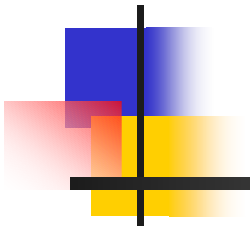

YOUR FIRST JOB:
Learning the Ropes and Riding the Waves

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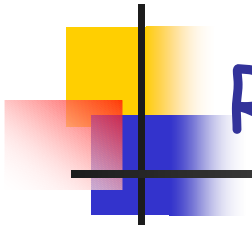
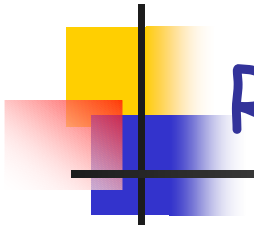


Roadmap

- Know the company you have joined
- You and your research
- Creating star performers
- Beyond technical excellence:
  - Communications skills, Mentoring, Support groups
- Companies change
- Reading materials
- Internet resources

Biographical Note

- Dipl. Ing. Degree in Power Engineering, University of Pristina, Yugoslavia, 1974
- MS in EE and MS in CE, Syracuse University, 1979 and 1981 (respectively)
- Ph.D. in EE, UCLA, 1986
- Visiting Lecturer, UCLA, 1986 - 1988
- Member of Technical Staff, AT&T Bell Laboratories, Murray Hill, NJ, 1988 - 1990
- Research Scientist, Bell Communications Research, Morristown, NJ, 1990 - 1995
- NSF Visiting Professor, UC Berkeley, 1995 - 1997
- Associate Professor and Professor, Simon Fraser University, 1998 - present



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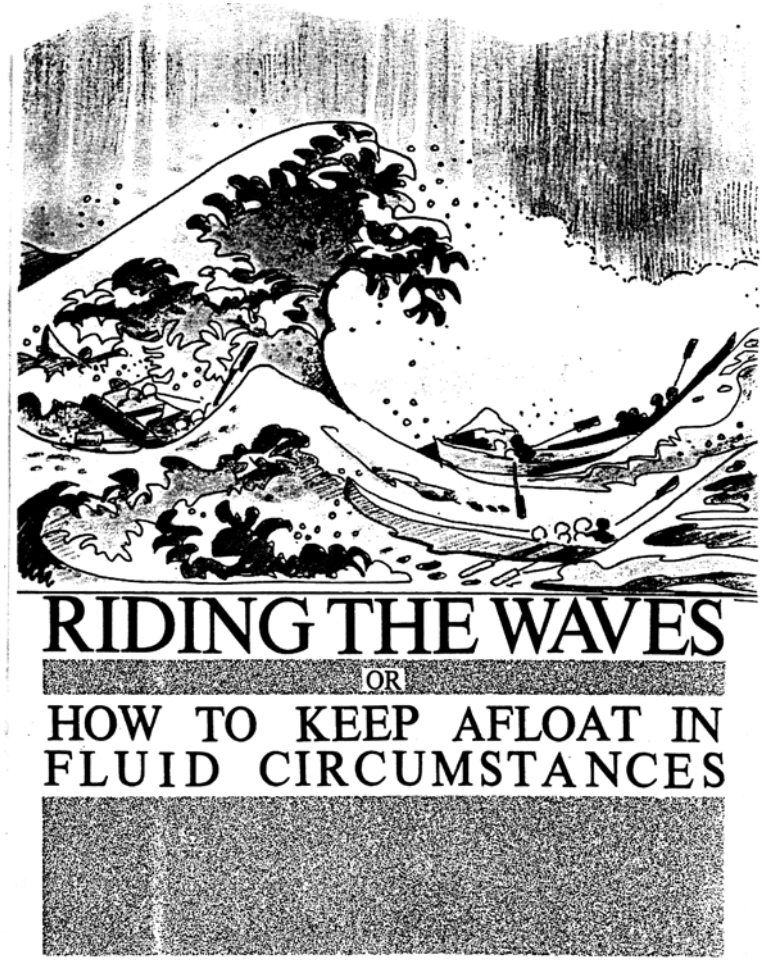
Know the Company You Have Joined



Bell Communications Research

- Bellcore, Established on January 1, 1985
- Research and development organization owned by seven Regional Bell Operating Companies
- Number of employees: 6,000
  - Bellcore staff:
  - Applied Research: 6%
  - Software Systems: 45%
  - Professional Services: 26%
  - Customer Solutions: 11%
- The Bellcore Mission describes the company primarily as a solutions company supported by world-class applied research: Bellcore provides compelling business value by managing the complex delivery of network solutions to carriers, suppliers, end-users, and governments.

