

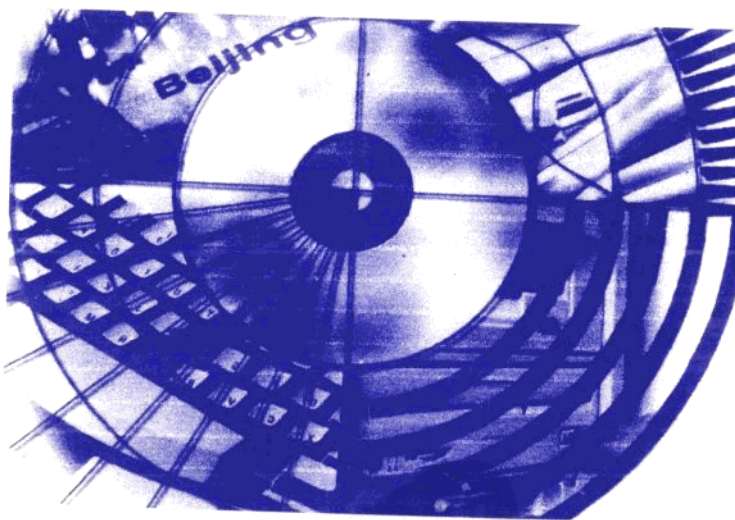
英语科普知识丛书

胡孝沁
瞿平

编译

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信息高速公路



Information Superhighway

武汉测绘科技大学出版社

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1 A Great Revolution

We stand today in the midst of one of the great revolutions in recorded history: the Information Age. This revolution is changing fundamentally the ways in which people work, learn, communicate, care for their own health, and create their home lives. The revolution is already bringing about fundamental structural changes in the pivotal institutions of contemporary life. The revolution is affecting how business manufactures and distributes goods and services, how government serves the public, how health care institutions care for their patients, how schools educate young people and adults, and ultimately how we participate in our democratic society.

Amid this amazing new development, a topic generating a great deal of interest, debate, and hype in industry and media today is that of the Information Superhighway (Information Highway, InfoHighway). Few topics in recent history have created or attracted as much hype and attention as the claims and promises being made about the Information Superhighway.

The hype began sometime around 1992, when then senator and vicepresidential hopeful Al Gore started talking about the Interstate highway system that his daddy helped to build. According to Gore, America had been transformed into a better, more prosperous place by these highways. Today,

America could be equally redeemed by the construction of a high-speed, nationwide electronic network—an information superhighway. With the hope of getting elected and staying there, Gore promised Americans that such a network would be built. After its reconfirmation by the U. S. President Bill Clinton in 1993, a wave of euphoria about a new wired world seeped across the country. The fever quickly caught on with *Time*, *Newsweek* and the rest of the big media.

Information Superhighway, a phrase that has been hot in recent times, describes an emerging ubiquitous medium of communications that will provide many new and exciting opportunities to create, market, deliver, and exploit new information, knowledge and services. In its broad sense, Information Superhighway is a series of components, including the collection of public and private high-speed, narrow, and broadband networks that exist today and will emerge tomorrow. It is the satellite, terrestrial, and wireless technologies that deliver content to homes, businesses, and other public and private institutions. It is the information and content that flow over the infrastructure, whether in the form of databases, the written word, a film, a piece of music, a sound recording, a picture, or computer software. It is the computers, televisions, telephones, radios, and other products that people will employ to access the infrastructure. It is the people who will provide, manage, and generate new information, and those who will help others to do the same. And it is all the individuals who will use and benefit from the Information

Superhighway. Information Superhighway is a term that encompasses all these components and captures the vision of a worldwide, invisible, seamless, dynamic web of transmission mechanisms, information, appliances, content, and people.

Recent literature indicates that the Information Superhighway will have a profound impact on business as well as society in general. Some scholars have illustrated how the future traffic on the Information Superhighway may potentially and radically affect each segment of society. It is claimed that the impact of the Information Superhighway in the areas of education and training, health care, information access, entertainment, telecommuting, online shopping, and others will be enormous and far reaching. In fact, beyond these essentials—enhanced economic, educational, and employment benefits—the Information Superhighway already offers dozens of new products and services that will greatly improve the overall quality and convenience of our everyday lives. Already through today's existing telecommunications infrastructure, we can catch a glimpse of the many benefits that await us. Automated teller machines (ATMs) give us instant access to cash—anytime and almost anywhere. Cable television and today's newest, small-dish satellite television antennas put a virtual entertainment conrucopia in our living rooms. Cellular phones keep us in touch—whenever, wherever we want to be. Electronic networks, including the World Wide Web, provide access to a broad variety of information and resources.

