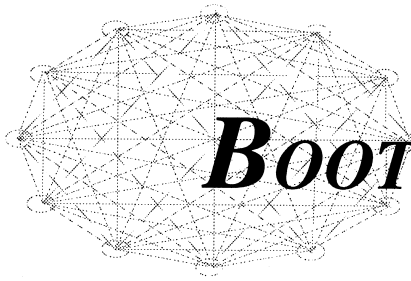


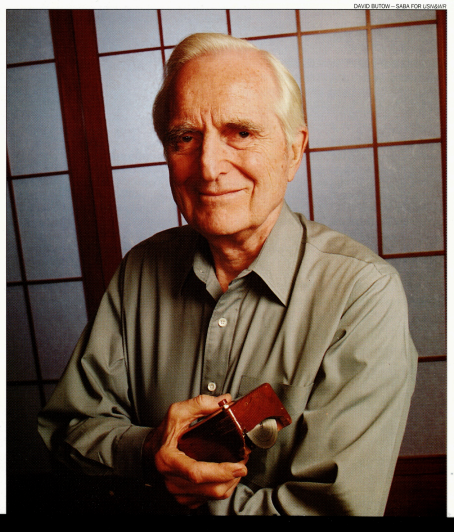
# BOOTSTRAP ALLIANCE

U.S. NEWS & WORLD REPORT

# The man who sees the future

*Doug Engelbart built the mouse; he may alter computing again*

DAVID BUTOW – SABA FOR USN&WR



Doug Engelbart is seated on a sofa in a quiet corner of his home in Atherton, Calif. On the shelf above him is a book titled *The Magic of Thinking Big*—which is what he is best known for. Today, he is thinking of a complex system, a freeway at rush hour. But his thoughts are not confined to the present as he explains the difficulty of expressing concepts for which past experiences offer no frame of reference. "You realize when you merge onto a freeway that you're betting your life on what you see in that little rearview mirror, and yet you don't think anything of it," Engelbart says in his soft, grandfatherly voice. "Now, think back to 1905 and what people used mirrors for. Nobody at that time would have ever thought of betting their life on what they could grok at 60 miles an hour with a few glances in a vanity mirror."

*Grok* is a favorite term of the 71-year-old Engelbart. It means to comprehend immediately, and it first appeared in the 1960s at a time when, it could be said, Engelbart was grokking the digital future. The mouse, on-screen windows, hypertext and many of the other innovations that define computing today are the direct result of Engelbart's work back then. "Yet," says Paul Saffo, a di-

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**BOOTSTRAP ALLIANCE**

## Frequently Asked Questions

*Contents*

1. *What is 'The Bootstrap Alliance'?*
2. *Who should participate?*
3. *Who is involved so far?*

# The Bootstrap Alliance

*Opening Frontiers for High Performance Organizations*

"We know where our organization is today. How do we take it forward as a market leader? How do we chart our future as a high performance organization? What technologies, practices, and strategies will be needed to support us? How can we accelerate our adoption of these capabilities? What are the initiatives we should be undertaking now? Next year? Who are the leaders in these innovations? What are our competitors doing?"

Are these among the questions your organization is striving to address? If so, Dr. Douglas C. Engelbart's Bootstrap Institute, in collaboration with Sun Microsystems, Netscape and other leaders, is offering you an opportunity to participate in a unique exploration of a high performance future – a future you can begin to apply today!

The Bootstrap Alliance is a set of collaborative forums, programs and technologies designed to advance our

### Selected Program Features

- ✓ Mediated discussion forums, including exchanges of issues, requirements, advice, strategies, lessons learned and best practices, supported by emerging, open architecture collaboration technologies.
- ✓ Facilitated development of participant interests and discussion agendas as themes for collaboration forums.

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ブーツストラップ インスティチュート
BOOTSTRAP INSTITUTE
Bootstrapping Organizations into the 21st Century

ダグラス エンゲルバート Ph.D.
**Douglas Engelbart, Ph.D.**
*Director*

6505 Kaiser Drive
Fremont, CA 94555
Fax: (510)792-3506
Website: www.bootstrap.org
*engelbart@bootstrap.org*
(510)713-3550

# The Bootstrap Alliance

## *Opening Frontiers for High Performance Organizations*

"**We know where our organization is today.** How do we take it forward as a market leader? How do we chart our future as a high performance organization? What technologies, practices, and strategies will be needed to support us? How can we accelerate our adoption of these capabilities? What are the initiatives we should be undertaking now? Next year? Who are the leaders in these innovations? What are our competitors doing?"

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The Bootstrap Alliance is a set of collaborative forums, programs and technologies designed to advance our understanding of that high performance future. Subscribing organizations explore areas of self-defined interest and need related to their own development of high performance capabilities.

Participants in The Bootstrap Alliance engage in a sustained series of confidential, collegial and collaborative discussions. They use emerging collaboration technologies to conduct their discussions, informing their own understanding as they work through high performance strategies.

People from your organization will participate in a range of collaboration forums, including the visionary, hands-on Open Teams program, an initiative focused on revolutionizing virtual team work.

With a charter, one-year subscription to The Bootstrap Alliance, you can engage in a unique approach to organizational learning and staff development — a high return, high leverage, low risk program for continuous improvement.

### Selected Program Features

- ✓ Mediated discussion forums, including exchanges of issues, requirements, advice, strategies, lessons learned and best practices, supported by emerging, open architecture collaboration technologies.
- ✓ Facilitated development of participant interests and discussion agendas as themes for collaboration forums.
- ✓ Featured research presentations and monthly reports of in-process discussions, new developments, upcoming themes.
- ✓ Briefings from program managers and selected R&D participants.
- ✓ Use of a hyperlinked knowledge repository, including cross-referenced reports, e-mail archives, intelligence data, recorded discussions and research presentations, as well as other materials submitted by program participants.
- ✓ Virtual teams formed to address key interest areas, engaging in focused intelligence gathering and analysis, experimentation and evaluations.
- ✓ Periodic workshops and conferences of participants for discussions of lessons learned and to explore prospective collaborations on future interests and innovation strategies.

# Open Teams

## *A Visionary Program for Hands-On Innovators*

Open Teams is an extended discussion and investigative forum exploring what it takes to develop high performance organizations and individuals, with a special focus on teams, collaboration and knowledge management. A common objective is accelerating organizational improvements.

