乘坐飞机即可快速抵达。由于人们纷纷逃离混乱贫穷的地区，非法移民人数已越来越多。罪犯和恐怖分子已经建立了全球性网络。全球环境变化：如气候趋暖、多变并影响着所有地区。这些联系强调表明：如果北美、欧洲和日本不能帮助其他地区成功发展，如果一个更大范围的世界变得更加绝望、动荡以及严重污染，那么损失最大的则是这三大地区。当一切其他的方法都无补于事时，贫穷地区将会向外传播其苦难。

22. Does it matter if some countries or regions fail while others succeed? I think it does. The world is already so strongly interlinked that no country stands alone, no area's future can be fully separated from that of others. Examples of such linkage are proliferating: The recent global financial crisis was triggered by events in Southeast Asia. Some 30 diseases have emerged during the past 20 years, mostly in developing countries, which are increasingly only a plane ride away from anywhere on earth. Illegal migration is increasing, as people flee chaotic and impoverished regions for better opportunities elsewhere, while criminals and terrorists have established worldwide networks. And global environmental changes, such as a potentially warmer and more-volatile climate, affect all regions. These connections underscore the fact that North America, Europe, and Japan have the most to lose if they fail to help other regions succeed and if a larger world turns desperate, unstable, and polluted. If all else fails, the poor will export their misery.

我很乐观地认为，大多数人类社会有决心、有创造力去克服所面临的挑战，确立未来的发展轨道，这种轨道应类似于“改良世界模式”而非“富垒世界模式”。但是，这样一个结果既不是必然的，也不是唾手可得的，因为它取决于人类尚待作出的抉择。

23. I am optimistic that most human societies will find the will and the creativity to overcome the

challenges they face and to establish trajectories into the future that bear more resemblance to a Transformed World than to a Fortress World. But such an outcome is neither inevitable nor easy, since it depends on human choices still to be made.

我们无法预测未来，但这并不重要。重要的是我们可以展望我们所期望的未来并开始努力使之实现。这就是如本文所述模式分析起重要作用的地方，因为进行一些战略性的思索是很有必要的。

24. We can't predict the future, but that is not terribly significant. What is more important is that we can envision the future we want and set about making it happen. And this is where scenarios such as those discussed in this article can play an important role, because some strategic thinking is essential.

人类不再是地球上另一匆匆的过客。如此之多的人数及如此大规模的人类事业对环境造成了近乎永久的无法逆转的影响。人类的破坏力及现今可能发生的灾难都是巨大的，这使得人类在 20 世纪中所经历的一切都显得微不足道。地球这个有限的星球和人类的贫穷无知所带来的制约是千真万确的。正如做父母的总试图教育他们的子女不能浑噩度日，而应该向前看，选择自己的前途，整个人类社会也早该学会这样做了。

25. Humanity is no longer just another passenger on planet Earth. The sheer numbers of people and the scale of the human enterprise are now such as to have a lasting, perhaps irreversible environmental impact. Our capacity for destruction and the potential size of the human disasters now possible are huge, dwarfing everything experienced in the twentieth century. The constraints of a finite planet and of human poverty and ignorance are real. Just as parents struggle to teach their children to think ahead, to choose a future and not just drift through life, it is high time that human society as a whole learns to do the same.



过去的二十多年的革命成果给“技术转让”这一概念加上了沉重负担。显然，这一概念有很大的局限性。随着时间推移，我们丝毫也没有搞清楚“技术转让”的方法有否改进，其结果是否有所进展。

1 The technological revolutions of the last two decades have placed a severe burden on the concept of "technology transfer". It is quite clear that the concept has serious limitations; with time, it is not at all clear that its methods have improved or its result progressed.

“技术转让”的基本设想就是：发达国家利用新发现开发新技术会给发展中国家带来适用的成果。尽管这种假定从来没有真正地在世界上验证过，但显然，不管在别处的效用如何，现在在非洲、东南亚和拉丁美洲这类发展中地区，“技术转让”不可能是它们技术发展的主要手段。问题在于，这种结果是不是转让过程中不可避免的、固有的，是不是仅仅反映了资源的缺乏和管理的不当。我认为，把“技术转让”作为发展中国家取得进步的一种手段是完全错误的，因而不会成功。

2 The underlying assumption in "technology transfer" is that the application of new discoveries to the development of new technology by the developed countries produces results which are applicable to underdeveloped countries. Although this assumption has never really been put to a true global test, it is by now clear that this cannot be the main means of technological progress in developing areas such as Africa, South-East Asia and Latin America, irrespective of its possible utility elsewhere. The question is whether such an outcome is inevitable and inherent in the process or whether it merely reflects the shortage of resources and improper management. It is my contention that "technology transfer" as a vehicle of progress for the developing countries is irreparably flawed and cannot succeed.

其基本的错误就是“技术转让”的模式是殖民主义的。发达国家按他们原先的殖民地-----现在的发展中国家-----所能接受的方法行事。这种殖民主义方法不考虑其发展过程是否能被“技术转让”接受国的人们所执行。“技术转让”始于培训，终于应用，其哲学基础是由制度化的科学结构内一整套社会文化和经济所决定的价值观念所构成。这些价值观念选择那些被认为是有意义的问题，决定要搞的研究计划，评估所取得的成果的意义。

3 The fundamental flaw is that "technology transfer" is cast in the die of a colonial process whereby developed countries do things in ways that they find acceptable for their former colonies, the developing countries. Whether the development process is carried out by citizens of the recipient nation or not is irrelevant; the philosophy upon which "technology transfer" is based, beginning with training and ending with application, is composed of a set of socio-culturally and economically determined values within the institutionalized fabric of science, which select the questions found to be meaningful, dictate the preferred research plans and evaluate the significance of the results obtained.

显然，基于这一系列决定因素的技术不可能和发展中国家的不同的经济和社会条件相关。它几乎不能满足这些国家的需要，甚至还会减慢其发展进程。

4 Clearly, technology based on the set of determinants is not likely to be very relevant to the vastly different economic and socio-cultural conditions of developing countries. It will hardly get to the needs of the developing countries, perhaps even serving to slow progress.

这种殖民主义方法必须用一种新的方法予以取代，这种新方法可以称之为“基础知识转让”作为前沿科学发展的一部分。这种方法有以下特点：

5 This situation must be replaced by a new process which might be called "basic knowledge transfer" as part of growth of a forefront science in the developing countries. This approach contains the following features:

(1) 发展中国家的科学家，如果能完全享用科学前沿新发现，也就是说，能从基础知识到应用知识都分享高密度转让领域，他们就可以创造他们自己的从基础知识至应用知识的技术转让。

(1) Given full access to new scientific discovery at the cutting edge of science, that is, at the region of high-intensity transfer from basic to applied knowledge, the scientists of developing countries can create their own technology transfer from basic to applied.

(2) 发展中国家的科学家能与政府、社团和工业积极进行对话，确定问题，排出解决问题的优先次序，创造出可以实施的局面。

(2) Scientists in the developing countries, in active dialog with other elements such as government, community and industry, can identify and prioritize problems and develop a practical situation.

(3) 内部“技术转让”要求每个国家或地区有一定数量的训练有素的科学家，要求每个国家和地区创造条件，使这些带头人始终胜任工作。

(3) The problem of internal "technology transfer" will require for each country or region a suitable number of trained scientific specialists; means for maintaining the competency of these leaders will need to be developed by each nation or region.

(4) 必须具备以下资源：

a) 为上面第(3)条所提到的科学家准备培训项目。

b) 建立各种研究和发展中心，其设备应能适应前沿领域研究，其规模要大到足以保持稳定，又能灵活得足以在指定的领域里从事所有相关问题的研究。

c) 这些机构必须建立在私人与国家共同支持的基础上，这样，这些项目就不会因政府政策的改变而受到影响。

d) 每一个机构必须负责详尽地评估他们的项目和建议对生态带来的后果。

e) 每个机构必须制定发展计划，使自己有复现能力，即能建立同类型的卫星机构。

(4) Resources to cover the following will be needed:

(a) The training programs under (3).

(b) The establishment of centers for all kinds of research and development suitably equipped for

forefront work. The institutions must be large enough to be stable and flexible enough to take on all related problems in their designated area.

(c) These institutions should be based on a mix of private and public support so that their programs cannot be compromised by shifts in governmental policy.

(d) Each institute must be responsible for detailed evaluation of ecological consequences of its programs and proposals.

(e) Each institute must plan a program of growth which permits it to become replicative, i.e., capable of forming new satellite institutions of its own type.

在我进而举例说明这一方法之前,我们还需考虑全球性资源需求的大约数量。根据六大地理区域和诸如农业、细胞生物学、工业材料和矿产资源等十类研究和开发,可以预测需要大约 150 个研究和发展机构。假定政府会赞助建楼和给予贷款,其启动资本总额将达 20 亿美元。维持 10 个研究队伍的开办工作人员和总数为 100 人的操作费用,估计每年要化大约 500 万美元,或者按全球计算,发展中国家的研究和发展总费用将达到七亿五千万美元。

6 Before I proceed to an illustration of this approach, the rough magnitude of the resources needed on a global basis should be considered. Based on six major geographical regions and ten categories of research and development such as agricultural, cell-biology, industrial materials, mineral resources, etc., one can project the need of approximately 150 R&D institutes. Assuming that governments will donate buildings and loans, initial capitalization cost will be of the order of 2 billion dollars. Operating costs, based on an initial staff for 10 research teams and 100 total personnel, yield a yearly cost estimate of 5 million or an aggregate global R&D total for the developing countries of \$ 750,000,000.