Know What You Want From Your Job

- Technical areas:
  - Research
  - Development
  - Marketing
  - Sales
- Promotion ladders:
  - Technical: Member of Technical Staff (MTS), Distinguished Member of Technical Staff (DMTS), AT&T or Bellcore Fellow, Chief Scientist
  - Management: Director, Department Head, Assistant Vice President, President
- Fast track:
  - Pipeline Development Program

Company Resources

- Information sources:
  telephone directories, directories of service, guide to purchasing, corporate personnel practices, committees, company news, salary reviews
- Getting started:
  working hours, job classifications, the role of applied research
- How to get things done:
  expense vouchers, publication policy, release procedures, purchasing
- Who can help:
  your manager, your division secretary, patent attorney, occupancy planner, advisory groups (AGAR), affirmative action
- Support services:
  computing, machine shops, library, graphic arts, stockroom, travel
- Personnel services:
  clubs (Murray Hill Canoe club), educational opportunities, employee benefits, medical
- Professional matters:
  research calendar, conference attendance, merit and salary review, riding the waves, teaching, writing a book

Merit and Salary Review: Performance Review

- Conducted annually
- Your input: written report of your accomplishments of the year ("I am great" report)
- Laboratory-wide meeting to rate all the members of a laboratory
- Feedback meeting: leave it with clear understanding of your standing with management
- Salary review

Riding the Waves

- Merit review is the key feature of (Bellcore) research environment: Research results are expected more frequently in Applied Research than at a university (no need to write grants, all necessary equipment provided, no teaching, no committees responsibilities)
- Relevance and creativity:
  recognized by peers, your management, other managers, customers.
  Choose projects that are relevant to company needs and choose project that you like.
- Impact:
  It is *sine qua non* of applied research. Ask yourself a question "so what" regarding your research results. Choose projects that are visible.
- Start with your local environment: peers and managers
  Do not stop there!
  Make yourself visible: be active in the professional societies, panels, conference committees

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You and Your Research

- **"You And Your Research,"** talk by Richard W. Hamming, given at Bellcore (March 7, 1986)
- R. W. Hamming spent 30 years at Bell Laboratories and is known by his work in mathematics, information theory, coding, and computer science.
- The talks centered on Hamming's observations and research on the question:
- "Why do so few scientists make significant contributions and so many are forgotten in the long run?"
- About what he has learned in terms of the properties of the individual scientist, their abilities, traits, working habits, attitudes, and philosophy

You and Your Research

- "If you chose to assert your ego in any number of ways, `I am going to do it my way,' you pay a small steady price throughout the whole of your professional career. And this, over a whole lifetime, adds up to an enormous amount of needless trouble."
- "In summary, ... some of the reasons why so many people who have greatness within their grasp don't succeed are:
  - they do not work on important problems,
  - they don't become emotionally involved,
  - they don't try and change what is difficult to some other situation which is easily done but is still important, and they keep giving themselves alibis what they don't."

You and Your Research

- "Luck favors a prepared mind. Luck changes the odds, but there is some definite control on the part of the individual."
- One prescription: work hard!