Led by Doug Engelbart and guest moderator Patricia Seybold, participants will evolve a shared vision of the future, identify and prioritize common challenges, and organize into virtual teams to investigate and "push the envelope" in key challenge areas.

These will be working teams, actively co-evolving the technologies, practices, and strategies that will be needed — discussing, gathering input from stakeholders, formulating requirements, researching related work, investigating tools and practices, putting them into practice, incorporating lessons learned, and making their work available to others in The Bootstrap Alliance and in their home organizations on an ongoing basis.

These teams provide a rich test bed and proving ground in which to "grow" results, feeding requirements while harnessing results to boost their own performance.

The Open Teams program emphasizes an evolutionary, "learn-by-doing" approach, grounded in real-world requirements and pilot use, resulting in working solutions and lessons learned to be conveyed directly to in-house teams.

## High Performance Themes

Prospective collaboration forums encompass a broad range of participant interests. High performance themes may relate to specific operational concerns – in areas such as integrated customer service, adaptive distribution channels, interactive marketing, work and family – or any number of other participant interests and needs. What's important is that you decide with your peers.

- Co-evolution of Human and Tool Systems
- Connecting Strategy to Practice in High Performance Organizations
- Continuous Learning in Knowledge Work
- Enabling Technologies and Practices for Collaborative Work and Learning
- Identity & Behavior in High Performance Work
- Innovation Management and Collective IQ
- Intellectual Capital and Management of Knowledge Assets
- Intranets, Internets, and Next Generation Open Architectures/Open Hyperdocuments
- Knowledge Workers and Adoption of Collaboration Technologies
- Lateral Learning Across Organizational Boundaries
- Learning's Contribution to Value Creation
- Making the Learning Organization Operational
- Optimizing Dynamic Knowledge Repositories
- Organizational "Knowledge" and "Knowing"
- Shifting from "Training" to "Learning"
- Sustaining High Performance Organizations

## High Return Staff Development

The Bootstrap Alliance's approach to distributed collaboration across and within organizations provides subscribers with a new model for staff development. Hands-on learning is experienced by participants through interactions with peers across organizations – peers sharing comparable interests, needs and challenges.

Your high performers and organizational leaders – both current and future – interact with innovators in areas of management, learning and technology R&D. You gain the benefit of individual learning and development grounded in the practical performance needs of your organization.

The virtual nature of these interactions, supported by collaboration technologies that include interactive video conferencing, limits costly time-away-from-task while providing a sustained professional development experience.

As a Charter Subscriber, your staff members can participate in as many collaboration forums, including Open Teams, as desired. Your participants can comprise an organizational improvement team, bringing the value of their experience to diverse parts of your organization – truly a high return investment in staff development.

## Bootstrap Alliance Charter Subscriber Offer

**One Year Subscription ..... $30,000.00**

Payable in two or four installments.
Discounted price of $25,000.00 if paid in advance.
Not-for-Profit discount of 20%.

Charter Subscriber Offer Valid Through March 31, 1997.

- Unlimited participation in all collaboration forums, plus Open Teams program.
- Place two participants in each collaboration forum and Open Teams program.
- Frame first year collaboration themes for all participants.
- Experiment with the latest collaboration technologies.

# Founder Profiles

## *Leaders in Innovation*

The Bootstrap Institute and its founder Dr. Douglas Engelbart are recognized as pioneers in research and development for **Collective IQ** and collaboration technologies in high performance organizations. Key interests of the Bootstrap Institute are **virtual teams, collaboration, knowledge management,** and **accelerating improvement** in organizations.

Netscape Communications Corporation is a leading provider of open software for linking people and information over enterprise networks and the Internet.

Sun Microsystems, with annual revenues of more than $6 billion, provides products and services that enable customers to build and maintain open network computing environments.

The Bootstrap Alliance is managed as a program through which collaborators provide services to subscribers and participate in program activities. An Executive Committee of actively involved collaborators directs The Bootstrap Alliance, with guidance from an Advisory Council of noted thought leaders and innovators.

For further information or to become a Charter Subscriber to The Bootstrap Alliance, please direct inquiries to:

BOOTSTRAP INSTITUTE

(510) 713-3550

info@bootstrap.org

*visit our website at:*

**http://www.bootstrap.org/**

# Organization

## Board of Directors

**Dr. Henry Braun , Vice President**
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Educational Testing Service
Princeton, NJ

**Dr. Douglas C. Engelbart, Director**
Bootstrap Institute
Fremont, CA

**Mr. Martin Haeberli, Director**
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**Jim Lynch, Director**
Corporate Quality
Sun Microsystems
Mountain View, CA

**Patricia Seybold, President**
Patricia Seybold Group
Boston, MA

## Business Operations

The Bootstrap Alliance (BA) is incorporated as a non-profit 501(c)(3) in the State of California. **American Technology Alliances** (AmTech) has been retained to set up and manage the legal, fiscal, and business affairs of the BA. AmTech is a non-profit whose business is to facilitate the formation and ongoing business operations of formal collaborative alliances, largely for NASA.

## Facilities

Office facilities provided by Logitech, Inc., of Fremont, CA. High end workstations provided by Sun Microsystems SMCC, as well as a Netra 150 webserver which is made available via a twin T3 internet access channel provided by Internet Services Inc.

# BOOTSTRAP ALLIANCE

## Frequently Asked Questions

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### Contents



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### 1. What is 'The Bootstrap Alliance'

The Bootstrap Alliance is a collaborative forum for actively exploring what it takes to develop high performing organizations, teams, and individuals. The Bootstrap Alliance provides a unique opportunity to interact on an ongoing basis with other pioneers who are pushing the envelope in this new frontier - leveraging advances in collaboration, knowledge management, intranets, virtual teams and communities, and continuous improvement and learning. Participants will:

- explore common interests, challenges, and concerns
- share strategies, paradigms, advice, lessons learned
- investigate what's emerging, who's trying it, what they're learning, where it's all headed, where to start
- develop a dynamic repository of accumulating program knowledge, dialog trails, and intelligence collections
- operate as a test-bed and proving ground for innovation
- leverage results within a rich variety of improvement initiatives and pilot projects

### 2. Who should participate?

Every organization seeking quantum leap improvements, heightened awareness of who's doing what out on the frontier, and/or improved quality of life in the global village should subscribe. This includes

corporations, universities, government agencies, institutions, development programs, initiatives, consortia, foundations, associations, professional societies, communities, regions, and whole nations.