请注意,这个数字只不过是世界上几个大国国防部研究和发展预算的 1%,仅等同于有些人提出的美国艾滋病研究费用,比美国全国癌症研究所的预算或里根总统的战略防御计划的费用都要少。还清注意,要集资今年后五至十年开展这个全球项目所需的基金,我们所需要做的只是一种简单的会计手段,-----把全国国防研究预算的 0.5%到 1.0%的分录凭单过户给发展中国家的国防研究和发展基金。这一点儿也不会影响防御研究。这些数字同时充分地表明,即使是稍稍做点裁军都会为许多发展扫清道路。

7 Please recognize that this is just 1% of the total R&D budget of the defense departments of the major powers and is only equal to the amount demanded by some for Aids research in the US and is less than the budget of either the national Cancer Institute, USA, or the SDI programme of Reagan. Note also that to achieve the pool of capital needed for this global venture spread out over 5-10 years all that is required is the simple accounting device of a journal voucher transfer of 0.5-1.00% of all national R&D defense budgets to an international R&D fund for developing countries. This would not disturb R&D for defense in the least. These figures also make it perfectly clear that even a little disarmament would clear the way for a lot of progress.

考虑一下当今主要技术革命，就会对这种研究发展中心网络的工作有一定的了解。在我们这个时代，这些革命包括：

§ 计算机、信息和系统分析革命

§ 生物技术和基因工程革命

§ 刚刚崭露头角的以超导体为基础的能源革命

8 Some idea of the operation of such a network of R&D centers can be gleaned by considering today's main technological revolutions. In our time these include:

§ The computer, information and system analysis revolution.

§ The bio-technology and genetic engineering revolution.

§ The just emerging super-conductor-based energy revolution.

我自己的专业使我有机会谈论基因工程的实用方面和有关的生物学革命。为了弄清楚这点，我们可以把基因工程的主要组成部分分为：

§ 基因鉴别、分离和结构序列的确定以及基因的调节要素。

§ 可取的基因型或表现型脱氧核酸单独分子的复制。

§ 基因作为一种新的生物表现型或可取的基因产品的表示法。

9 My own field permits me to discuss the practical aspects of the genetic engineering and related biological revolution. To appreciate this we can view the major components of genetic engineering as:

§ The identification, isolation and sequencing of genes and genetic regulatory elements.

§ The replication of the isolated DNA molecules representing the desired genotype and phenotype.

§ The expression of the gene as a new biological phenotype or a desired gene product.

首先，我们应该认识到这是一种很便宜的技术。由训练有素的技术人员来做很容易，有很高的可预言性，又能再生产。那么一个发展中地区可以让分子生物学机构做点什么呢？我列出以下几种可能的应用及目标。

10 Let us first recognize that this is a remarkably inexpensive technology which can be handled with ease by well trained technicians in a highly predictable and reproducible fashion. What then can a developing region call on the R&D molecular biology-genetic engineering institute to do? I list below several possible applications and their objectives.

(1) 通过细胞培养转染、筛选和种植无性繁殖植物和有性繁殖植物来产生新品种以提高农业生产率。这些新品种包括抗病、抗旱、抗虫害，生长特性以及作为食物、工业或医疗资源的化学成分。昆虫的基因工程可以间接地用来产生生物上可取的或有用的变体。以同样的方法还可以提高产蛋率、产奶量、肉类生产和养鱼业。

(1) Increase in agricultural productivity by introducing new traits into plants through cell culture transfections, followed by selection and growth of vegetative and sexual plants. These new traits might include disease resistance, drought resistance, insect resistance, growth characteristics and chemical composition as food, industrial or medicinal sources. Indirectly, genetic engineering of insects can be used to produce biologically desirable or useful variants. In a similar fashion it might be possible to improve egg-laying productivity, milk production, meat production and fish farmery.

(2) 与治疗疾病有关的开发可以包括提供新的诊断工具。例如 DNA 探针，可以用来探测易得疾病的基因或基因组合。这些诊断工具可以用来快速甄别可供当地使用的新品种。在动物饲养方面，可以快速探测到新牲畜群中的疾病和疾病的传病媒介体。能探测动物传染病、瘟病及其病源，进而予以隔离。

(2) Disease-related development might include provision of new diagnostic tools, such as DNA probes which can detect genes or gene combinations prone to disease. These could provide rapid screens of new varieties for local usage. In the case of animal husbandry, the presence of disease and disease vectors in new animal stock can be quickly detected; zoonotic and epidemic sources can be detected and isolated.

(3) 开发一批对付寄生虫的手段，包括寄生虫隐蔽阶段的探测、搞抗原基多细胞株疫苗的培育、防寄生虫病，分离抗寄生虫的基因以及把它们转变成所希望的品种。

(3) Development of a battery of tools related to parasite ranging from detection in occult stages, development of antigen-based poly-clonal evaluate , isolation of genes for resistance to parasites and transfer to desired species.

(4) 诊断人类疾病的后期或初始状态、基因缺陷和载体状态。

(4) diagnosis of human disease states, real or incipient, genetic deficits and carrier states.

(5) 研究新的方法，通过基因的化学结构排序，生产抗体和疫苗，再用化学和生物方法大量生产与排序基因相符的各种蛋白。这些方法可以用于免疫和接种。

(5) Development of new approaches to antibody and vaccine production by gene sequencing leading to mass chemical or biological production of the proteins corresponding to the sequenced gene. These instances can be used for immunization or vaccination.

以上所列各条谈不上有什么想象力，但却可说是远远不够完整的。以上所列的各条如能开发成功，就能产生经济效益，在某种程度上能为机构的运转进一步提供资金。

11 This short laundry list is not highly imaginative but is highly incomplete. Successful development in many categories listed above could produce economic gains refundable in some measure to the operation of the institutions.

在结束之前，我还要强调一点，分子生物学和基因工程学，跟其他所有科学一样，可以完善、也可以摧毁这个世界，除了军事方面的应用，他们还具有破坏环境的危险特征。因此，一种为提高抵抗力或生长速度而培育的动物、植物或昆虫有可能因一连串的连锁效应而使其他物种的生态龛不稳定。因此我们必须提前为这一现象作准备，在项目中应考虑有厚实的资源搞生态评估，把生态评估作为决策的一部分，任何涉及严重的生物圈问题的项目未经评估都不能搞。

12 Before concluding, I must emphasize one strong caution. Molecular biology and genetic engineering like all other sciences are capable of both making or breaking the world. Apart from the usual military application, these add the equally hazardous feature of destroying the environment. Thus, a new animal, plant or insect, bred for resistance or growth or both can destabilize the ecological niches of other species with cascade effects. We must, accordingly, prepare in advance for this by incorporating strong resources for ecological evaluation into programs and requiring that no program having serious biosphere implications be generated without a counterpart ecological evaluation as part of the decision to go ahead

虽然，我从物质的观点来探讨技术转让，但还有另外一层重要性，技术转让是一种殖民主义产物。它可被看成是：殖民主义者更普遍地拒绝给受压迫民族和国家以真正的智力开发、机会、使之强大的组成部分。只有在那些需要有自己知识分子的国家，人们才能分享知识的力量。因此在殖民地，绝无前沿科学的成果和价值可分享。这一现象也延续到新殖民主义时代。除了印度外，前沿科学不可能以任何一种有影响的方式到达发展中国家。在印度，科学家作出了令人敬畏的贡献，保持与西方国家的科学平等。在其他发展中国家，总的来说，科学在衰退，前沿科学还没有达到非洲等地就已经被许多新的发明浪潮所湮没。本文将把这一权力还给欧洲、北美洲以外的人们，并欢迎被排除在外的 3/4 的人们在每一次新的发明浪潮来临之际就加入科学的前沿阵地里来。

13 Although I have approached technology transfer from the material point of view, there is another aspect of importance. Having characterize technology transfer as a colonial carryover, it can be recognized as a part of the more general colonial denial of any real intellectual developments, opportunity and power to the oppressed nation or country. Only where the mother country needed a counterpart native intellectual elite was intellectual power shared with native peoples. Thus the fruits and values of forefront sciences were of course denied to colonies. This also carried over into the neocolonial period, so that forefront science did not reach the developing countries in any significant way with the exception of India, where Indian scientists have done an awesome job of maintaining scientific equality with the western world. Elsewhere in the developing countries, science has deteriorated in general and forefront science has not reached places such as Africa until it has already been passed by many new waves of discovery. This proposal returns this human right to the rest of humankind outside Europe and North America and invites the excluded 3/4ths of humankind to participate in the frontiers of science at the start of each new wave of discovery and disclosure.



