-2.Scientific methodology

01-the process of acquring scientific knowledge is often referred to as the scientific method, the foundation of all of science

Observations and Data

02-the scientific process began with observations. Although these are sometimes made accidentally, they are normally made under closely controlled conditions in the laboratory.

03-Observations may be qualitative(we might observe, for example, that the color of a certain rose is, simply, red) or quantitative (we might use an instrument in order to obtain a numerical value of the wave-lengths of the light reflecting off its petals)

04-Records of observations are called data.

05-Data from quantitative observations are often recorded in tables of numbers, which may then be summarized in graphs or mathematical relationships.

Laws

06-Careful examination of scientific data sometimes reveals similarities, regularities, or consistnecies, which cna be concisely summarized in a generalization knows as a natural law, or more simply, law.

07-Consider an example. Years ago, the British scientist Robert Boyle studied the way the volume of a sample of gas changes in response to changes int he pressure on the gas when the gas is kept at a constant temperature.

08-Table 1-1 show the results of some measurements like those made by Boyle.

09-When we look closely at the number in the table, we see that the product of the pressure on the gas times its volume is always the same, as is shown in the right-hand column.

10-Using data from a large number of expreiments on different gases, Boyle reached the conclusion that a sample of any gas kept at a fixed temperature.

pressure x volume = a constants

11-this statement, a generalization which summarizes the results of many gas-measurement experiments, is known today as Boyle's law

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4.Welcome to the Always-On World

01-These days our culture is trying to the digest several new technologies at the same time.

02-THe controversy over cell-phone etiquette is part of this process, and it portends much greater controversies to come.

03-How can we think about it? You are sitting in the theater and your cell phone rings.

04-The theater performance has been disrupted, but the caller is innocnet.

05-Instead, everyone is mad at you: you could have turned your phone off or switched it vibrate instead of ringing. It's your fault.

06-But something deeper is going on.

07-Think about it: anyone in the world can reach into the theater and cause a machine to emit a loud noise.

08-In the old days, the theater was a more controlled space than that.

09-The theater, in its very architecture, reflects a set of social relationships : between the players and the audience, between those who have been admitted into the seating areas and thos who haven't, between the people with the expensive ticket and the people with the cheap tickes, between the bartenders and the customers, and so the play can get perfomed.

01-The yeaers of IEEE spectrum's first issue, 1964, was the years Vannervar Bush received the U.S National Medal of science and a celebrated New York World's Fair took place.

02-Optimism about technology abounded, tempered only slighty by the lessons of Hiroshima.

03-There was hope and belief that technological advances would improve the human condition, not just in terms of labor-saving devices and productivity, but also the social good.

04-Bush, an important figure in U.S science policy (and an eletrical engineer educated at the Massachusetts Institute of Technology) understood early on that computers would be useful more than number-crunching.

05-He saw that they would be an integral part of information management.

06-In this famous 1945 article “As We May Think”. Bush anticipated the notion of “Hypertext" - the idea at the core of the internet of randomly linking information so that it can be accessed and searched in novel ways by a user other than the one who put it there.

07-However, even Bush could not have anticipated the amount of information being generated today and the need to move it around the planet for many to use and share.

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08-The 1964 New York's World Fair was a science and technology extravaganza, a precursor to Disneyland.

09-The fair's theme, "Man in a Shrinking Globe in an Expanding Universe", in a sense presaged the always-on theme of this 2001 spectrum issue.

10-For as we become increasingly networked, our worlds will grow smaller and bigger simultaneously.

11-What we can see now is just the beginning of a deep connectivity, and the possibility of a pervasive data and information sharing that will stimulate many new ideas about how networks are used.

12-As in 1964, the vision is one of hope for human betterment. Here's our take on where we have been and where we may be headed.

13-The first section "Bursting at the Seams" looks at how the growth of the Internet is driving improvements to its underlying telecommunication networks.

14-Optical nets and wireless nets are central to theses improvements.

15-The foldout maps out the relationships of the physical underpinnings of the infrastructure.

16-The growth of the Internet is also forcing the resolution of numerous Net management, testing, and security issues, all of which have been with us for some time now, but are taking new urgency as the Net gets bigger and more valuable.

17-In the second section, "Elements of a Well-Oiled Machine", we look at how network growth is leading to better network components and ways of simulating and testing them once they are in place

18-Zero tolerance for failure is the goal as more and more critical services move to the Net.

19-The third section "An Energy Crunch Worsens" examines the power needs of our technologies.

20-In 1964, nuclear energy was the answer, intended to provide electricity that was "too cheap to meter".

21-Now interest centers on electric gird deregulation, natural gas, green power, and the new business opportunities these present.

22-We also ask whether the internet is an energy hog or an environmental friends.

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