We invite pro-active participation from stakeholders representing a variety of related improvement initiatives, disciplines, backgrounds, and functions of the organization spanning Program Management, Total Quality, Information Resources, R&D and Human Resources.

### 3. Who is involved so far?

The Bootstrap Alliance is just now opening its doors to new members. Founding members include Bootstrap Institute, Sun Microsystems, Netscape Communications, the Educational Testing Service, Patricia Seybold Group, Electric Minds, General Services Administration, ISX, and others.

### 4. How might I participate?

A subscription in the Bootstrap Alliance entitles selected members of your organization to participate in regular meetings, invitational workshops, ongoing online discussions, and team activities. To get you started, one of our hosts will introduce you to the Program activities, services, and participants, help you get started in the discussions and teams, and sign you up for upcoming events.

All you need to start participating is a browser with access to the internet. Selected other tools will be made available for your use. Your host can lead you through the download/install process for any you elect to try.

Depending on your schedule, you might sign on to the website occasionally for updates, or you might contribute to the moderated discussions several times each day. You may be active on one or more teams, for example investigating desktop video conferencing tools, or best practices for facilitating stakeholder collaboration, or building an intelligence collection on emerging intranet products and services. You may attend any number of events during the year, in person or via teleconference.

### 5. How is this initiative different?

The Bootstrap Alliance is a strategic, high leverage, cost-effective, participatory, learn-by-doing, results-oriented, customer-centered, evolutionary program.

The Bootstrap Alliance is a forum for improvement initiatives to collaborate across organizations and across domains, zeroing in on what they share in common, and what can be done to significantly boost their results. Special emphasis is placed on exploring capabilities that will boost their improvement cycle as well as the product cycle of member organizations - thus the focus on collaboration, knowledge management, virtual teams/communities, and continuous improvement and learning. The integration of these capabilities represents a significant point of leverage at all levels of the organization.

The Bootstrap Alliance stresses putting into practice new organizational processes along with technological advances, and continuously *co-evolving* the two through scenario development, experimentation, and real-world pilot usage. The Alliance itself operates as an advanced-pilot "virtual enterprise", combining new tools and processes to support its distributed collaborations. Many members are also conducting pilot projects in their own organizations. The result is a rich test-bed for innovation and a proving ground for working solutions.

The Bootstrap Alliance is also strongly customer-centered. The discussion agenda is shaped by participant interest and need from the end-user perspective. Even vendors and consultants are participating as end-customers of Program results. Participants are asked to engage representative stakeholders within their organizations to form an open, ongoing two-way transfer of non-proprietary ideas, feedback, lessons learned, and working solutions between the Alliance and the various improvement initiatives within their respective organizations. A core focus is how best to leverage the 'Collective IQ' of the membership into the Alliance, in order to provide the most leverage to the membership in terms of new insights, experience, and results.

### 6. How will my organization benefit?

No one can accurately predict where your organization needs to end up. There are no prescriptions, no products or services in the offing that will miraculously get you there. There are no one-shot answers. Success will depend largely on educated guesswork and unprecedented levels of experimentation. The Bootstrap Alliance offers a unique forum for joining forces with others on the frontier, helping you position for the future with greater assurance, while sharing the cost and risks of exploration. This includes increasing your organization's capacity for improvement and innovation, along with a heightened awareness of emerging trends, products and services. The Boot-

strap Alliance helps you carve a cost effective, high leverage evolutionary path into the future.

### 7. How will I benefit?

Ongoing association with peers, thought leaders, and innovators from a wide cross-section of domains affords a high return staff development opportunity. Exploratory personal use of advanced collaborative technologies and practices, and first-hand exposure to new roles and requirements, provide a solid foundation for leveraging program results in-house, as well as an invaluable context for career planning aimed at high performing teams and organizations.

### 8. How can I learn more?

For more information, please visit our website at www.bootstrap.org or contact the **Bootstrap Institute** at (510)713-3550 or email info@bootstrap.org, or fax us at (510)792-3506.

### 9. How do I join?

A one-year Charter Subscription in the Bootstrap Alliance costs $30,000 per organization. Flexible payment terms are available, including discounts for non-profits and for those paying in advance. A Charter Subscription entitles you and selected others in your organization to participate on an ongoing basis throughout the year. To become a Charter Subscriber, please contact the Bootstrap Institute.

### 10.When can I start?

You can join any time; however, those who come in on the ground floor will have the added advantage of helping to shape the direction and focus of the discussions and projects, while getting a head start on positioning for the future.

The first Members Event is scheduled for March 20-21, 1997. Online discussions have already been launched on Howard Rheingold's new venture Electric Minds, and the website is operational on a Netra internet server donated by Sun Microsystems.

# BOOTSTRAP ALLIANCE

## Vision Statement

- Our world is a complex place with urgent problems of a global scale.
- The rate, scale, and complex nature of change is unprecedented and beyond the capability of any one person, organization, or even nation to comprehend and respond to.
- Challenges of an exponential scale require an evolutionary coping strategy of a commensurate scale on a cooperative cross-disciplinary, international, cross-cultural level.
- We need a new, co-evolutionary environment capable of handling simultaneous complex social, technical, and economic changes at an appropriate rate and scale.
- The grand challenge is to boost the Collective IQ of organizations and of society; success of this effort will improve the capacity to address any other grand challenge.
- The improvements gained and applied in its own pursuit will accelerate the improvement of Collective IQ. This is a bootstrapping strategy.
- Those organizations and communities that successfully bootstrap their Collective IQ will achieve the highest levels of performance and success.