北纬地区的鸟儿迁移到赤道地区是为了逃避冰封的冬天，这是当年亚里士多德知道，我们现在也同样清楚的事实；尽管如此，鸟儿是怎样从一个半球迁移到另一个半球的，至今依然是自然世界的一大之谜。

1 Although it was as obvious to Aristotle as it is to us now that birds from northern latitudes migrate to the tropics in order to escape an ice-bound winter, precisely how they manage to make their way from one hemisphere to the other remains one of the great puzzles of the natural world.

我们现在知道，有几种动物其航海术和航空技巧精湛得令人瞠目结舌。仅就距离(的遥远)而言，恐怕当首推北极燕鸥了；每年，它从北极圈地区的产卵地一直迁移到南极大陆海岸的越冬地。就(迁移的)绝对准确性而言，大剪嘴鸥无疑是佼佼者之一；它在北大西洋的沿海地区越冬，在南大西洋产卵，南大西洋上完全孤立的火山岛特里斯坦达库尼亚群岛成了大剪嘴鸥的一些主要的栖息地之一。

2 We know now that some species are capable of quite staggering feats of sea-and airmanship. For sheer distance, the arctic tern probably holds the record; it migrates each year from its summer breeding grounds in the latitudes of the arctic circle to wintering grounds on the coast of Antarctica. For pinpoint accuracy, the great shearwater must surely be one of the best; it spends the winter in the coastal areas of the north Atlantic and breeds in the south Atlantic, where the completely isolated volcanic island of Tristan da Cunha provides the site for some of its main colonies.

或许，更加令人称奇的是那些“一生中只有一次”的迁移动物的奇迹。这些动物中最为人们熟知的是鲑鱼。太平洋和大西洋鲑鱼都产卵于流入这二大洋北部海域的河流的上游水区。随着幼鱼的逐渐成熟，它渐渐顺流而下，直到过了二至八年不等的的时间以后，鲑鱼加入到春季大迁移的队伍，游向河口，再游入海洋中部。它在那里生活了一至四年以后，又重新回到曾是其“出生”地的河流，逆流而上，开始了游回产卵地的艰难历程。

3 Even more astonishing, perhaps, are the feats of the “once only” migrants. The most familiar of these is the salmon. Both the Pacific and Atlantic salmon are spawned in the headwaters of the rivers that flow into the northern areas of these oceans. As the young fish matures, it gradually moves downstream until, anything from two to eight years later, it takes part in the great spring migration down to the river’s mouth and out into mid-ocean. There it lives for one th four years before returning to the river of its “birth” to begin the difficult journey upstream to the spawning grounds.

这些非同寻常的奇迹引出了一系列的问题。动物究竟为何需要迁移？它们是如何知道迁移的时间的？它们是怎么知道应该往哪里去、怎么去那里呢？找到动物为什么要迁移的生态学上的充足理由，似乎是轻而易举的事，甚至(我们)也能够轻而易举地认识到，迁移的时机选择或许是一些环境信号所决定，例如，白昼或气温的变化等。几个世纪以来一直使科学家与非科学家同样感到困扰的真正奥秘所在是：动物是靠什么辨别迁移方向的。要准确地到达图籍未标的大海中部的某一弹丸之地，那是人类航海家们即使应用现代人造卫星导航装置也殊难胜任的。动物连最简陋的六分仪或指南针都不必借助，居然能殊途同归，简直堪称奇迹。

4 These remarkable feats raise a number of questions. Why do animals migrate at all? How do they know when to migrate? How do they know where to go or how to get there? It is perhaps easy enough to identify good ecological reasons why animals should migrate, and even to appreciate that the timing of migrations might be determined by environmental cues as changing day-length or temperature. The real mystery that has baffled scientist and non-scientist alike over the centuries has been how the migrants know which way to go. To arrive at a pinpoint in the middle of an uncharted ocean is very difficult for human navigators, even with modern satellite



navigation systems. That animals can achieve the same without the advantage of even the crudest sextant or compass seems little short of miraculous.

由一地到另一地的迁移有三种截然不同的方式，把它们互相加以区别，那是很有意义的。最简单的一种方式地标领航法，也就是从一个熟悉的地标到下一个熟悉的地标间的移动。这并不需要特别的技能，因为实际上它无异于非迁移动物在自己的领地里觅食时天天重复的事情。稍稍复杂一点的是定向法，即迁移呈现始终朝一个方向前进的倾向性；这不仅需要有一种意向，还需要在任何给定的位置上都能确定该方向的某种方向确定办法(不管是遗传的还是非遗传的)。第三种可能是导航法，它要求有相当高的本领，因为这包含着这么一种能力：确定地图上的某一位置和与之相距遥远的另一位置之间的座标关系，并在两地之间确定一条路线。 5 It is important at this point to distinguish between three quite different ways of getting from A to B. The simplest, piloting, is to move from one familiar landmark to the next. It requires no special skills, being no more nor less than what most non-migratory animals do every day while looking for food in their territories. Slightly more complex is orienting (showing a consistent tendency to head in one direction); this requires some mechanism for determining the direction in question at any given location as well as a predisposition (genetic or otherwise) to prefer a particular heading. The third possibility, navigating, raises the prospect of quite superior powers, for it implies an ability to determine the coordinate relationship between one position on a map and another distant one and to set a course between the two.

早在 50 年代，马克斯·普朗克研究所的古斯塔夫·克雷默尔就清楚地看到，鸽子的归巢能力包括二个明显的阶段。第一阶段是从放飞点回到鸽房的附近地带所走的路程；第二阶段涉及的任务更简单，即鸽子重返旧地时确定鸽房的所在地。据认为，第二阶段涉及简单的地标导航，但是，克雷默尔认定第一阶段涉及名符其实的导航；他的实验为 30 多年的研究定下了基调。 6 As early as the 1950' s, Gustav Kramer at the Max Planck Institute recognized that homing in pigeons involved two distinct stages. The first covered the route from the point of release back to the general vicinity of the home loft; the second involved the simpler task of relocating the loft once the bird was back on familiar territory. This second stage was believed to involve simple piloting, but Kramer presumed that the first stage involved genuine navigation, and his experiments set the tone for more than three decades of research.

鸽子是怎样顺利地飞完第一阶段路程的呢？多年来已经提出了各种各样的理论。最早的实验证据是在 1950 年出现的，当时克雷默尔和诺贝尔奖获得者卡尔·冯·弗里施各自发表了椋鸟和蜜蜂都用太阳进行导航的证据。这些发现的重大意义在于，这意味着这些动物能够弥补太阳在空中的位移。由于这种运动，与太阳成一定角度飞行的路线产生一个 U 字形的轨迹。为了把太阳当指南针用，就有必要确定一个固定的参照点(如太阳在正午时分的位置或太阳在地平线上升起或落下的位置)，自那以后，已经有许多物种经证实是用太阳当指南针的。此后又发现即使在多云天气里蜂照样能找对方向。这又使人们发现，它们可以应用光的偏振面来正确地确定太阳在空中的位置。 7 How do pigeons manage to negotiate stage one? Various theories have been put forward over the years. The earliest experimental evidence came in 1950, when Kramer and the Nobel laureate Karl von Frisch independently published proof that starlings and honeybees, respectively, use the Sun in navigation. The significant point about these results was that they implied that the animals were able to compensate for the Sun's movement across the

sky. Because of this movement, a route taken at a fixed angle to the Sun results in a U-shaped path. In order to use the Sun as a compass, it is necessary to determine a fixed reference point (such as its position at midday or the point on the horizon where it rises or sets). Since then, a vast range of species has been shown to use the Sun as a compass. Subsequently, it was found that bees were able to orient correctly even on overcast days. This led to the discovery that they can use the plane of polarization of light to locate the position of the Sun very precisely.

太阳光经过大气层过滤, 因此只有在一个平面上偏振的光线才得以通过。由于偏振面取决于太阳在空中的位置, 所以, 任何能够观察到偏振面的动物, 它们要确定太阳的位置都会很容易。 8 Sunlight is filtered by the atmosphere so that only rays that vibrate in one plane tend to get through. Since the plane of polarization depends on the Sun's position in the sky, any animal that can detect the plane of polarization can easily determine where the Sun is.

但是, 许多迁徙鸟类仅在夜间飞行, 因此, 不能利用太阳作指南针。人类早就学会得心应手地利用星星在夜间导航, 尤其是利用那些位于地球转轴上空的、因此每晚看起来总是在同一位置的“固定”星星。在 50 年代末期, 弗朗兹·绍尔和他的夫人向人们证实了迁徙的刺嘴莺能够在天文馆的人造天空底下正确地确定方向。这些发现引发了长达二十年的实验研究, 都是应用了天文馆对夜行迁徙鸟类的行星罗经进行研究的。或许, 最让人感到饶有兴趣的是康奈尔大学的史蒂文·埃姆林的发现: 利用星星作导航的本领并非天生而是后天形成的, 这与绍尔夫妇的假设截然不同。他对靛蓝色的巫鸟雀的幼鸟所作的实验表明, 不仅仅是星星的形状需要鸟儿在出生后的幼鸟阶段在空中飞行时学知, 即使是长大的鸟也需学会注意极地上空的那一小群星座中的各种不同参照星。 9 But many migrant birds fly only at night and so cannot use the Sun as a compass. Humans have learned to navigate very competently at night using the stars, in particular the “fixed” stars that lie on the Earth's axis of rotation and, therefore, always appear in the same place night after night. In the late 1950's, Franz Sauer and his wife were able to show that migrating warblers could orient correctly under an artificial sky in a planetarium. These findings generated two decades of experimental work using planetaria to explore the star compasses of the nocturnal migrants. Perhaps the most intriguing aspect of this was the finding by Steven Emlen of Cornell University that, contrary to the Sauers' original supposition, the use of the stars for navigation is not innate but has to be learned. His experiments with young indigo buntings showed not only that the star patterns have to be learned through exposure to the skies at an early stage in life, but individual birds may learn to fixate on different reference stars in the small group of constellations that lie over the pole.

