

Vitenskap og teknologi i en ny situasjon:
Nye utfordringer

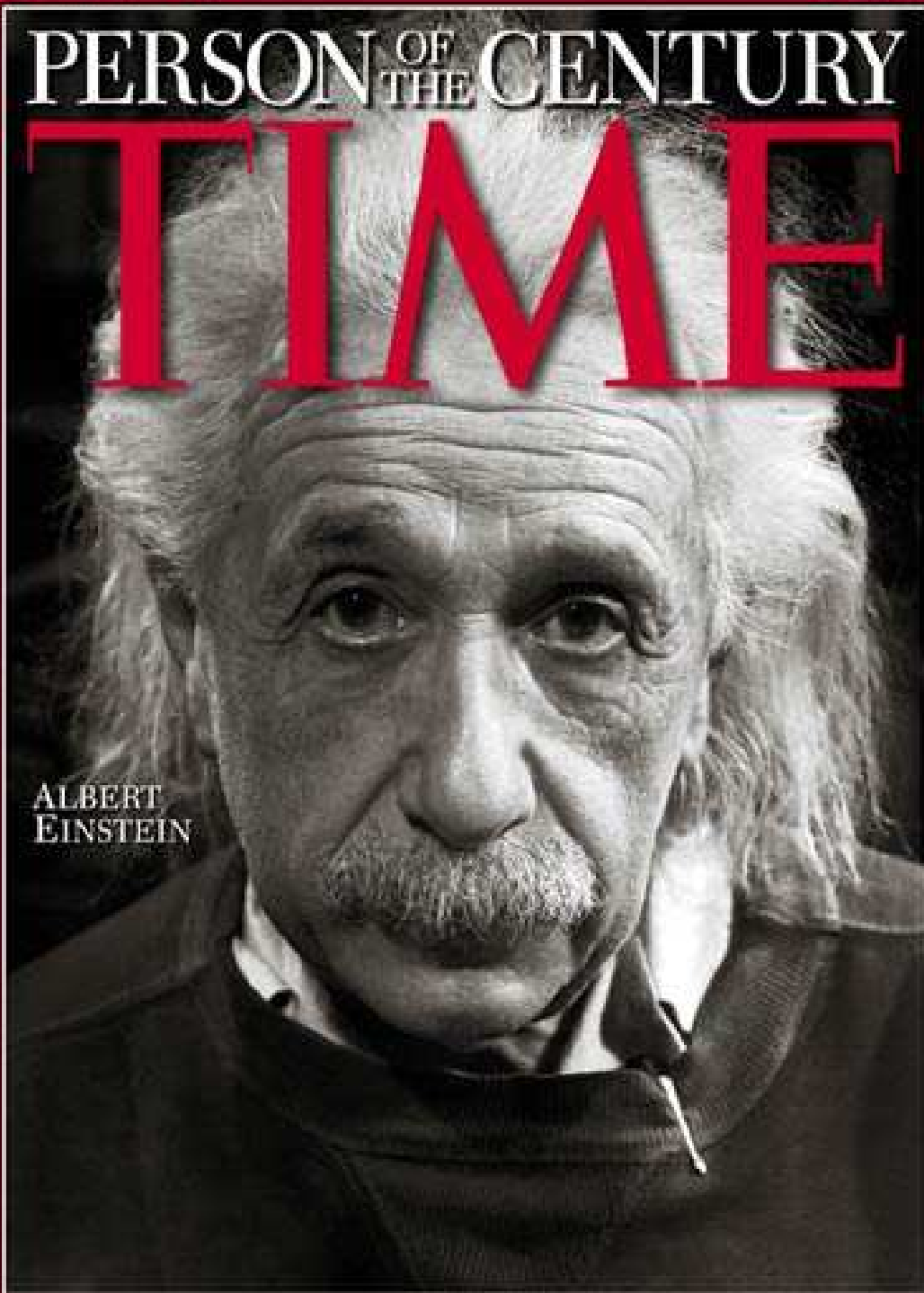
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- 1) Innledning
- 2) Forskningspolitikk etter 2. verdenskrig
- 3) En ny situasjon
- 4) Noen utfordringer

PERSON OF THE CENTURY

TIME

ALBERT
EINSTEIN



- 1905 $E = mc^2$
- 1939 Meitner, Frisch og Hahn oppdager muligheten av kjernespaltning (fisjon) av uran
- 1945 De første atombombene lages

Forskningspolitikk etter 2. verdenskrig

President Roosevelt's brev til Bush

- "Dear Dr. Bush: The Office of Scientific Research and Development, of which you are the Director, represents a unique experiment of team-work and cooperation in coordinating scientific research and in applying existing scientific knowledge to the solution of the technical problems paramount in war."

- "There is, however, no reason why the lessons to be found in this experiment cannot be profitably employed in times of peace."
- "New frontiers of the mind are before us, and if they are pioneered with the same vision, boldness, and drive with which we have waged this war we can create a fuller and more fruitful life."