# BOOTSTRAP ALLIANCE

## Mission Statement

### Our Mission is to:

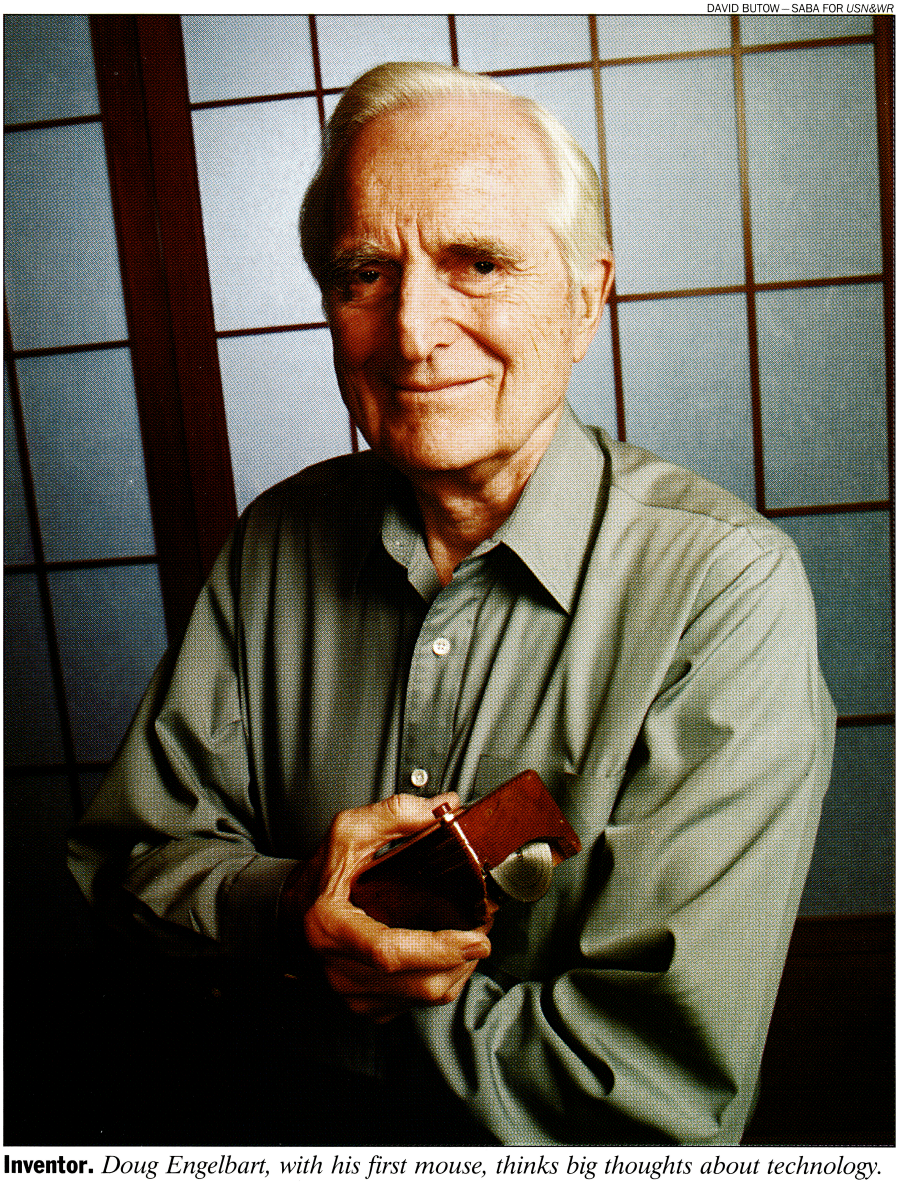
- Promote awareness of the scale, urgency, and complexity of the challenges we face;
- Catalyze, launch, and shepherd an active, strategic pursuit of boosting the Collective IQ on a scale commensurate with the rate, scale, and pervasiveness of change;
- Create an exploratory environment where participants can collaborate, experiment, and set in motion advanced pilot outposts in diverse application areas;
- Enable a whole new way of thinking about the way we work, learn, and live together;
- Promote development of Collective IQ among, within and by networked improvement communities;
- Cultivate a knowledge environment which includes a shared dynamic knowledge repository;
- Foster development of an open platform information system infrastructure, based on an Open Hyperdocument Systems (OHS) framework;
- Share the A-B-C's of Bootstrapping and support co-evolution of human organizations and their tools;
- Enable sharing of effort, cost and risks of advanced exploration among a diverse set of organizations and improvement communities.

U.S.News & WORLD REPORT

# The man who sees the future

## *Doug Engelbart built the mouse; he may alter computing again*

DAVID BUTOW—SABA FOR *USN&WR*



**Inventor.** *Doug Engelbart, with his first mouse, thinks big thoughts about technology.*

Doug Engelbart is seated on a sofa in a quiet corner of his home in Atherton, Calif. On the shelf above him is a book titled *The Magic of Thinking Big*—which is what he is best known for. Today, he is thinking of a complex system, a freeway at rush hour. But his thoughts are not confined to the present as he explains the difficulty of expressing concepts for which past experiences offer no frame of reference. "You realize when you merge onto a freeway that you're betting your life on what you see in that little rearview mirror, and yet you don't think anything of it," Engelbart says in his soft, grandfatherly voice. "Now, think back to 1905 and what people used mirrors for. Nobody at that time would have ever thought of betting their life on what they could grok at 60 miles an hour with a few glances in a vanity mirror."

*Grok* is a favorite term of the 71-year-old Engelbart. It means to comprehend immediately, and it first appeared in the 1960s at a time when, it could be said, Engelbart was grokking the digital future. The mouse, on-screen windows, hypertext and many of the other innovations that define computing today are the direct result of Engelbart's work back then. "Yet," says Paul Saffo, a director of the Institute for the Future, "all the brilliant things he has produced are mere baubles compared to the ideas he's trying to get across."

Those ideas are based on the premise that the complexity and urgency of the world's problems are increasing at a rate that is greater than mankind's ability to cope. Engelbart's solution is bound up in his idea of augmenting the collective IQ of organizations through a process known as bootstrapping. Though these ideas have driven him for the better part of 45 years, to the outside world they remain largely ungrokked.

**Visionary.** That's why Engelbart is relatively unknown beyond the high-tech community. Yet ask almost any executive in Silicon Valley and he or she will describe him as a visionary so far ahead of his time that he has often had difficulty explaining his concepts to those rooted firmly in the present. "I've always thought of [Engelbart] as the father of personal computing," says Alan Kay, a senior fellow at Apple Computer who is often referred to by that title.

In his 1985 book, *Tools for Thought,* Howard Rheingold called his chapter on Engelbart "The Loneliness of a Long-Distance Thinker." That sums up what has been Engelbart's blessing and curse. It all began in 1951. Fresh out of the Navy, with a fiancée and a new engineering job at the precursor of today's National Aeronautics and Space Administration, Engelbart saw his future as a featureless hallway going on indefinitely. "I just thought," he recalls, "I've got a steady job, I'm going to get married and live happily ever after, and oh, my God, are all my life's goals already met?"