动物也许会利用地球的磁场为自己确定飞行方向, 这一思想大约是一个世纪前首次提出的, 但是这一思想在 60 年代前并未引起人们多大的关注; 60 年代, 法兰克福大学的 F·W·梅克尔及其同仁对刺嘴莺进行了一系列广泛的实验。这一令人震惊的宣称引发了大量的实验工作, 这些实验的结果是, 相互间区别很大的动物种类, 如蜂, 蛾, 两栖动物, 鱼类, 鸟类, 鼠类以及人类, 经证实都能利用地球磁场正确辨别方向。要证明这一点, 通常要用实例显示: 如果动物个体的感知磁场能力受到破坏(通过在它身上系上小块磁条, 或者把它关在由赫姆霍尔茨线圈包围的笼子里), 那么它就不能确定正确的方向, 而对比动物却能够确定正确方向。动物是怎样感知地球磁场的, 至今似乎仍是一个谜团, 尽管有人曾提出过许多设想。 10 The idea that animals might use the Earth's magnetic field to orient themselves was first suggested almost a century ago, but it received little serious attention until the 1960's when an extensive series of experiments were carried out on warblers by F.W. Merkel and his associates at the University of Frankfurt. This astounding claim led to a good deal of experimentation, as a result of which species as diverse as bees, moths, amphibians, fish, birds, mice and people have

been shown to be capable of using the Earth's magnetic field to orient correctly. Proof of this has usually rested on demonstrating that individuals whose ability to perceive the magnetic field is disrupted (by having small magnets attached to them or by being kept in cages surrounded by Helmholtz coils) cannot orient correctly, whereas control animals can. How animals detect the Earth's magnetic field remains something of a mystery, although a number of suggestions have been made.

解释蜜蜂和迁移鸟类的惊人的确定方向本领的各种理论并不缺乏,但是,若就导航一词的本意而言,那么根据罗经航向确定方向的能力,尚不能满足导航的要求。那得需要一张地图,一张可以找到起始点的相关位置、以便确定其间正确航向的地图。定向法仅仅要求在适当的时候沿正确的方向行进的能力,并可以在遗传基因中编有“白昼渐短之日,鸟儿南飞之时”这种简单定则。人类为了导航,广泛地利用星星和太阳在双坐标系统上确定其经纬度,但是这需要仔细测量并利用复杂的图表(姑且不说作为这些测量、图表基础的计算)。11 There are theories which can account for the orienting feats of honeybees and migrating birds, but an ability to orient on a compass course is not enough for navigation in the proper sense. That requires a map on which the relative positions of the start and end points can be located in order to determine the correct course between them. Orienting merely requires pointing in the right direction at the right time and could be genetically programmed as the simple rule “Fly south when the days start to shorten.” In order to navigate, humans make extensive use of the stars and the Sun to locate their latitude and longitude on a bi-coordinate system, but this requires careful measurements and the use of complex tables not to mention the calculations on which these are based).

动物迁移飞行研究中最大的问题一直只是研究范围问题,或许这不足为奇。大多数传统式研究的内容要么是利用从放飞后的鸟儿腿上收回纪录环,要么是观察实验室小笼子里鸟儿是如何确定方向的。12 Not surprisingly perhaps, the biggest problem with work on animal navigation has been the sheer scale of the problem. Most classical studies involved either recording rings retrieved from the legs of translocated birds or observing the orienting directions of birds in small cages in the laboratory.

曼彻斯特大学的罗宾·贝克在他的《动物迁移进化生态学》一书中提出,几乎所有的长距离迁移都可以用地标法、导航法来解释。他坚持认为,由于进行异地迁移飞行,也由于进行当地探寻活动,动物对于地面上远远超出其巢区正常范围的一些地区的地貌有了一个大致的印象。他的这一观点还是有一定的道理的。因为在某一高度(如 1500 米)飞翔的鸟儿可以看得见 80 公里开外的地平线,而显著的地标,如山峰,则可以在比这更远的地方看个清楚。散在世界各大洋的火山岛中,许多都有云团笼罩其上空,鸟类在成百上千公里之遥就能看见。例如,几乎可以肯定地说,大剪嘴鸥在至少 150 公里之遥就能找到它位于特里斯坦达库尼亚群岛上的产卵地,因为,在该群岛有独特云团萦绕于上空。从导航的角度看,这使大剪嘴鸥的任务变得更加简单,因为它的瞄准范围是一个直径 300 公里的区域,而不是几公里方圆的小岛。这一类地区许多都位于来自迁移动物出发地的盛行风的必经之路上,正如贝克·杰勒德和另一些人士所指出的,这类目的地因长距离探寻的结果,原本或许凭偶然机会就能找到。以下事实可以更好地说明这一点:鸟儿来往于特里斯坦达库尼亚群岛的迁移路径往往完全不同,这是因为它们(迁移路径)其实就是偏北或偏南的盛行风经过的方向各异的路线。13 In The Evolutionary Ecology of Animal Migration, Robin Baker of Manchester University has suggested that almost all long-distance migrations can be accounted for by piloting. He argues that, as a result of both migration flights and local exploratory movements, an animal has a rough idea of the way the land looks over an area far beyond the normal limits of its home range. There is something to be said for this view, for birds flying at an altitude of, say, 1500 meters can see a

horizon that is 80 kilometers away, while prominent landmarks such as mountain peaks would be visible from very much farther away. Many of the volcanic islands scattered about the world's oceans have cloud caps above them that can be seen from hundreds of kilometers distant. The great shearwater, for example, is almost certainly able to locate its breeding grounds on the island of Tristan da Cunha from at least 150 kilometers away because of the characteristic cloud cap that hangs over it. From a navigational point of view, this makes the bird's task much easier since it has an area 300 kilometers in diameter to aim at rather than a tiny island just a few kilometers across. Many of these places lie on the track of prevailing winds from the migrant's starting point, and as Baker, Gerrard and others have pointed out, such end points could easily have been found originally simply by chance as the result of long-distance exploration. This is highlighted by the fact that the migration routes to and from such places as Tristan da Cunha are often completely different because they follow the divergent tracks of the northerly and southerly prevailing winds.

贝克所写的著作提出，人类经常利用当地的地面标志(配合其他的信号,例如包括内在的磁罗径)来确定回归家园的正确方向。旅行者讲述过许多游牧部落的导航奇迹，他们这些非凡的故事便可作为这一观点的明证。许多年以前，一个穿越撒哈拉大沙漠中部大沙海的军队远征队队员作过一次讲座。该远征队随行带上了一位年长阿拉伯人，他作为向导的主要资格就是他平生曾两次穿过这个大沙海，其中一次他还是个年青小伙子，令远征队叹服的是，他带领车队迳直横穿沙海时与罗盘方向完全吻合，显然他全靠回忆那些只在多年前见识过两次的细小的地貌特征(如地平线上的一个土丘或者一片非同一般的红色沙漠)。在事关生死存亡的关头，对环境次要细节的记忆能力会因此大大增加。动物还可能利用非视觉的次要的感知刺激。过去二十年对鲑鱼所作的一系列广泛的实验雄辩地证明：鱼类会记住它们幼年栖息河流的化学特征。由于从某一河系排放出的水会形成股流，奔腾入海，绵延甚长，看来鱼类一进入临近海域，准确地找到河口并无多大问题。洋面海流同样可能会有一些自身特性，这样世界上的海洋完全有可能存在着纵横交错的可通航的海上航路。 14 Baker's own work has suggested that local landmarks are often used by humans (in conjunction with other cues, including an internal magnetic compass) to determine the correct direction of home. There are many remarkable travelers' tales of navigational feats by desert nomads that tend to confirm this view. Many years ago, a lecture was given by members of an army expedition that had crossed the great sand sea in the middle of the Sahara desert. The expedition had taken with them an elderly Arab whose main qualifications as a guide were that he had crossed the sand sea twice before in his lifetime, once as a young lad. To the expedition's amazement, he had kept the vehicles at an exact compass bearing right across the sand sea, apparently based solely on his recollection of minor features in the landscape (a hump on the horizon or a patch of unusual red sand) that he had seen only twice many years before. When one's life depends on it, the capacity to memorize minor details in the environment can become very highly developed. Animals may also use nonvisual sensory cues. The extensive series of experiments that have been conducted on salmon over the past two decades have shown quite conclusively that the fish become imprinted on the chemical characteristics of the rivers in which they live as babies. Since the water discharged from a river system forms a plume that runs out into the open sea for some considerable distance, it seems that fish would have no difficulty finding the right river mouth once they were in the general area. Ocean surface currents may likewise have their own characteristic tastes, so that the oceans of the world may well be crisscrossed with navigable sea-lanes.