Through the Information Superhighway, the nature of

work process is changing dramatically, becoming more inclusive and more collaborative. Workers will be able to draw upon the diverse idea and expertise of geographically and culturally disparate participants. If people are tied to the home by family commitments, personal preference, or other reasons, telecommuting will give them full access to the workplace. The Information Superhighway has changed our way of thinking about information technology (IT) and information itself. An essential change it has caused is the worldwide sharing of information, without limitation by time and space. Information, even if it is very local and very special, will be globally accessible by everyone or every organization all over the world, simultaneously from its creation onward.

The Information Superhighway is, naturally, also expected to affect business and society in some negative ways, as some major risks on the Information Superhighway have been identified. The regulatory and legislative policy issues related to the Information Superhighway have already sparked some public debates and concerns. It is a challenging and exciting task to designing and implementing the Information Superhighway for the next millennium. As we devote ourselves to this historic mission, a number of scientists have urged that we extend to every person in every community the opportunity to participate in building the Information Superhighway. As most information is social, the Information Superhighway must be a tool that is available to all—people of all ages, those from a wide range of economic, social, and cultural backgrounds, and

those with a wide range of functional abilities and limitations—not just a select few. It must be affordable, easy to use, and accessible from even the most disadvantaged neighborhood or remote dwelling.

At present, however, the notion of the Information Superhighway has baffled both industry and academia. This confusion partly stems from speculations, incongruity, overlap and the multiplicity of the private and public sector definitions and visions of the Information Superhighway—for example, on the one hand a commonly held view is that the Information Superhighway is nothing more than a fantasy, while, on the other hand, some believe that the Information Superhighway already exists. Part of such confusion can also be attributed to the inconsistency in the use of terms for the Information Superhighway. For instance, terms such as “the Internet (International Network)”, “ the electronic society ”, “cyberspace”, “hyperspace”, “infobahn” and “the National Information Infrastructure (NII)” are commonly utilized to describe the Information Superhighway. Thus it is clear that in spite of the enormous exposure given by the media and the government as well as the current devotion of papers, books and symposia to debating what the Information Superhighway will ultimately look like, it is still an enigma to most people and organizations. It is apparent that the Information Superhighway has come to mean different things to different people.

Vocabulary

hype [haip] *vt.* 浮夸宣传, (对某种事物的) 热衷哄闹

euphoria [ju:'fɔ:riə] *n.* state of wellbeing and pleasant excitement; elation
欣快; 欣喜

seep [si:p] *vi.* ooze out or through; trickle 渗漏; 渗出

ubiquitous [ju:'bikwitas] *adj.* present everywhere or in several places at the same time 无所不在的; 普遍存在的

virtual ['vɜ:tʃuəl] *adj.* being in fact, acting as, what is described, but not accepted openly or in name as such 实际上的; 实质上的

cornucopia [ˌkɔ:nju'kəupiə] *n.* of plenty 丰富; 丰饶

cellular ['seljələ(r)] *adj.* consisting of cells 多孔的. ~phone (=movable phone) 移动电话; 手机; 大哥大

disparate ['dispərət] *adj.* that cannot be compared in quality, amount, kind, etc; essentially different 完全不同的; 没有联系的

millenium [mi'leniəm] *n.* 1. period of 1000 years 一千年. 2. future time of great happiness 太平盛世

enigma ['nigmə] *n.* question, person, thing, circumstance, that is puzzling
谜; 令人迷惑的; 不可思议的人(或物)

译文:

一场伟大的革命

我们正面临人类有史以来最伟大的革命之一——信息时

代。这场革命正从根本上改变着人们工作、学习、交流、医疗保健和家庭生活的方式。它早已给当代生活的重要方面带来了根本性的结构变化。它影响到了工业生产、商品流通和社会服务,影响到了政府职能、医疗卫生和教育事业,最终影响到了人们整个的民主社会生活。

在这场令人眼花缭乱的新奇变化中,如今在工业界和传媒界引起浓厚兴趣、诸多争议和极大热情的话题之一就是信息高速公路。人们对它的要求,它给人们带来的希望,激发了大家的热情,吸引了公众的注意,其声势在现代史上极少先例。