The thought caused Engelbart to calculate how many minutes he would invest in his working life until age 60 (roughly 5.5 million) and what return he wanted on that investment. He considered changing careers. Then he hit upon the idea that would change his life: computers. "It was February 1951 when I had the picture," says Engelbart. "To think then

of computers being devoted to supporting individuals sitting there interacting with them was crazy."

Things might have been different had Engelbart's vision been confined to one or two notions about office automation. But his was a worldview, an overarching idea of how computers and humans could interact and of how information could be displayed, networked, organized, cross-referenced and logged to augment the collective IQ of organizations. Engelbart was finally able to pursue his dream in 1963, when he founded the Augmentation Research Center at Stanford Research Institute. That's when the innovations started to flow; from the mouse, to help menus, to becoming the second node on the Internet, much of what defines computing today was developed at ARC by Engelbart and his colleagues.

DAVID BUTOW—SABA FOR *USN&WR*

**History.** *Engelbart's mouse was created in the 1960s.*

**In the cold.** When the funding for ARC gave out in 1977, Engelbart took his crusade to the private sector, but he found himself in an intellectual wilderness where few understood his ideas and even fewer were willing to back them. "The rate at which a person can mature is directly proportional to the embarrassment he can tolerate," Engelbart said in a 1994 interview. "I've tolerated lots."

Yet today, two Silicon Valley companies, Sun Microsystems and Netscape Communications, are working closely with Engelbart to create an alliance of business, government and civic organizations that will act as a prototype for many of his ideas. At its heart is the concept of bootstrapping, an engineering term describing a process in which the results of an action are fed back to achieve greater results more quickly with less effort.

In practice, the alliance will involve organizations coming together in a dialogue that will be tracked and cross-referenced to build up a knowledge base. The dialogue will range from organizations communicating their needs to computer companies to more abstract ideas about the coevolution of computers and humanity.

There is also a technological component. Although the alliance will be open to all, the enabling technologies will be Netscape's World Wide Web browser and Sun's Java language, which lets programs run over the Net. The idea is for users to migrate onto the Web so all data on an individual's desktop computer will be accessible at any time, from anywhere, using any PC.

Engelbart remains hopeful. "In the late '50s and so many years afterward, I'd wake up in a sweat and say, 'God, why am I doing this?' " he says. "But on the other hand, you think that as soon as the world learns how to get this value, it will make a big difference." And so Doug Engelbart, who grokked the digital future more than four decades ago, continues to wait for that future to grok him. ■

BY ERIC RANSDELL IN SAN FRANCISCO

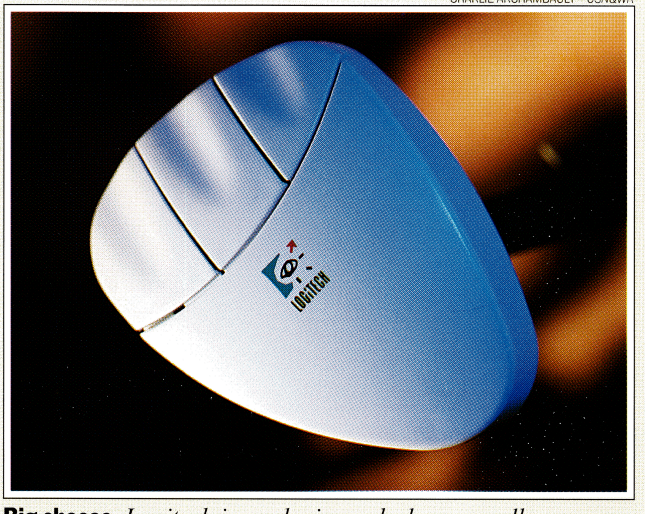
**GRAY MATTER**

# The mouse that really roared

On its original patent, it carries the catchy name "X-Y Position Indicator for a Display System." But someone at the Augmentation Research Center dubbed it a mouse. "I don't know who gave it the name," says Doug Engelbart, the device's inventor. "But it stuck."

And it changed computing forever. There is probably no single tool that has made computers easier to use for non-propeller heads than the mouse. Says Larry Koskinen of the Council for Excellence in Government: "It's the greatest empowerment invention since the development of the electric starter for automobiles, which made it possible for anyone without the sufficient body strength to crank-start a motor."

CHARLIE ARCHAMBAULT—*USN&WR*

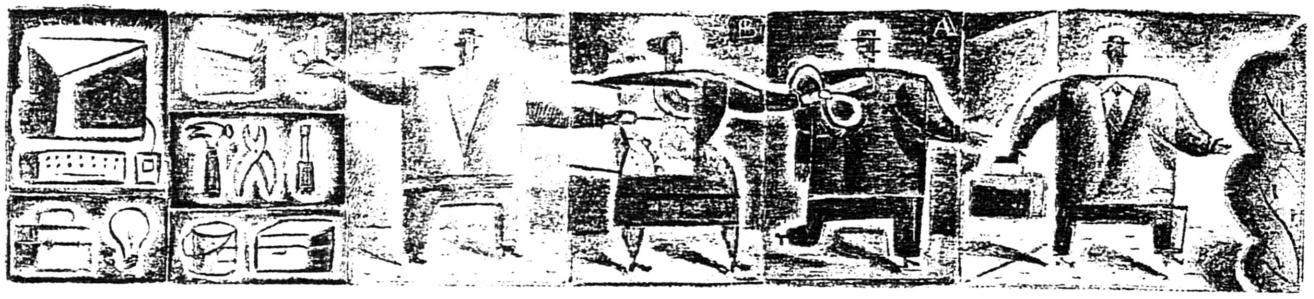



**Big cheese.** *Logitech is producing a sleek new cordless mouse.*

**Leader.** No company has profited more from Engelbart's idea than Logitech of Fremont, Calif. Last month, the company's 100 millionth mouse rolled off the assembly line. Started in 1981, the firm now controls 40 percent of the global mouse market and supplies mice to computer makers like Apple, Compaq and Digital Equipment Corp.