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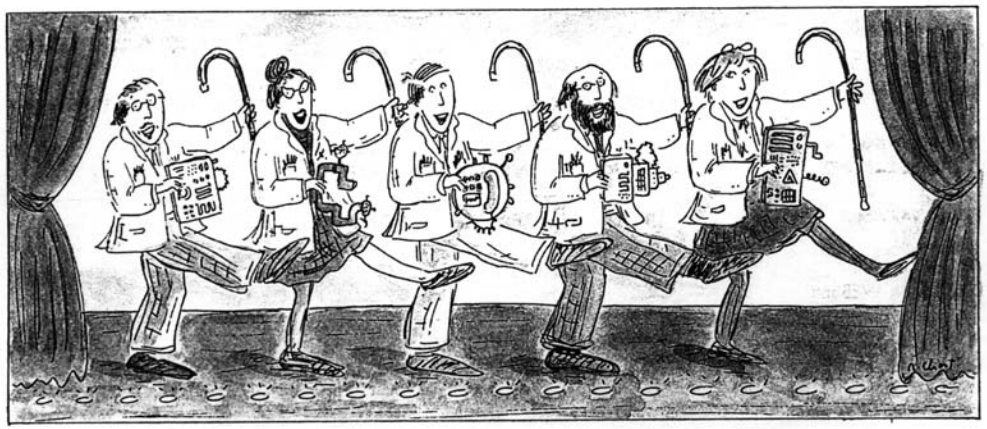
Companies Create Star Performers

- "How Bell Labs Creates Star Performers," by R. Kelly and J. Caplan, *Harvard Business Review*, July-August, 1993.

Any training program for improving the productivity of professionals must first target taking initiative.