在过去几年里，由于意大利的比萨大学和西德的马克斯·普朗克动物行为学研究所对鸽子进行的各项实验，人们对气味是否会在地标领航的基础这一可能性重新燃起了兴趣。这些实验

表明, (鸟儿)要从多至 700 公里之遥的地方成功地归巢, 嗅觉是必需的。尽管对早期的实验存在不同意见, 看来事情渐渐明朗, 即至少鸽子是有能力学会利用嗅迹图, 即便其它动物不在其列也罢。 15 In the past few years, there has been a renewed interest in the possibilities of smell as a basis for piloting as a result of experiments carried out on pigeons by researchers at the University of Pisa in Italy and at the Max Planck Institute for Ethology in West Germany. The experiments have shown that the sense of smell is necessary for successful homing from distances as great as 700 kilometers. Although there has been criticism of the early experiments, it is beginning to look as though pigeons, if no one else, are able to learn scent-based maps.

从气味到声音仅仅是一步之遥。事实证明, 声音有着更令人感兴趣的特性。我们只是在近来才认识到下列事实: 诸如山脉或者甚至一小片波形独特的海区(如珊瑚礁)这样的个体地貌特征, 都能在甚低频率段(10 赫兹)形成自己声音的鲜明特征。这种所谓的“次声”在几千公里远的地方就可以被探测到(显然也可以辨别得出来)。至少在理论上对这些频率敏感的动物, 根据几个参照点的鲜明特征的不同强度, 建立起双座标地图。沿声频梯度运动就可使动物个体从未知的起始点重新确定其老家所在。人们已知道, 鸟类——或许还有某些陆栖哺乳动物——能够探测到次声, 当然, 它们中是否有动物利用次声进行导航, 对此我们依然不得而知。

16 From smell, it is but a short step to sound—which turns out to have even more interesting properties. It is only quite recently that we have become aware of the fact that individual geophysical features such as mountain ranges or even bits of ocean with particular wave characteristics (such as coral reefs) create their own sound signatures in they very low frequency range (less than 10 Hz). This so-called “infrasound” can be detected (and apparently recognized) at distances in the order of thousands of kilometers. In theory, at least, animals sensitive to these frequencies could build up bi-coordinate maps based on the intensity of signatures from several reference points. Movement along gradients would then allow individuals to relocate their home base from unknown starting points. Birds and possibly some terrestrial mammals are known to be able to detect infrasound, though it remains to be seen whether any of them use it for navigating.

这一系列显然让人不得要领的解释突出了生态系统的一个总体特征, 即冗余现象。冗余可能是动物导航系统的一个重要特点, 这一点正在变得越来越清楚。为了做实验而被剥夺了一种导航能力的鸟完全有可能像对比实验鸟一样, 有能力返回巢, 因为实验鸟可以转而借助另一个系统得到弥补。现在大家一般都认为, 大部分动物的导航现象涉及一个对来自各个不同来源的大量信息不断评估的过程。这一领域的一位评论家最近把这一认识描述为二十年来取得的最最重要的进步。 17 This apparently confusing array of explanations underlines a general feature of biological systems, namely redundancy. It is becoming increasingly clear that redundancy may be a key feature of animal navigation systems. Birds that are experimentally deprived of one navigational aid may be just as likely as control birds to get back home because they can compensate by resorting to an alternative system. It is now generally accepted that most animal navigation involves the continuous assessment of a mass of information from a variety of different sources. This realization has been described by one recent reviewer of the field as the single most important advance in the last two decades.

最近在法兰克福大学进行的实验研究表明, 迁移刺嘴莺和信鸽这两类鸟都利用了磁罗盘和星座(或太阳)罗经, 前者居领先地位。詹姆斯·古尔德及其同仁都证实, 除了太阳罗经以个, 蜜蜂至少利用了三套不同的后备信号, 包括光的偏振平面, 磁罗盘及对几天前太阳在不同时间的位置的记忆能力。可是也许技术最高超的还数一种颈部白色的麻雀——北美的一种夜行迁移鸟, 因为最近纽约州大学奥尔巴分校的肯尼思·埃布尔证明, 这类鸟能够利用飞行定下方向, 哪怕是天降大雾。 18 Recent experimental studies at the University of Frankfurt have

shown that both migratory warblers and homing pigeons make use of a magnetic compass and a star (or Sun) compass, with the former taking precedence over the latter. James Gould and his colleagues have shown that honeybees make use of at least three different sets of back-up cues in addition to their Sun compass; these include the plane of polarization of light, a magnetic compass and a memory for the Sun's position at different times on previous days. But perhaps it is the white-throated sparrow, a North American nocturnal migrant, that has the best skill, for it has recently been shown by Kenneth Able, at the State University of New York at Albany, that this species can use the polarization pattern of the early evening sky to set a bearing for the rest of the night's flying, even if thick fog descends.

这种依靠后备信息源的能力意味着在所讨论的这些动物身上蕴含着相当复杂的决策能力。确实，至少有二位动物导航方面的权威人士——洛克菲勒大学的唐纳德·格里芬和罗宾·贝克——坚持认为，动物自动地对外部刺激作出反应的这种传统动物行为学观点应该摒弃，转而接受这一观点：动物有能力对环境提供的一系列信息进行审视并据此分析作出明智决策。这一观点在研究动物行为学其它领域的人士中正在得到普遍的响应。 19 This ability to rely on alternative sources of information implies quite complex decision-making abilities in the animals in question. Indeed, at least two authorities on animal navigation, Donald Griffin of Rockefeller University and Robin Baker, have argued that we need to move away from the traditional ethological view of animals responding more or less automatically to external stimuli, towards the view that animals are capable of carefully evaluating an array of information provided by the environment and basing sensitive decisions on these analyses. This is a view that is beginning to be widely voiced among researchers in other areas of animal behavior.

半个世纪以来，对动物导航的研究或许可以得出两个教训。其一是，没有一个理论是至当不易的理论，而且，没有哪一种动物是依靠单一的机制来确定方向的；其二是，尽管我们在证据不足的情况下接受貌似离谱的思想时，理应谨慎小心；但是，科学史已经一再向世人证明大自然总是具有让世人吃惊的能力，我们牢记这一点也不是无裨益的。 20 There are perhaps two main lessons that emerge from the previous half century's work on animal navigation. The first is that no one theory is universally applicable and that no animal relies only on one mechanism for determining direction. The other is that, while we naturally have to be careful about accepting what appears to be wild ideas without adequate evidence, it may be well to remember that the history of science repeatedly shows that nature always has the ability to surprise us.

很高兴以多年前职业学校学生的身份站在你们面前，懊恼的是当年我是个非常糟糕的学生。倘若我的中学工艺劳作课老师今天在场，他一定会感到无比自豪，因为在我的所有的中学老师里，只有他相当正确地认为我不会有多大出息——至少在职业教育方面。他曾是我哥哥的老师。我哥哥是工艺劳作上的天才。我至今仍记得当时多么羡慕他的每一件作品。他做过一只精致漂亮的枪盒，给我母亲做过一个希望盒。他给家里做过百叶窗，还有前门台阶上的铁栏杆，做过壁架、工作凳、绘图台，还做过书档、工具柜以及里面的工具，他无所不能，是工艺老师梦寐以求的好学生。 1 I am pleased to stand before you as a vocational student of some years past though a very poor one I am chagrined to admit. My high school industrial arts teacher would be so proud today because he, of all my high school teachers, quite rightfully thought I would not amount to much of anything --- at least not in vocational education. He had been my brother's teacher and my brother was a genius in industrial arts. I remember envying all of his school projects. He made a magnificent gun cabinet. He made a hope chest for my mother. He made shutters for our windows and iron railings for our front steps. He made wall shelves and work benches and drawing tables. He made book ends and tool cabinets and tools to go in them. There was nothing he could not produce. He was a shop teacher's dream.

然后就是我。我想，在两年的工艺课中，我唯一做完的的作品是一只铅皮夸脱量杯(杯子的边还被我不小心开裂了个口子，因此从未盛过一滴液体)，一只漏斗，漏斗的嘴又宽又大，任何东西倒进去都会像春天的雪崩一样一泻而下。还有一只形状骇人的切面包板，在这块板上谁也无法摆好面包切出一片像样的面包片，要做一块谁都猜不出一块切面包板的面包板可不容易，然而我竟做出来了，尽管我的过去记录不佳，今天我被大会邀请来讲话，这实在令我鼓舞，也会令我的那位老师鼓舞。显然，二十年前我的第一次尝试未曾获得成功，谢谢你们给我第二次机会来赢得你们的尊敬。 2 Then I came along. I think in two years of industrial arts the only things I concluded successfully were a tin quart cup (which I accidentally split down the side and which never held a drop of anything liquid), a funnel which had a spout on it so broad that all materials rushed through with the abandonment of a spring avalanche, and a frightfully shaped breadboard on which no respectable loaf of bread would have been caught dead--- or sliced. It is hard to produce an unrecognizable breadboard on which no respectable loaf of bread would have been caught dead-or sliced. It is hard to produce an unrecognizable breadboard but I did. The fact that, in spite of such a meager record, I am now invited to address your conference heartens me and would hearten that teacher. Thank you for a second chance to earn your respect after an obviously unsuccessful first attempt 20 years ago.