这场信息高速公路热大约开始于1992年。当时有希望当选副总统的美国参议员阿·戈尔谈到了他父亲曾协助兴建的州际高速公路系统。据戈尔宣称,由于有了这些高速公路,美国已成为一个更加美好和富有的国度,而今天如果兴建一个全国范围的高速电子网络——信息高速公路,美国将同样受益匪浅。为了能够当选,戈尔向美国人民保证这条高速公路将会建立起来。当美国总统比尔·克林顿于1993年再次确认这一设想之后,对新奇的有线通讯世界的欣喜感染了举国上下。《时代》、《新闻周刊》和其它各大新闻媒体一时间都染上了这一热症。

“信息高速公路”这一近年来炒热的术语,指的是一种新兴的、渗透于社会各个角落的通讯媒体,它将提供许多新的、令人兴奋的机会以便产生、推销、传播和利用各种新信息、新知识和新服务功能。而广义说来,它由许多成份所组成,包括各种各样现在的和未来的、公营的和私营的、宽带的和窄带的高速网络。它包括各种向家庭、企业和其它公营或私营机构传送信息的卫星、地面和无线技术。它包括不论以何种形式在这一基础设施中运行的各种信息,可以是数据库、文字、电影、音乐、录音、图片或电脑软件。它包括人们用以进入这一基础设施的电脑、电视、电

话、收音机和其它设备。它包括所有提供、管理、产生新信息并且帮助别人也这样做的人们。它还包括使用信息高速公路并从中获益的每一个个人。信息高速公路这一术语涵盖了上述所有这些部分,概括了一个世界范围的、无形无缝的动态网络之概念,其中有信息传输机制、信息本身、信息接收设备、各种内容和涉及信息的人们。

近年来的研究文献显示,信息高速公路将对工商界和整个社会产生深刻的影响。已有学者描绘出了未来信息高速公路上的交通将如何对社会的每个组成部分产生潜在的、剧烈的影响。他们宣称信息高速公路在教育培训、医疗卫生、信息获取、消遣娱乐、远程通讯、联线购物和其它一些方面的影响将极为巨大而又深远。实际上,除了这些经济、教育、就业等方面的非常基本的获益之外,信息高速公路的开发已经在提供许多新产品和新服务项目,从而在很大程度上为人们的日常生活增加便利、改善质量。通过现有的一些通讯基础设施,我们已经可以窥见许多未来的收益。自动取款机使我们在任何时候和几乎是任何地方都可以即时取到现金。有线电视和最新的小型碟式卫星电视天线使我们起居室内的娱乐真正丰富多彩。不论何时何地,移动电话能使我们互相之间永远保持着联络。包括环球网在内的各种电子网络提供了获取种类繁多的信息和资源的机会。

由于信息高速公路的作用,工作过程的性质正在发生巨大的变化,变得愈加全方位和具备更多的合作性。每个人将能够从地理和文化上都十分遥远的同行那里获取经验和知识。如果因为家庭负担、个人爱好或其它原因,人们深居简出,远程通讯手段将能使他们完全照常应付工作。信息高速公路改变了我们对信息技术和信息本身的思维方式。它所引起的基本变化之一就是信息的全球共享,而且不受时空限制。即使其性质非常局部和

非常特殊,信息也能够一经产生就为全世界每个个人和组织在全球各地所同时获取。

当然,信息高速公路也会对工商界和整个社会产生一些负面效应,一些主要的负作用已为人们所认识。有关的法规和政策也已引起了公众的议论和关注。为未来的1 000年设计和实施信息高速公路是一项富于挑战性和刺激性的工作。我们在努力完成这一历史性重任的同时,一些科学家敦促我们要让全社会的每一个人都有机会参与它的兴建。大部分的信息归社会所有,信息高速公路必须是一个所有人可以利用的工具,这将包括所有年龄层的人,所有经济、社会和文化背景的人,所有健康人和残疾人,而绝不仅仅是一些精英分子。它还必须价格合理、易于使用,不论是条件最差的社区还是最遥远的住宅都应该具备进入这条高速公路的机会。

然而在目前,信息高速公路这一概念同时也使工业界和学术界感到迷惑不解。这种困惑部分来源于不同公、私营部门对它在定义和看法上的各种推测、自相矛盾、意义重叠和多重性。例如,一方面许多人都认为所谓信息高速公路只不过是异想天开罢了;而另一方面也有人认为它早已存在。这种混乱状况也可以部分地归因于在有关术语的使用上存在的不一致。譬如,目前常被用来描述信息高速公路的术语就有:互联网(全球互联网络)、电子社会、电脑自控空间、超空间、信息轨道、国家信息基础设施等。由此可见,尽管传媒界和政府给予了大量报导,而且不少文章、著作和会议专门讨论了信息高速公路最终将为何物,对绝大多数个人和组织来说,它仍然是个谜。而且,很显然,对不同的人它还具有不同的含义。