How Bell Labs Creates Star Performers

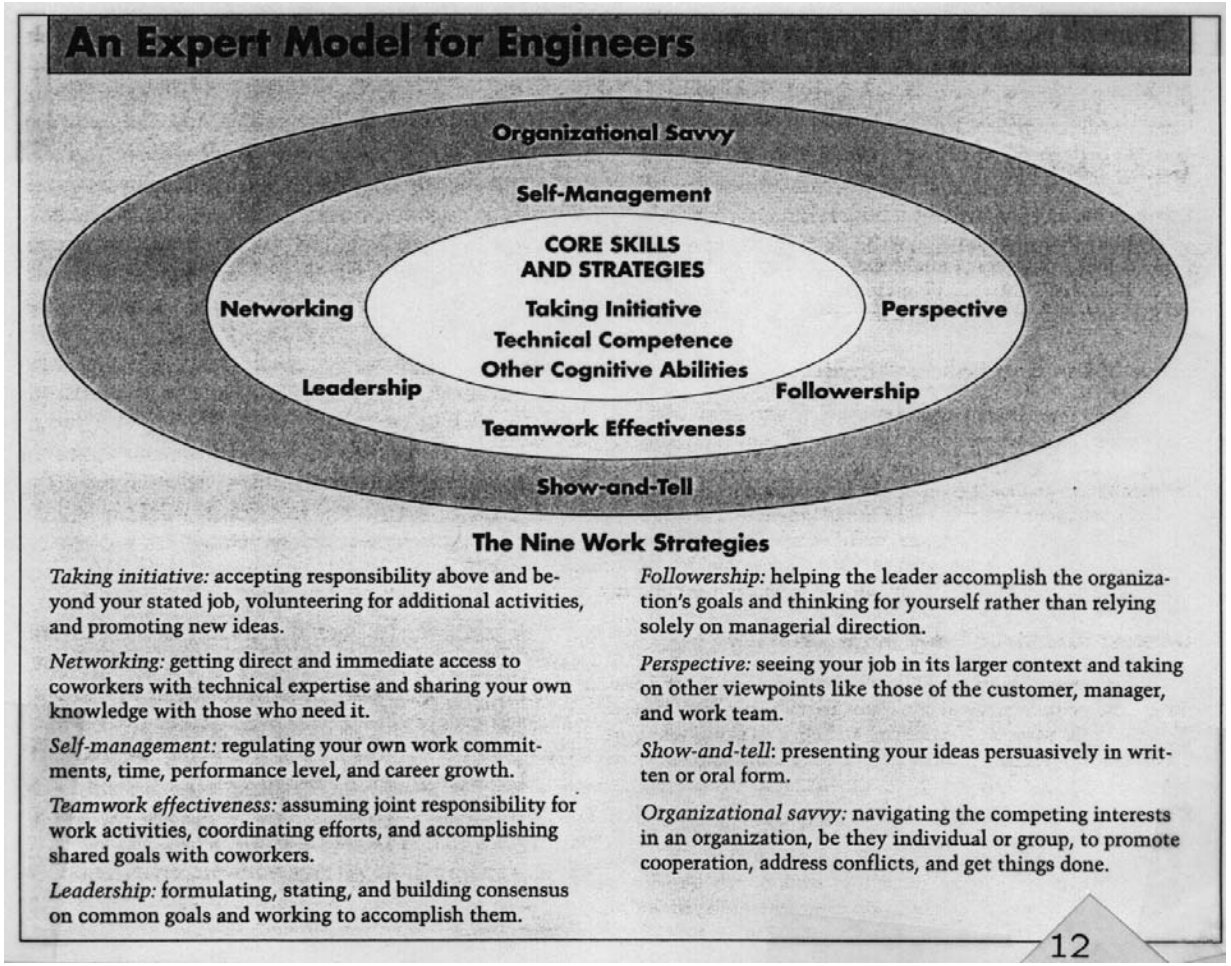


by Robert Kelley and Janet Caplan

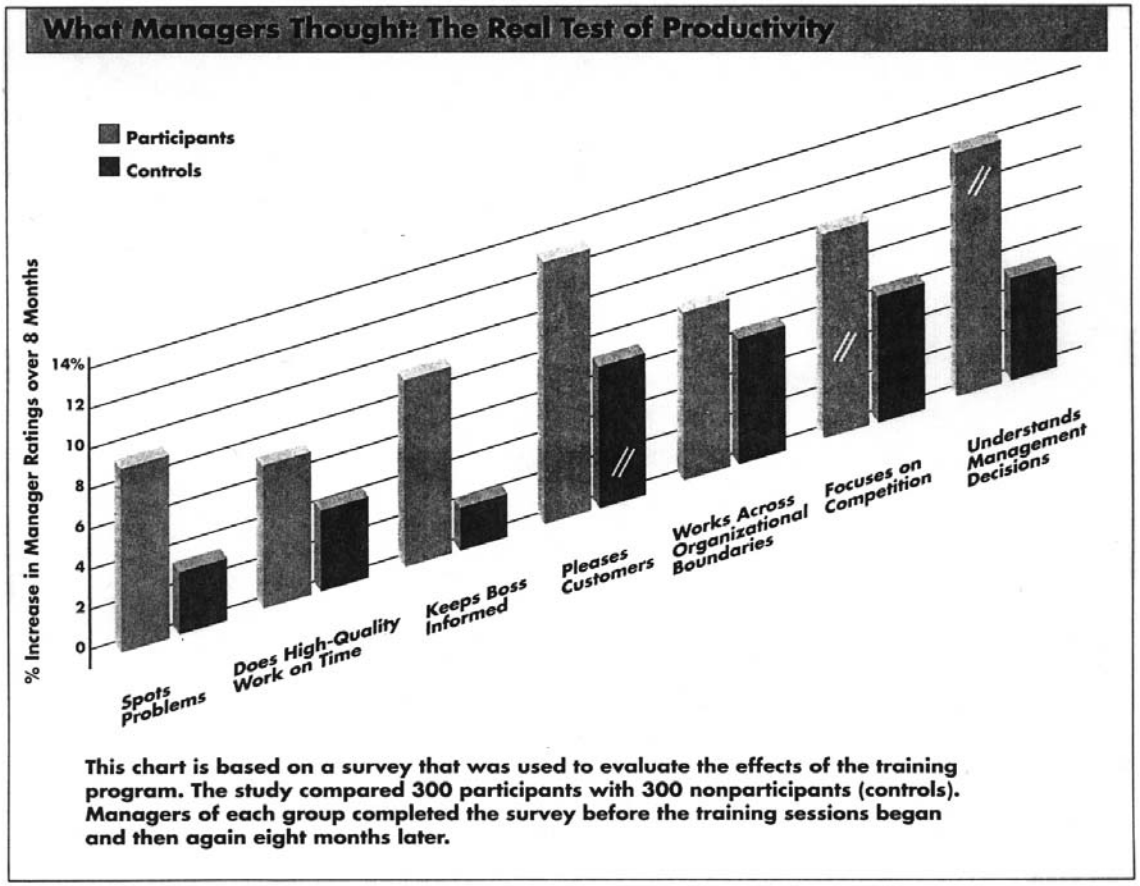
Companies Create Star Performers

- Managers can't observe the work that goes on inside a knowledge professional's head
- High IQs don't explain the difference between stars and middle performers
- For the Bell Labs experts, taking initiative means going above and beyond the call of duty
- Men and women may indeed communicate with their bosses differently