顺便提一下，尽管我母亲从未用过我做过的那些用具中的任何一样，她以母亲们闻名于世的爱接受了它们。她和那位工艺老师的看法相同——我哥哥和我大不相同，但是如果我们竭尽全力，我们会找到各自的合适领域，不仅能为自己谋求福利和发展，而且能为社会作出更大的贡献。我想，每个母亲的孩子都是如此。因此我们感谢你们为这个国家许许多多的青年男女提供了许多诚实、光荣的途径，使他们能够以自己选择的方式接受本次会议主题的挑战，而且用在你们指导下获得的技能 " 为祖国服务 " 。 3 By the way, my mother never found a way to use any of these implements I made but she received them with the love that mother are famous for. She saw what that shop teacher saw-that my brother and I were very different but that we both should, if we gave it our best effort, find some area in which we would not only contribute to our own well-being and development but also make some larger contribution to society. I think that is true of every mother's child and we commend you for offering many honest, honorable ways in which hundreds of young men and women in this state can, in ways of their own choosing, accept

the challenge of your conference theme and indeed “serve the nation” with skills they have acquired under your direction.

有一个关于拉尔夫·沃尔多·爱默森(现代史上的伟人之一，可以说是十九世纪中叶美国最具有影响的著作家和思想家)的故事。似乎，他是在牧场上，想把一头倔犟地不肯向前走的小牛赶进牲口棚大门，他软硬兼施，但看不出有成功的希望。尽管他具有新英格兰人的智慧和扬基式的机灵，尽管他又推又拉，那牲口硬是不动。不远处，一个年青聪慧的爱尔兰挤奶姑娘望着这位“康科德圣人”，强忍住不笑出声来。正当爱默森先生束手无策，气急败坏的时候，年轻姑娘走到小牛身边，沾湿她的食指，塞进小牛的嘴里，慢慢地领着它走进牲口棚。 4 A story is told of Ralph Waldo Emerson, one of the great men in modern history and perhaps the single most influential literary and cultural mind of midnineteenth century America. It seems he was out on his grounds coaxing, bullying, imploring, and shoving a balky calf toward the barn door but with no discernible success. For all of his New England wisdom and Yankee ingenuity, Emerson could not budge the animal, shove and tug and pull as he would. Nearby a bright young Irish milkmaid was watching “the Sage of Concord” and fought valiantly to hold back her audible laughter. Just when Mr. Emerson's frustration was at the boiling point, the young girl walked over to the calf, moistened her forefinger, stuck it in the calf's mouth, and led it gently into the barn.

爱默森在一旁看得目瞪口呆，他站着呆呆地凝视着，一言不发，然后大步走回家，洗完手，坐在书桌边，拿起笔，在日记中他醒目地写道：“我喜欢会做事的人！” 5 Emerson watched in astonishment. He stood and gazed and said nothing. Then he marched into his home, washed his hands, sat down at his study, and picked up his pen. In his daily journal he wrote boldly, “I like people who can do things!”

教育之奇妙在于它培养人们做事的能力，教育在人类大家庭里互相尊重使我们有所成就的各种才干和技能。爱默森佩服挤奶姑娘，因为她那实用、富于创造性的窍门使她在工作中得心应手。反之，她也必然为爱默森创作的诗歌，作的讲演，写的著书作而敬佩他。在教育的天地里——教育就其最广和最好的意义而言——有互相尊重的空间，一切出于对真正才干的互相尊重，一切都出自对会“做事”的人的敬佩。 6 The wonderful thing about education is that it prepares people to do things and it teaches a respect among the family of men for the variety of talents and skills which lead us to accomplishment. Emerson admired the milkmaid for the practical, even ingenious skills which made her effective in her work. She, too, surely must have admired him for the poetry he wrote and the lectures he gave and the books he produced. In a world of education....; education in its broadest and best meaning....; there is room for that kind of mutual respect, all in the name of genuine ability, all in admiration for people who can “do things.”

美国传统的精粹之一是它的多元性——它愿意接纳，甚至鼓励多样性、广泛性和多重性。能在如此诱人的范围中自由选择无疑是这传统的一部分。我们享受国家教育计划的广泛性和选择自由。我代表一个私立的、由教会赞助的教育体系，同时存在的还有其它的私立学校以及一个影响广泛的杰出的公立教育体系，你们中大多数人代表各种职业技术教育，但是还有别的一些人从事艺术和专门职业的教育。毫无疑问，不仅有足够的余地使大家能有宽广的选择和茁壮成长，人人也都有这个需求。没有任何一所学校，一位教师，一种课堂学习能够提供复杂的、多样化的教育活动。我们提倡这种教育活动，因为它是国力的一部分。 7 One of the



beauties of the American tradition lies in its pluralism...; in its willingness to entertain, even to encourage, diversity and breadth and multiplicity. And surely part of that American tradition is the freedom of choice we have within such attractive options. We enjoy that breadth and freedom in the educational programs of this nation. I represent a private, church-sponsored educational system, but there are other private institutions as well as a superb and influential public system. Most of you represent certain kinds of vocational and technical teaching, but there are others who teach the arts and the professions. Surely there is not only room enough for all but a need for all, to make our choices broad and our growth certain. No one school or one teacher or one classroom experience can cater to the complex diversified educational activity that we encourage as part of our national strength.

我高兴地注意到犹他州的大学董事会主席唐纳德·霍尔布鲁克最近在犹他大学讲话中的态度。他说：

“犹他的高教系统的前提是：各校的作用和方法尽可迥然不同，但是他们在强化特色的同时各校之间寻求协调、合作，相辅相成，完善整体……我们决心努力在技术职业教育领域创造机会[同时保持]各高校特色……各高校之间突出个性特色的精神是独树一帜，而不(一定)是雷同或标准化，提供了机会。”

“我希望看到一流的大学，我希望看到最最优秀的技术学院。我希望每个四年制和二年制的学院都能全面履行犹他州协力拼搏这一教育体系阐明的职责。”

8 I was pleased to note this response from Chairman Donald B.Holbrook of the Utah State Board of Regents in a recent address at the University of Utah. He said,

“The Utah System of Higher Education is based on the premise that intuitions can greatly differ in their roles and methods and still find harmony and cooperation which will complement the whole, while strengthening the need for difference ... we have pledged our efforts to nurture opportunities in the technical vocational field [while preserving] differences in the institutions of higher learning ... the spirit of individualism between institutions of higher learning has provided opportunity for uniqueness, not [necessarily] sameness or standardization.”

“I want universities of excellence. I want the very best for technical colleges. I want each of our four-and two-year colleges to find total fulfillment of its role as defined by our Utah system of cooperative endeavor.”

我相信这种精神和观点同样主导着本州的中学管理。它意味着鼓励职业教育工作者的开明时代已经到来，它不损害其它教育计划，而是和它们并肩共存，协调一致。我与本州成千上万的父母一样，感激众多的机构，学校和教育计划。它们教我们的儿女“做事”，无论是写诗，修车，绘画，缝衣，编写电脑程序，还是挤牛奶，结算总账，开车床，写书，或者进行心内直视外科手术。当每个个人都得到了可能得到的最广泛的、有意义的服务机遇，我们大家的生活就更美好，我们的祖国就得到最佳的服务。9 I am sure that same spirit and sentiment prevails with the secondary school administration of this state. It suggests an enlightened and encouraging time for vocational educators, not at the expense of other programs but alongside and in harmony with them. I join the thousands of parents in this state who are grateful for the many agencies, schools, and programs which teach our sons and daughters “to do things” whether that

be write a poem, repair an automobile, paint a picture, sew a dress, program a computer, milk a cow, balance an account ledger, turn a lathe, write a book, or perform open-heart surgery. All of our lives are enhanced and our nation is best served when each individual is led to the broadest possible opportunity for meaningful service.

针对提供服务与履行职责的要求,我建议每个教师都应该教三项原则。我想,这三项原则是你们刻意准备,并且能够在职业技术教育中传授的。我现在以我国教育工作者同仁的身份(如果你们愿意的话,你们是我的兄弟姐妹)和你们谈话,或许我不仅是同行,同时也以家长的身份在说话。不久我的儿女无疑会到你们执教的班级里去,求学于你们的门下。在为他们——我的孩子和你们的孩子——提供专门技术训练,培养他们的技能的时候,我请求你们教给他们三种价值观,无论他们选择何种职业,这三种价值观对于他们乃至整个国家都至关重要。 10 Against this backdrop of service and fulfillment, let me suggest just three principles I would hope every educator would teach. These are, I think, three which you are particularly prepared and able to teach in vocational and technical programs. I speak to you now as colleagues-brothers and sisters you will-in the work of education in this nation. And perhaps I speak now not only as a fellow professional but also as a parent. My sons and daughter will undoubtedly be in some of your classes soon and they will sit at your feet to learn. While you develop their skills and provide technical, vocational training for these children....; mine and yours....; I invite you to teach them at least three values that will be important to them and this nation whatever their personal choices may be.