Logitech's mice bear little resemblance to Engelbart's original wooden box with steel wheels. Today, the company produces everything from a three-button mouse to radio-controlled cordless devices to "designer" mice with names like "Blue Leopard." "If you look at Doug's mouse and the mouse today, they are totally different in the way they are made," explains Logitech cofounder Pierluigi Zappacosta. "But the reality is that nothing of any significance has changed in the concept of the mouse."

Ironically, Engelbart never grew rich from his invention. Because it was created at ARC with government funds, the patent became government property. But for the past five years, Engelbart's foundation, the Bootstrap Institute, has had free office space at Logitech. Says Zappacosta: "The little we give him is *very* little compared to what he has done for us." —E.R.



# Tools That Make Business Better and Better

BY THOMAS A. STEWART

*A Silicon Valley legend who invented the mouse and pioneered the Internet now tells us how companies can improve their ability to cope with problems.*

One smart man has been thinking about how groups can work smarter—companies, divisions, teams, whatever—longer than anyone else. Better than anyone too: His ideas—long incubated, long promulgated, and long ignored—provide a way of looking at how to improve corporate performance that's fresh and refreshingly practical.

His name is Douglas C. Engelbart. He runs something called the Bootstrap Institute. It's appropriate that his office is in Fremont, California, a town named for explorer John Charles Frémont, a.k.a. the "Pathfinder," who played a major part in the conquest of California in the Mexican War and was the Republican Party's first presidential candidate. A Silicon Valley legend, Engelbart, 71, is a pathfinder too.

Bootstrap occupies a small office and a few cubicles in the headquarters of Logitech Corp. Logitech lets Engelbart use the space for free, which is also appropriate: Logitech makes mice for computers, a business that wouldn't exist but for Engelbart, who invented the mouse. Indeed, many a fortune traces to Engelbart's ideas: He conceived the use of multiple windows on computer screens, invented groupware and hypertext (the system of nodes and links that is the basis of the World Wide Web), and was the first to augment electronic mail with files and graphics. In November 1969, when Vint Cerf and others at UCLA sent the first packets of information over the ARPAnet, precursor of the Internet, the recipient was Doug Engelbart, then at the Stanford Research Institute, the Net's second node. Even then, the potential of computer networking was old news to this thaumaturge; he had been thinking about it since 1951—when fewer than two dozen computers existed.

Technology, though, doesn't really interest Engelbart, who says, "I've become famous for the technology, but I keep telling people, 'No, that's just part of the pursuit.' " He's chasing a more elusive fox: "how to improve mankind's ability to deal collectively with complex problems." Not solve problems, notice: improve the ability to cope with them. To this end, the computer is a tool—one destined to be more important, in Engelbart's view, than the printing press or the discovery of bronze. But its real worth is to make it possible to alter and augment the ways people bring brainpower to bear on complex problems.

THE COMPUTER IS A TOOL—ONE DESTINED TO BE MORE IMPORTANT THAN THE PRINTING PRESS. BUT ITS REAL WORTH IS THAT IT MAKES IT POSSIBLE TO AUGMENT THE WAYS PEOPLE BRING BRAINPOWER TO BEAR ON COMPLEX PROBLEMS.

The needle on the *Future Shock* voltmeter is way over into the red part of the dial and shows no sign of falling back. Consequently, one of the most complex problems around is keeping a company functioning smoothly—indeed, continually improving—while both it and its environment are changing rapidly. In the FORTUNE 500, unlike the one in Indianapolis, drivers have no scheduled pit stops.

Ergo (read slowly, dense clause ahead): The capability that most needs to be improved is the capability to improve capability. You've got to get better at getting better—while keeping the place going. How do you do that?

Engelbart likes to think in terms of infrastructures, and there are two of them. First is a "capability infrastructure," which we use to do our jobs: this building, these colleagues, customers, labs, computers, Rolodexes, "core competencies" in chemistry, packaging, and recruitment—whatever's core for you. Depending how widely you want to cast your net, the capability infrastructure could range from the specific (operating Okuma flexible manufacturing systems) to the general (knowing English or a reasonable facsimile thereof).

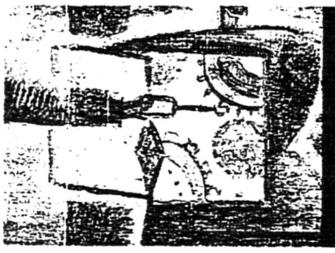
Managers spend lots of time working on the capability infrastructure. They design organizations, write procedures, learn and teach skills, instill attitudes—all part of the "human system." They then align and augment these with a "tool system" of machines, facilities, vehicles, and so on. Sometimes tools change the human system: For example, to get the most out of a computer network or a flexible manufacturing system, you'll want to rejigger the organizational chart and rewrite the procedures manual. If this sounds like the familiar distinction between social and technical systems, it is, though Engelbart emphasizes skills—knowledge assets and tools—more than organizational apparatus.

But there's a second infrastructure,

ILLUSTRATION BY RICHARD LILLASH

which gets less management attention: an "improvement infrastructure," sets of activities that make the organization better. These too have a human and a tool dimension. We don't neglect the improvement infrastructure, but we do far less with it than we should, especially in fast-changing times. Engelbart, with an engineer's knack for breaking things into pieces, has a way to explain why.

Three kinds of activities go on in companies, Engelbart says. The "A" activities are directly relevant to what you sell—R&D, marketing, sales, manufacturing, distribution. You've got a whole set of management and control systems for them, like reporting relationships, accounting mechanisms, and budget and planning processes by which you decide where to invest—the basic stuff of management. It keeps the capability infrastructure oiled. Investment in "A" work (putting in a new assembly line, opening a new store) increases profits but not profitability—the total, not the percentage.



HOW DO YOU KEEP A COMPANY FUNCTIONING SMOOTHLY WHILE IT AND ITS ENVIRONMENT ARE CHANGING RAPIDLY?

Then there are "B" activities: things you do to improve the "A" work. You're doing "B" work when you spend a bundle to put in computer-aided-design software in place of pencils and straightedges, commission a team to reengineer human resources, or bar-code every item in the warehouse. These serve the improvement infrastructure. Often they're projects. You're aware of them and you manage them: they might be a special line item in the budget, but at least they're in it. Indeed, the great trend in managing over the past decade has been to automate "A" work or to push responsibility for it down to front-line employees, freeing managerial time to do "B" stuff. Money invested here—say in cycle-time improvement—gives you percentage-rate gains.