Companies Create Star Performers



The Effect of Training



HARVARD BUSINESS REVIEW July-August 1993

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Communications Skills

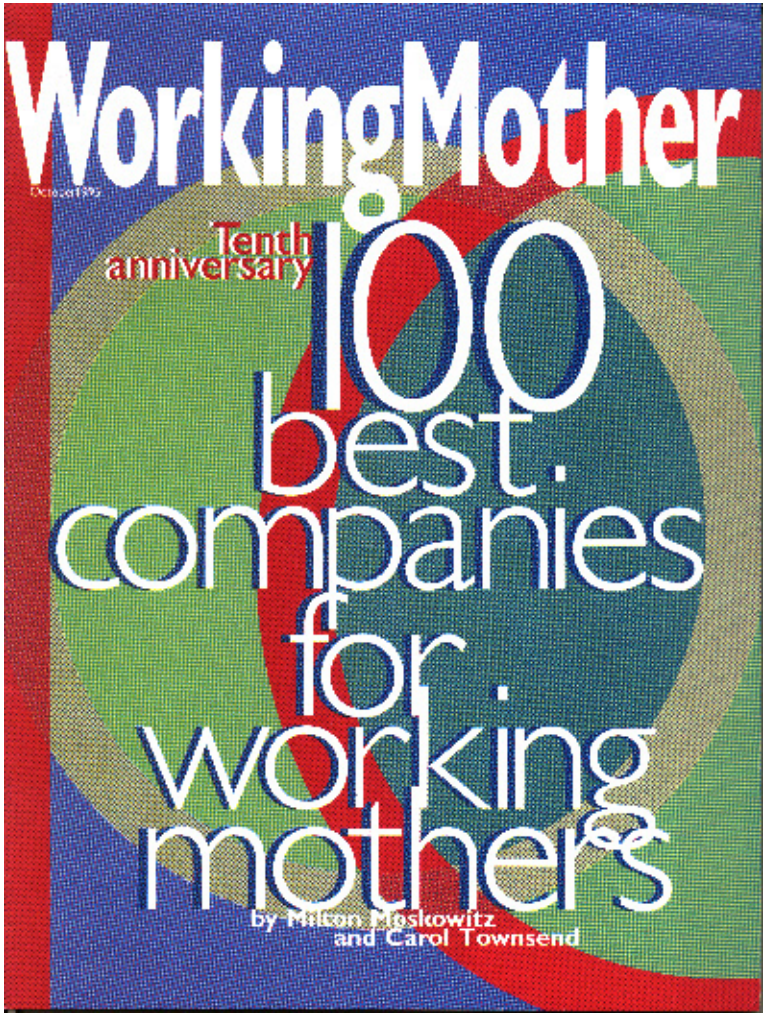
Presenting your way to the top:

- "No skill opens more doors, creates more visibility, or gives you more opportunity to exercise power. Right or wrong, fair or unfair, the person who is capable of articulating an idea is usually credited with having had it."
- J. Calano and J. Salzman, *Career Tracking: 26 Success Shortcuts to the Top*. New York: Simon and Schuster, 1988.

Mentors Make a Difference!

- How to find a mentor:
  - assigned by company
  - choose a role-model
  - your advisor, your boss
  - have several mentors
  - change mentors as you are "growing up"
  - electronic mentoring
  - a network of people you can rely on

Find Your Support Groups



Guts, Gumption, Smarts, and Luck:

- Are they enough to get you to the top?