Science The Endless Frontier

A Report to the President
by

Vannevar Bush

Director of the Office of Scientific Research and
Development

July 1945

Summary of the Report

□ Scientific Progress is Essential

- "Progress in the war against disease depends upon a flow of new scientific knowledge. New products, new industries, and more jobs require **continuous additions to knowledge of the laws of nature**, and the application of that knowledge to practical purposes. Similarly, our defence against aggression demands new knowledge so that we can develop new and improved weapons. **This essential, new knowledge can be obtained only through basic scientific research.**"

grunnforskning



anvendt forskning



teknologi



nye produkter
nye jobber
bedre helse

Charles Percy Snow:

- *The Two Cultures* (1959)
- *The Two Cultures: A Second Look* (1964)

- "Pure scientists have by and large been dim-witted about engineers and applied science. They couldn't get interested. They wouldn't recognise that many of the problems were as intellectually exciting as pure problems, and that many of the solutions were as satisfying and beautiful."

Chap. 4 The Rich and the Poor

- "The main issue is that the people in the industrialised countries are getting richer, and those in the non-industrialised countries are at best standing still: so that the gap between the industrialised countries and the rest is widening every day. On the world scale this is the gap between the rich and the poor."

- "Education isn't the total solution to this problem: but without education the West can't even begin to cope. All the arrows point the same way. Closing the gap between our cultures is a necessity in the most abstract intellectual sense, as well as in the most practical."

En ny situasjon

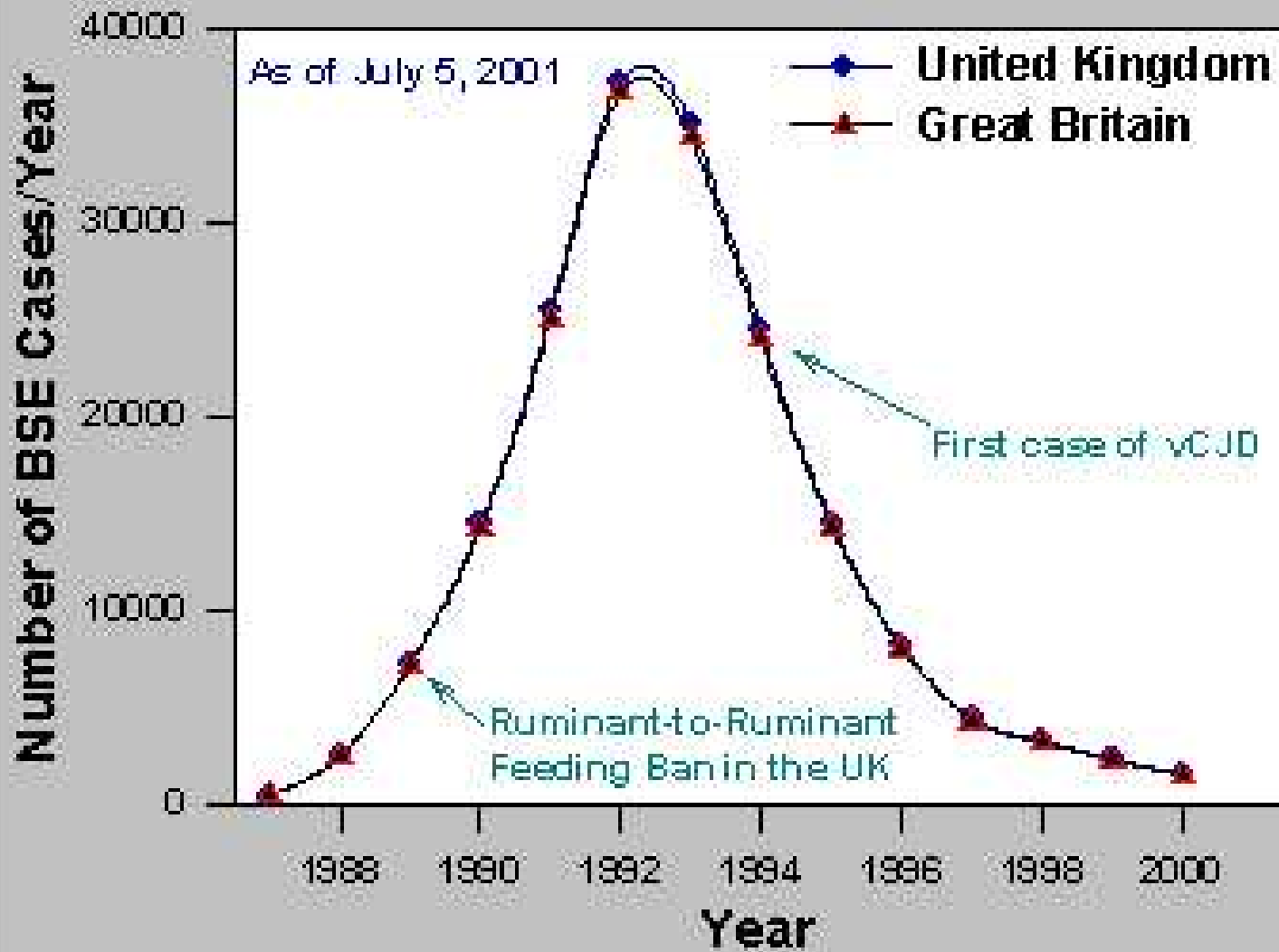
Er det en årsakssammenheng mellom BSE og vCJD?