The problem's in the "C" activities. These, as Engelbart describes them, involve "improving the organization's ability to do 'B' work": things you do to get better at getting better. They too belong in the improvement infrastructure. They provide real leverage because they not only raise your percentage of profits but also raise the rate at which they compound.

Pause a second, and list three or four examples of "C" activities—go ahead ...

Not much of a list, right? That's Engelbart's point: Most groups never think explicitly about how to improve their ability to improve. They can't even name "C" activities. If they sometimes perform them—and they do—it's by happenstance rather than by design.

It's this "C" work I want to dwell on, but first, something that might amuse and enlighten the whimsically bent. You may remember that T.S. Eliot, in *Old Possum's Book of Practical Cats*, insisted that every cat needed three different names. You can think of Engelbart's ABC's of organizational improvement as corresponding to this triptych of feline nomenclature. First, the poet wrote, "there's the name that the family use daily"—the "A" activities, some of which might be quite sophisticated. In addition, Eliot tells us, "a cat needs a name that's particular ... else how can he hold up his tail perpendicular?"—a set of "B" activities for special occasions. But a cat has a third name, which it alone knows; a meditative mouser, eyes closed and brain whirring, says Eliot, is contemplating the inscrutable secret of this third name. These are the "C's": unspoken, ineffable, almost magical. But I digress.

Here are some examples of "C" activities: increasing the effectiveness with which you transfer knowledge from one part of the company to another; getting better at scanning the competitive environment; and improving your ability to run pilot programs and projects (for instance, picking the right pilots to get maximum return on investment, getting them up faster, and replicating them better).

Corporations have begun building tool systems to support "C" activities. In the year since I wrote about knowledge databases (The Leading Edge, October 30 and November 27, 1995) there has been a huge proliferation of internal Websites, Lotus Notes databases, and data warehouses. Engelbart himself devised a setup quite like today's intranets back in the 1960s, and by 1978 was using it to integrate communications and computing at Tymshare, later part of McDonnell Douglas. Then as now, technology could boost collective IQ by creating a repository where people can share information and lessons learned.

The human system, however, lags. The

most important "C" activity. Engelbart says, is to encourage and fund cross-functional "improvement communities" explicitly charged with working on common challenges to improve improvement.

To understand what that means, think about governing devices, which are attached to machines to keep them under control. We've got plenty of governors—boards, executive committees, auditors. What we need are accelerating devices.

Harley-Davidson has one. In addition to having the usual panoply of governance systems, CEO Richard Teerlink has created a special 20-person steering committee, which reports to President Jeff Bleustein. It includes people from each of three "circles": a "produce product" circle of eight, whose day jobs involve manufacturing, design, materials, logistics, etc.; a seven-person "create demand" circle (dealerships, marketing, riding clubs) and a staff circle of five. Members of the circles are top executives who meet at least once a month to conceive, analyze, and decide on ideas for improvement, new lines of business, and so on. An inner circle of eight, including Bleustein, also meets at least monthly and takes on the biggest ideas; its members are elected by their peers on the outer circles for two-year terms. The circles have almost unconstrained authority to make decisions; that creates an atmosphere where the explicit purpose is to push forward with change, short-circuiting what had been a predictably slow governing process in which decisions were delayed while one functional executive after another offered reasons something couldn't be done.


Harley's intersecting brainstorming circles are exactly the kind of accelerating device that companies need if they are to improve their ability to improve their abilities. Projects and task forces aren't enough, and all the tools and technology in the world won't help if people aren't around to extract their lessons and convert them into better ways of getting better. For that, says Engelbart, "you need to talk about communities." F

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The New York Times

MONDAY, OCTOBER 7 1996



Technology | Denise Caruso

# Computer Pioneer Works to Raise the 'Collective I.Q.' of Organizations

If not for Douglas Engelbart, a great many of the technical innovations we consider integral to the personal computer revolution would not exist. While Dr. Engelbart was working at what was then called the Stanford Research Institute, during a remarkable run of creativity that began in the early 1950's and continued throughout the 1960's, he invented many seminal products and concepts that we take wholly for granted today — the computer mouse, hypertext, groupware and many others.

Today, his contributions more widely recognized, but for decades the technologies he invented and demonstrated were largely ignored or misunderstood. And even now, with PC's and the World Wide Web as direct descendants of his pioneering work, these technologies have not had nearly the transformative effect that Dr. Engelbart had hoped.

Until recently most of his inventions, as the industry gradually adopted them, were built into stand-alone computers. But from the beginning Dr. Engelbart conceived his techniques with networked computers in mind. His motivating concept, still largely untested today, was that information technologies could serve as the connective tissue between people and information.

The result, he said, would be an exponential increase in what he calls an organization's "collective I.Q.," which would in turn supercharge a group's ability to improve itself over time.

In essence, Dr. Engelbart's theory separates work into three categories. A-work, as he calls it, is the primary mission of an organization, like building cars or operating a health care system. B-work involves ways of improving A-work, and it is likely to be basically the same among similar organizations, be they auto makers or hospitals.

C-work, in turn, is about improving the improvement process itself. Although an auto maker might be loath to share information about B-work with its competitors,

Tom Bloom

Dr. Engelbart's hypothesis is that much good could come from their sharing information about C-work — about how to improve the process of recording and responding to consumer complaints, for example, which might enhance processes all the way down the line.

## The inventor of groupware seeks togetherness.

And that exercise might be equally valuable to a software company, a car maker or a bookstore — resulting in what he calls "high-performance organizations" that are much more capable of improving their work processes quickly and effectively.

Dr. Engelbart's technology key is a giant hypertext handbook about a specific problem — a "collaborative hypertext document," in his parlance — in which E-mail, project reports and other relevant data are linked together electronically, much as they might be on a Web page. Such a document is built using various electronic tools, like shared-screen teleconferencing, sophisticated document repositories and E-mail that creates its own archive and index.

His strategy for changing how organizations work includes a company he founded in 1989 and runs with his daughter, Christina. The **Bootstrap Institute** (http://www.bootstrap.org), as this company is called, makes its money from quarterly seminars and basic research into technology and organizations.

In addition, the Engelbarts are in the early stages of forming the Bootstrap Alliance — a group of "thought leaders" from industry, government and universities. Such a broad-based initiative is critical because changing the way people work together is as critical as the technologies that connect them, according to Ms. Engelbart, a cultural anthropologist.