Communications Skills

- 204 British CEOs rated the five factors they felt were most influential in their rise to the top:
  US News and World report, Sept. 25, 1989.
  - the ability to work with variety of people
  - early overall responsibility for important tasks
  - a need to achieve results
  - leadership experience early in career
  - wide experience in many functions prior to age 35

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Companies Change

- **Just When You Thought You Have Learned It All, The Company Redefines Its Research Goals:**

PUMPING UP THE BABY BELLS' R&D ARM

Fresh from TI, George Heilmeier is whipping Bellcore into shape

No one knows better than George H. Heilmeier that an earthquake is shaking Bellcore, the R&D arm of the seven phone holding companies known as the Baby Bells. ... Bell core's board ...

... can Telephone & Telegraph Co. The Bell companies didn't want an R&D branch that dictated products and technology to them, as Bell Labs had done. So Bellcore was initially weighted down with 144 ... committees, panels, and ... search for research's sake, says Steven Starliper, a project manager for Pacific Bell. Or, oodles of features might be added to a product to satisfy all seven Bell owners. Projects became mired in debate, and costs and timetables took a backseat. For instance, maintenance software called OSS, for operations support system, was supposed to take ... years to develop. When ... summer, it will ... will ...

BELL LABS REORGANIZES RESEARCH FOR MORE COMPETITIVE ENVIRONMENT

Seven years ago, just after the US telephone company was broken up in ... surprisingly uncontroversial court-... agreement ... so that these would not inadvertently get lost as what was once the national phone company went through the ... of transforming itself ... Bernstein's title.

One of the leitmotifs of Bernstein's book, admittedly an ... trait of the ...

Bell Labs: Shakeout Follows Breakup

A long-dreaded reorganization at the lab last fall has left some investigators happier—but many basic researchers feel the luster is gone from AT&T's "crown jewel"

PAPERWEIGHT given to IBM research managers lays out objectives.

SCIENCE AND BUSINESS

Rethinking Research

Bell Labs seeks a new model for industrial research

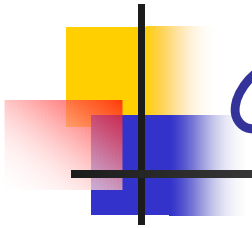
"The man who embraces a new paradigm at an early stage must...have faith that the new paradigm will succeed....

"Something must make at least a few scientists feel that the new proposal is on the right track, and sometimes it is only personal and inarticulate aesthetic considerations that can do that."

—THOMAS S. KUHN, *The Structure of Scientific Revolutions*

Captain, my captain. *Lab director Arno Penzias: After divestiture, Bell Labs could have become a "sinking ship," but "we've fixed the hull."*

ARNO A. PENZIAS, vice president of research at Bell Labs, must both preserve the quality of research and make research pay its way. Photo: Louis Psihoyos/Matrix.



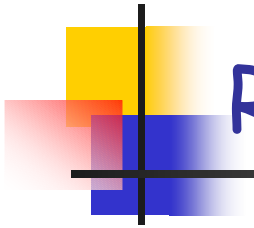
Companies Change Their Mission

Bellcore catechism (G. Heilmeier, Bellcore CEO):

- What are you trying to do?
- How is it done now and what are the limitations of the current practice?
- What's new about your approach and why do you think it will work?
- If you're successful, what difference does it make?
- How do our customers get paid?
- What are the risks?
- How much it will cost?
- How long will it take?
- What are the mid-term and final exams?

Companies Get Sold and Broken-up

- Sale of Bellcore:
  (04-06-95)
  WASHINGTON (AP) Showing just how divergent they've become, the nation's seven regional Bell companies are planning to sell their long-coveted research facility Bellcore.
- Break-up of AT&T:
  (U.S. Edition)
  Monday, January 8, 1996 - 11:45 a.m. EST
  More than 200,000 jobs [were] eliminated since 1984 by AT&T and the Baby Bells. Yet, surprisingly, the number of jobs in telecommunications has stayed rock-steady, between 1.3 million and 1.4 million, just over 1% of the U.S. workforce, according to federal statistics. That steady employment picture conceals growth in some jobs, a decline in others. The 40,000 workers emerging from AT&T have several things going for them, according to former employees, analysts and recruiters.