请教给他们勤奋工作,敬业创业的必要性及其伟大价值。在个人和集体的进步中,最强大的力量莫过于熟练、明确、诚实的努力。工作。勤奋。流汗。有些技术知识的首次获得或许纯属偶然。但这种情况不多,也不常发生。托马斯·爱迪生曾经说过他一生所获得的成就无一来自偶然。在文明的稳步进程中,最终结出硕果的是常期不懈的努力。古往今来,这个国家的人民通过一代又一代长期不懈、目标明确的努力,将自然资源转化成人类历史上前所未闻的、富丰多样的大量商品和服务。我们必须教育正在成长的下一代付出同样的代价,得到同样的收获。我说的收获不仅指知识和技能,还包括情感和精神这两方面的祝愿。

11 Please teach them the need for and the great value in hard, productive, faithfully pursued work. No mortal force has been more powerful in our personal and collective progress than clean, clear-cut, honest effort. Work. Industry. Perspiration. Some of our first technical learning may have come by accident but not much and not often. Thomas Edison once said that nothing he ever did in his life that was worthwhile came by accident. It is ultimately long hours of effort that pay off in the steady advancement of civilization. Past and present generations in this nation have, by continuous and purposeful labor, converted the resources of this country into a quantity and variety of goods and services never before known in the history of mankind. We must teach the rising generation to pay that same price in order to reap the same reward. I include in these rewards the blessings of heart and spirit as well as head and hand.

最近,美丽的犹他工学院新校园在奥勒姆市建成。在落成典礼上,斯潘塞·金布尔院长说:“拿我来说,我就非常担忧我们的社会过高地崇尚休闲和物质。休闲和拜物主义会耗尽社会的力量,丧失社会的目标,而工作和道德却能使我们进步,民族壮大,国家强盛。”

12 President Spencer W. Kimball said recently at the dedication of the beautiful new Utah Technical College campus in Orem, “I for one worry lest we value leisure too highly in our society along with material things. Leisure and materialism can drain our society of strength and purpose,

but work and morality will permit us to progress and grow as a people and to keep our nation strong.”

金希尔院长把工作与道德联系起来，引起我的兴趣。因为我相信两者之间存在重要和明显的关系。我们为人的正直要求我们诚实地按劳取酬。仔细周到，认真可靠，决意对产品或服务负责，是使社会优秀分子闻名于世的品质。这些都是道德问题。打开开关，电灯应该亮，帐目入帐帐册就该结算平衡，药到就该病除，耕耙结束，田垅理应笔直。自古至今，一个人工作的质与量历来是他为人的最有力的证明。 13 It interests me that President Kimball links “work” with “morality,” for I believe there is an important and explicit relationship between the two. Our integrity should demand of us an honest day's effort for an honest day's pay. Thoroughness and reliability and the will to stand by our product or service are qualities for which the best men and women have always been known. These are “moral” issues. When the switch is thrown, the lights should go on. When the entries are made, the books should balance. When the medication is applied, the disease should waste away. When the plowing is finished, the furrows should be straight. Since time began, the quality and the quantity of his work has spoken volumes about a man.

我记得有个男孩的祖父化了很长时间，煞费苦心地建造一艘船只，男孩在一旁看着，等着，等着，看着。祖父一丝不苟地对待每一刀，每个角，每一条弧线，每个接口；他极其注意桅杆的质量，接缝的填塞密封，构件的撑绷加固。小男孩心焦得不耐烦，请求祖父道：“你怎么化这么长的时间呀？我想出海去。”祖父的回答饱含老人的智慧。“当你最终扬帆起航时，船只必须能飘浮在水上。孩子，大海是什么也不会都听你‘解释’的。” 14 I am reminded of the young boy who watched and waited and waited and watched while his grandfather spent long, painstaking hours on a boat he was building. Great care and concern was given to every cut of the wood, to every angle and curve and connection. Great care was given to the quality of the mast and to the sealing and stretching and reinforcements. In weariness and impatience the child pled with his grandfather, “Why do you take so long? I want to go out to sea.” His grandfather replied with the wisdom of age. “When you finally sail your ship, it has to float, son. You can't ‘explain’ anything to the ocean.”

请教育我的孩子懂得艰苦工作的价值和懂得尽心竭力、忠于职守完成工作的积极的道德意义。 15 Please teach my children the value of hard work and the positive moral meaning of work when it is performed to the best and most faithful of their abilities.

我希望你们教给孩子的第二条原则(它和第一条密切相关)是他们对自己从事的工作、选择的职业的适度的自豪感和自尊。技术和职业技能并不总是得到表现非凡的诚实劳动应得的那种尊重，这样说并不失之公正。作为一个国家，我们也许自觉或不自觉地轻视着蓝领装，穿胶皮靴，系家务围裙的人们所从事工作，不予赞扬。我一直欣赏前健康教育与福利部长约翰·加德纳对于这种不正确态度的发人深省的评论。他说：“出色的管道工远比不称职的哲学家更令人尊敬。一个社会如果因管道工工作卑贱而蔑视其杰出者，因哲学备受推崇而容忍其滥竽充数者，那么，社会既不会有令人满意的管道工程，也不会有正确的哲学。管道和理论都要出漏洞。”

16 The second principle which I would hope you could teach my children-and it is closely related to the first....; is a sense of appropriate pride and self-esteem in the work they do and the career choices they make. I think it is fair to say that technical, vocational skills have not always been held in the kind of esteem that honest labor well performed deserves. As a nation we may have

consciously or unconsciously held back our commendation for the work done inside a blue collar or a pair of rubber boots or a domestic apron. I have loved for a long time the telling comment by John W. Gardner, former Secretary of Health, Education, and Welfare, on some of those misspent attitudes. He said, "An excellent plumber is infinitely more admirable than an incompetent philosopher. The society which scorns excellence in plumbing because plumbing is a humble activity and tolerates shoddiness in philosophy because it is an exalted activity will have. Neither good plumbing nor good philosophy. neither is pipes nor its theories will hold water."

想一想这段话今天——这个星期，这个月——对于我们的意义。经济情况，商品与服务的获得与代价，主宰着我们生活的大部分。我猜想在座的没有一个是煤矿工人，然而煤炭可能成为全国的关注焦点。我猜想在座的没有一位是农民，但是农业可能成为全国的关注焦点。各条战线名单很长，继续罗列下去，势必涉及每一个别的行业，乃至所有在座的人。归根结底，国家经济与技术的成就在很大程度上取决于工人们的稳定与技术水平。我用“工人”这个字包括上至美国总统，下至最低工资收入者的所有人——哲学家，管道工，劳工，律师等等。我要在此说明，这正是我们依靠你们教诲的领域。且不论长达二、三千年的西方文明教给了我们别的什么，我们至少受到教导：每个公民都应尽可能训练有素，以便为他自己，为家庭和整个社区的福利作出卓有成效的贡献。其逻辑的含义是：只有当每个人的才能得到最充分的发挥时，才能谋取最大的福利。即使最原始的社会都认识到为不同的才干和技能提供充分的训练，分配合适的岗位。我想，今天的美国终于开始认识这一点。17 Consider what that may mean for us today-this week, this month. Economics, the availability and cost of goods and services, dominate much of our lives. No one in the room, I presume, is a coal miner. But coal mines can capture the nation's attention. No one in the room, I presume, is a farmer. But farms can capture the nation's attention. The list of battle fronts goes on, inevitably touching every other front until all in this room are affected. Ultimately the success of this nation's economy and technical accomplishment depends in no small part on the peace and proficiency of nation's workers. I use that designation "worker" to include everyone from the president of the United States down to the minimum wage earner....; philosophers, plumbers, laborers, lawyers. And once again that is where we look to you who teach. Whatever else two or three thousand years of western civilization has taught us, it has taught us that every citizen should be as well equipped as possible to contribute effectively for the welfare of that individual, his family, and the community as a whole. The logic of that suggests that the highest possible welfare is achieved only when each individual produces to the limit of his or her capacity. Adequate training and assignments for those varied talents and skills have been recognized by even the most primitive societies. I think finally we are now recognizing them in America.