"The whole groupware push, for example, has been about how to simply share a document," she says. "What's missing is how you can work together inside a repository of information that ties everyone together. That's what a lot of our work is about. We're trying to figure out how dramatically — and humanely — we can change the organization."

And they are getting some powerful assistance: **Sun Microsystems** Inc. and the **Netscape Communications Corporation** have each assigned a top engineer to help the Engelbarts get the alliance running.

One is Jeff Rulifson, the director of technology development at Sun Microsystems who was the system architect for Dr. Engelbart's Stanford Research project in 1966 and who shares credit with him for the invention of hypertext. Back then, he said, they spent a lot of time looking at what he calls co-evolution — the way people change how they do things in response to technology.

"But the real study of co-evolution never happened," Mr. Rulifson said. "Instead, we've been evolving technology and crossing our fingers, hoping that when it comes to processes and personal interactions and how we organize ourselves, we'll figure it out. But now, with the explosion in the World Wide Web and collaborative tools, Doug's wisdom can get out."

Another of the engineers is Martin Haeberli, a member of Apple Computer'soriginal Macintosh team who has since joined Netscape as director of technology. He has been helping translate Dr. Engelbart's academic constructs into ideas that can be more easily understood by the wide variety of people whom the Engelbarts hope to draw into the alliance.

## Thought is given to personal interactions.

"Doug has made profound contributions, and one of my assignments is to help him achieve broader recognition," Mr. Haeberli said. "His vision is an intellectual challenge to understand, but it shouldn't be. We want to find a larger group of people who are willing to engage in wrestling with the angel — the angel in this case being Doug."

And the benefit of wrestling with the angel would be an opportunity to be in the first group that helps design and put into use the tools and systems to make Dr. Engelbart's system a reality.

The major obstacle, of course, is that most broad-scale efforts to get companies and institutions to work together have been disastrous. Despite the fact that many consortiums have been formed to solve common problems, the self-interest of each company almost always ends up taking precedence and stops participants from truly contributing.

"Consortiums are tough," Ms. Engelbart concedes. "But this whole topic of discussion is exactly what's needed to make organizations run better."

A PUBLICATION OF THE DRUCKER FOUNDATION AND JOSSEY-BASS PUBLISHERS

# Leader to Leader

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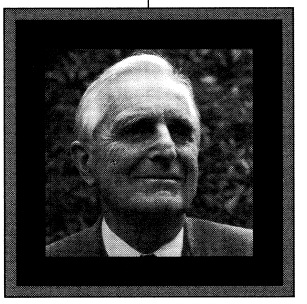
# Improving Your Organization's IQ

In some of the most innovative companies in Silicon Valley—Apple Computer, Sun Microsystems, SRI International, 3Com, Xerox's Palo Alto Research Center—the name Douglas Englebart is spoken with reverence. The 70-year-old electrical engineer is credited with inventing the mouse, hypertext, multiple-window screen displays, and computer conferencing, among other staples of computer technology. But his greatest innovation has been largely ignored. It is a vision of people using technology to "improve the collective IQ of organizations," and "build a collaborative community of knowledge workers."

Englebart developed high tech tools not because they were nifty or marketable (most went unused for decades), but because he felt the world was in trouble. He was driven by his assessment 35 years ago that the "complexity and urgency [of world problems] are increasing exponentially, and the product of the two will soon challenge our organizations and institutions to change in quantum leaps rather than incremental steps." The real power of computers, he believes, lies not simply in automating work processes but in "augmenting human intellect" to address environmental and social problems that are "reaching the point of no return."

His formula for organizational change involves terms only a technologist could love: "open hyperdocument systems" and CoDIAK (concurrent development, integration, and application of knowledge) capabilities. For the rest of us, that translates to human and technical systems that allow people to enhance an organization's improvement process.



*Douglas Englebart*

In Englebart's model, most organizations operate in at least two dimensions—"A" work, or the development, support, and delivery of its essential product or service; and "B" work, or systems and activities, such as e-mail or quality management processes, intended to improve the performance of A work. But while companies spend millions on such improvement processes, they seldom think about how to make B work, itself, more effective. That's the purpose of "C" work, says Englebart. C work—anything from attending a TQM conference to forming a consortium for enhancing an organization's "improvement infrastructure"—gives organizations an opportunity to "compound the return on your process-improvement investment."

"Ask yourself how big an investment it's going to be over the next 20 years for your organization to totally transform itself—as it will have to, to survive," says Englebart. "Do you have a strategy for that? To address complex, urgent problems you have to say, 'I can improve not only my product cycle time, I can improve my *improvement* cycle time.'"

Key to this process is compiling a "handbook"— the body of knowledge comprising everything the organization has learned. That knowledge is dispersed throughout every organization—in business plans, product designs, procedures manuals—and people's heads. The odds of meaningful improvement and collaboration increase as that information is made available to all who need it; hence the need for open, electronic hyperdocuments that allow everyone to seamlessly share what they know.

Englebart's esoteric ideas are grounded by a gift for metaphor. He founded the Bootstrap Institute, named for both Paul Bunyan—who, of course, lifted himself by

his bootstraps to see above the trees—and for the engineering concept in which a small electrical charge ignites a larger and faster reaction (as in "booting up" a computer). The institute, based in Fremont, California, seeks to build a "collaborative C community" through conferences, publishing, and research. Englebart foresees organizations establishing jointly funded "exploration outposts" to help "settle the frontier" of group innovation.

Educator and longtime Apple Fellow Alan Kay, called by some the father of personal computing, says that the title really belongs to Englebart. "We were all influenced a lot by Englebart," he says of the early pioneers of the industry. "Work he did 25 years ago is still at the cutting edge . . . and his organizational ideas are at least as profound." Englebart's theories of collaboration address a particular weakness of American business: "Most corporations state their objectives and try to reach them directly," says Kay. "The problem is, they don't see the larger context. The fastest route from point A to point B is sometimes through C."

But Kay identifies a related weakness of organizations—and individuals—that makes Englebart's message unwelcome: "an immunological response to new ideas." The rejection of the new has doomed a lot of enterprises and, says Kay, turned people like Englebart into "intellectual outlaws who refuse to be socialized as conventional thinkers. Instead, they grew up to be scientists whose new ideas are adopted 30 years later."

***Work Englebart did 25 years ago is still on the cutting edge.***