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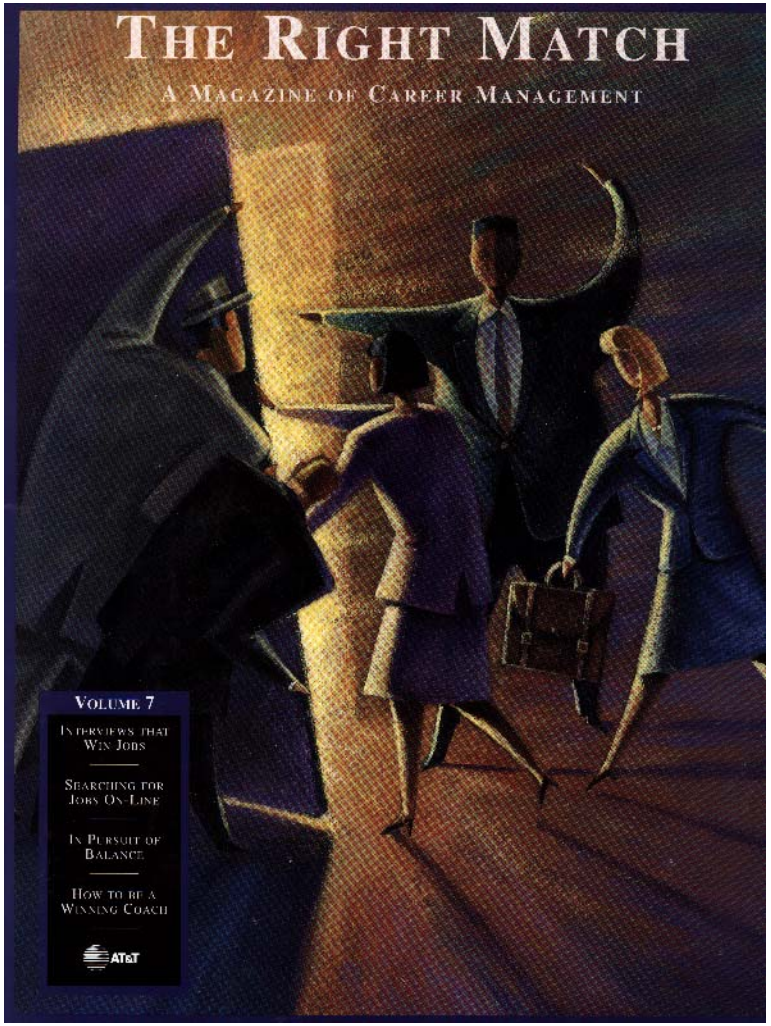
Reading Material

- Company magazines
- Company handouts
- Company library
- Start at home



Reading Material: Special interest groups

- *How Schools Shortchange Girls.* Washington, DC: The AAUW Report, 1992.
- M. L. Matyas and L. S. Dix (Eds.), *Science and Engineering Programs: On target for Women?* Washington, DC: National Academy Press, 1992.
- D. Tannen, *You Just Don't Understand: Women and Men in Conversation.* New York: William Morrow, 1990.
- E. Spertus, *Why are There so Few Female Computer Scientists?*. Report No. 1315, Cambridge, MA: MIT Artificial Intelligence Laboratory, 1991.
- "Women in Science" Special Section, *Science*, vol. 255, March 13, 1992, pp. 1365-1388.
- "Women in Computing," *Communications of the ACM*, January 1995, vol. 38, No. 1.

Professional Organizations

- Conferences
- Mailing list
- Societies:
  - IEEE
  - Association of Computing Machinery
  - Scientific Societies (Sigma Xi)
  - Society of Women Engineers

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Internet Resources

- Computer Professionals for Social Responsibility: http://cpsr.org/issues/womenintech/
- The Ada Project (TAP): http://women.cs.cmu.edu/ada/
- The History of Women in Computer Science: http://www.telecompricer.com/article/The-History-of-Women-in-Computer-Science.html
- Women in Computer Science: http://www.meetingtomorrow.com/cms-category/women-in-computer-science