2 The Internet and the Information Superhighway

The Internet, one of the terms used by some people for the Information Superhighway, has its origins in a large communications project of the U. S. military, which is, though, frequently forgotten. In the 1960s, researchers in the U. S. defence and computer science communities wanted to develop a system for gaining remote access to mainframe computers. The Advanced Research Projects Agency of the U. S. Department of Defence designed a new type of network, based on the technique of packet switching and supported the construction of a data highway for strategic purposes, that would be impervious to sabotage or other forms of damage or attack. If an individual computer or "node" in the network system ceases to function, the network would itself be able to compensate for the loss by routing data along another path.

The response to these stringent requirements was to create a set of computer "protocols" in the 1970s for linking computer networks and governing the way the networked computers would communicate with one another; TCP/IP (Transfer Control Protocol/Internet Protocol), even though the networks may have different speeds and packet sizes. By 1984, most of the protocols had been established, which are the basis for the linked, worldwide electronic network later known

as the Internet. The Internet has less to do with particular wires and machines as it has with a standardized means of exchanging digital information. Any computer, or group of computers, is said to be on the Internet if it employs the standard and has a gateway to any other computer already on the Internet.

For more than a decade, the only computers that inhabited the Internet were those belonging to the U. S. military and a few select research institutions around the world. In the early 1980s, there were only about twenty-five networks making up the Internet, with only a few hundred primary computers linked together. Although the computer science community had already become keen users of the early Internet, the larger science research community had only limited experience with the technology. When the U. S. National Science Foundation (NSF) began funding the network in 1986 to enhance the backbone services so as to make it a means of linking computer centers and university research centers together, the character and size of the network began to change dramatically, especially as more and more members of the general public gained access to the Internet. Today, there are more than 44 000 network "domains" and more than 3. 2 million linked host computers.

The U. S. National Science Foundation developed the NSFNET, which was designed to provide researchers with broadband access via a backbone network to the Foundation's five supercomputers. It has funded the main backbone links of

the Internet within the U.S. , which, with a transmission capacity of 45 Mbps, currently links nineteen sites, called nodes, throughout the U.S. At these nodes, mid-level (or regional) networks are attached. The regional networks connect thousands of local networks at schools, universities, libraries, research laboratories, government facilities and supporting commercial organizations.

In recent years, with the explosion of the number of users on the Internet, the system is being stretched in several directions. Perhaps the most important of the new directions has to do with the heightened presence of commercial interests on the network. While commercial activity was disallowed by the policies of NSF for the network, vendors of goods and services had to be very circumspect about how they presented themselves. In 1992, NSFNET was commercialized, opening access to a much wider community and heralding the end to free networking. From 1994 to the end of 1995, the National Science Foundation subsidies were phased out. Thus the financial responsibility for the continued viability of the Internet has been passed on to the public sector. Under a cooperative agreement, the National Science Foundation is funding the communications giant Microwave Communications Inc. (MCI) to develop a very high speed backbone network service for US \$ 50 million over five years. This will be a physically separate network designed to connect the Foundation's supercomputer centers and provide an environment that supports the development of high-

performance computing. General-purpose Internet traffic will not be carried on the network. This development, more than any other, has opened the way for commercial traffic on the Internet and there has been a virtual stampede of businesses applying to network administrators for the exclusive use of distinctive domain names to identify their companies on-line. According to recent statistics, the current rate of annual increase in business use of the Internet is 300 to 400 percent against thirty to forty percent on part of the research use.

A crucial distinction must be made, however given the common tendency to equate the existing Internet with the coming Information Superhighway in the minds of many people, it is very important to note how these two differ. The Information Superhighway that is being planned by government and commercial interests will not only be bigger and faster than the Internet, it will be quite different in basic orientation and presentation. To separate the two is to speak of the difference between a research and information platform, with some added commercial content—the Internet—and an open two-way platform for the exchange of products, services, and entertainment—the Information Superhighway. Government and research primarily created and support the former. Businesses and consumers will largely fund and support the latter.

Popular discourse would have people believe that the Information Superhighway will just be a faster, more powerful version of the Internet. But there are key differences between