拿我来说，无论何时，我都看重令人满意的管道工程，藐视滥竽充数的哲学。但是我也看重正确的哲学藐视整脚的管道工程。归根结底，我们需要出色的哲学和出色的管道。我们有权期待两者都杰出。我们真正要求的仅是消除大家头脑中都有的陈旧偏见，转而赞赏出类拔萃，无论那个工作是什么。倘若如此，过去加在某些行业，某些职业选择上的污名便会消失。我相信，我们将拥有前面曾提及的最佳的多元结构，最大的自由和选择。那么，加德纳先生十五年前不得不使用的有区别的词语(如“被推崇的职业”，“卑贱的”的职业)所具有的社会力量就会减少。我们赞扬或批评的是工作质量，而非其形象。这样，我们的管道和理论才能够同样滴水不漏，无懈可击。18 I, for one, will take good plumbing over poor philosophy anytime. But I also prefer good philosophy to poor plumbing. Ultimately good philosophy and good plumbing are necessary and we have a right to expect both. What we really ask for here is the

dissipation of old prejudices, which all of us have, and a turn to appreciation for excellence, whatever the task. When we do that, then any stigma inappropriately attached to certain walks of life and career choices in the past disappear. What we will have, I believe, is the best of the pluralism, the best of the freedoms and choices we referred to earlier. Then even the distinctions Mr. Gardner was forced to use fifteen years ago—distinctions such as “exalted activity” and “humble activity”—will carry less social force. We will praise or criticize the quality and not simply the image of the endeavor. Then both our pipes and our theories will hold water.

让我和你们的孩子对于完成得出色的工作都怀有骄傲和自尊。这个国家再一次地呼唤自尊。自尊有助于重新获得我们在过去 25 或者 30 年中丧失殆尽的统一的道德观。罢工,战争,干旱,通货膨胀一次次地提醒我们:我们生活在同一星球上,因而我们必须全球合作。像两个世纪前的托马斯·杰佛逊一样,我们希望我们能够摒弃性别、出身、传统上的差异,消除错误的偏见和傲慢,重新回到对于出色工作的互相尊重和共同敬慕,不去考虑工作和工作者的背景如何。请帮助我的孩子相信这种职业天地的存在。 19 Give my child and yours appropriate pride and self-esteem in the work he or she does, when it is excellently done. This nation needs that self-esteem again. To have it will aid a kind of moral unity we have managed to lose in the last twenty five or thirty years. Strikes, and wars, and droughts, and inflation constantly remind us that we are on this planet together and we must make it work together. As Thomas Jefferson did two centuries ago, I hope we can set aside gender, ancestral lines, and inheritance, dispel false prejudices and arrogance for a return to mutual respect and common admiration for a job well done, whatever the background of the labor or the laborer. Help my children believe in that kind of professional world.

我希望你们教的第三条,即最后一条,原则是前两条的延伸。教育我的孩子们无论作何种选择,不管成就高低,人生究其根本不仅仅是事业,不仅仅是职业。无论是秘书或科学家,机修工或音乐家,农民或生理学家,那些职业并不能涵盖人生的全部。我们有责任不但教他们以海阔天空的事业天地,而且教他们以事业之外的生活之多姿和意义。一百年前,亨利·沃德·比彻说:“教育就是通晓如何利用自己的整个身心。在人的二十种天赋中。许多人只利用了一、二种。一个人,如果懂得如何使每种天赋成为工具,如何施展它,使其保持锐利,懂得如何将它服务于所有的实际目的,他就是一个受过教育的人。”

20 The third and concluding principle I hope you will teach my children, and it stems from the first two, is that finally life is more than a career, more than a vocation, whatever that choice may be and however fulfilling it should become. Whether secretary or scientist, mechanic or musician, farmer or physiologist those employments are not all there is to this mortal experience. We owe it to our students to teach not only the breadth within careers but the immensely full and rewarding life outside of careers. One hundred years ago Henry Ward Beecher said, “Education is the knowledge of how to use the whole of oneself. Many men use but one or two faculties out of the score with which they are endowed. A man is educated how knows how to make a tool of every faculty, how to open it and keep it sharp and how to apply it to all practical purposes.”

人皆需要培训。我把培训界定为教我们做事,教我们谋生。秘书、科学家、机修工、音乐家、农民和生理学家固然需要培训,但每个人同样都需要教育。我给教育的定义是:教育不仅帮助我们谋“生计”,而且帮助我们创造“人生”。我认为人的精神有永恒的潜在价值。我信奉培训和教育这个哲学,它不断推动人生,舒展人生,扩大人生,拓宽人生。我们应该像比彻所说的那样去做——使每一种天赋成为一种工具,利用我们的整个身心。我认为秘书应该懂一点牛顿的物理学,同样物理学家应该知道怎么打字,会查找存档材料。我认为机修工应能

分辨巴赫音乐与贝多芬音乐之间的区别。我当然也认为音乐家应该会联接自己汽车上的蓄电池的电线，农民应该懂一点儿人体骨骼结构。我认为生理学家应该知道给他的果树喷什么药水。这种日常工作世界之外的学识、经历和乐趣，用我所想信的凡夫俗子们未来之为人标准衡量，是既有实际意义，又有精神意义的。 21 Every person needs training. I define training as that which teaches us to perform a task, to make a living. Secretaries and scientists, mechanics and musicians, farmers and physiologists need training. But every person needs education, too. I define education as that which not only helps us make a "living" but helps us make a "life." I believe in the eternal possibilities of the human soul and I am committed to a philosophy of training and education which pushes and stretches and expands and broadens life forever. We ought to do as Beecher said-make a tool of every faculty and use the whole of ourselves. I think secretaries ought to understand something of Newtonian physics. On the other hand I think physics ought to know how to type and find something they have filed. I think mechanics ought to recognize the difference between Bach's music and Beethoven's. And I certainly think a musician ought to be able to connect a battery cable on his own car. I think a farmer ought to know a little of the skeletal structure of man. I think a physiologist ought to know what to spray on his fruit trees. Such learning and experience and enjoyment outside our work-a-day world has both practical and spiritual meaning in terms of what I believe mortal men and women can someday become.

除了个人的成就之外，当然还有更大、更多的公众问题值得我们全力关注。最近，犹他大学校长大卫·加德纳说：“不管我们的学生由于一生的工作需要要留在这儿、或者去德黑兰或台湾，我们必须培养他们能对付世界上的风云变幻；培养他们有能力生活在风云突变、前途未卜之中，有能力知己知彼，有能力交流自如；培养他们能容忍与尊重与我们观点相左的人；培养他们能欣赏我们生活的这个物质世界、自然世界、社会世界和经济世界。”我赞同他的观点，我想你们也一样。

22 Along with these personal achievements there are, of course, larger and more public issues which should stretch us. Recently President David Gardner of the University of Utah said, "We must equip our students to cope with the complexities of the global world, whether their life's work finds them here in our valley or in Tehran or Taiwan. We must develop in our students a capacity for living with uncertainty and ambiguity, for understanding [themselves] and others, for communicating with effect, for tolerance and respect for those whose views and opinions may be at odds with our own and for an appreciation of the physical, natural, social, and economic world in which we live." I agree and I assume you do also.

我非常高兴地注意到前劳工部长威拉德·沃茨关于不但要在工作天地内实现自己的抱负，而且追求工作之外的各个方面的生活之完美所发表的公开言论。他说：“当我意识到今天和1900年时一样，工作只占用了人们除睡眠之外的生活的三分之一的时间时，我不知道如果我们仅仅以某人的挣得的财物，工资和职业来衡量这个人的教育价值，那该是个什么样的错误……在我看来，越来越多的证据表明，我们正面临在流沙上走捷径的危险。” 23 I was pleased to note that former Secretary of Labor, Willard Wirtz, had gone on record regarding the need to fulfill lives not only within the world of work but also in those dimensions that are outside it. He said, "When I realize that work occupies only one-third as much of the waking hours of the human being today as it did in 1900 ... I wonder what kind of mistake is about to be made when we put the measure of the value of education [only] in terms of the earnings, the wages, [the job] of a particular [person]... it seems to me that the evidence is mounting that here is danger of our taking

a shortcut across the quicksand.”

你们能够帮助我们的孩子——我的孩子和你的孩子——避开流沙。正如你给予他们事业选择所需要的技能和自尊那样，你可以向他们展示他们的技能和自尊的憧憬，让他们跨出、登上和超越他们以前所实践的一切。你们能点燃学生们的心灵之火——看着火焰燃烧，超越车床、实验室或你的教室。你们能够看着它升腾为对生活最美好事物和最辉煌成就的热烈追求。也许，如果做得正确，数年以后，你遇到那位学生时，那团追求至善臻美的火焰仍然在闪烁。如果教书有什么最高的乐趣和奖赏，那就是：你惊奇地发现，有时候是在多年之后，你不但永远地提高了一个上帝之子的职业，而且开阔了他的视野。愿你们励志奋进，忠实于全国所有工作中这一最崇高的职业——教书。谢谢各位。 24 You can help our children....; mine and yours....; avoid that quicksand. Even as you give them both the skills and self-esteem of their career choices, so can you give them a vision of skill and self-esteem that goes out and up and beyond anything they have ever done before. You can ignite the flame within these students' souls....; and watch it burn far beyond the lathe or the laboratory or your classroom. You can watch it leap into a consuming passion for the best and brightest that life has to offer. And chances are, if we do it right, you will meet that student years hence and the flames of fulfillment will still be dancing. If there is one joy and reward for teaching that ranks above all the others, it is that one....; the stunning, awesome realization, sometimes many years after the fact, that you have elevated forever, not only the vocation but also the vision, of a child of God. May you be encouraged and faithful in that worthiest of all the nation's professional services-teaching. Thank you.