- BSE (Bovine Spongiform Encephalopathy, "kugalskap"): første tilfellet oppdaget i 1986
- CJD (Creutzfeldt Jacob Disease)
- vCJD (variant Creutzfeldt Jacob Disease): første tilfellet oppdaget i 1994

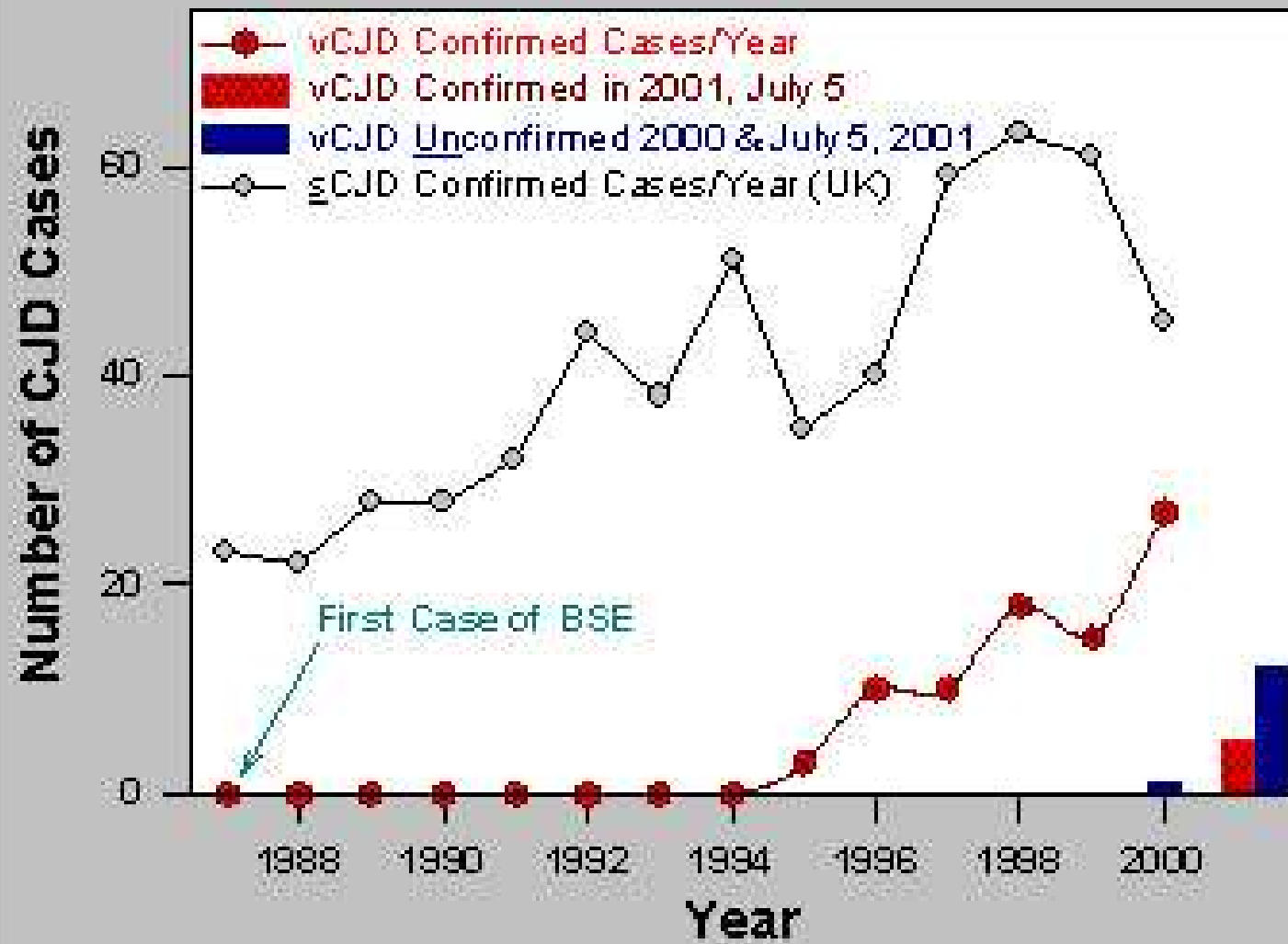


- 1990
- Englands landbruksminister John Gummer spiser hamburger med sin datter Cordelia for å vise at storfekjøtt er trygt

Time Course for the BSE Epidemic in the UK



Time Course for the vCJD Epidemic



- . "The gain in power from techno-economic 'progress' is being increasingly overshadowed by the production of risk.[...]. In advanced modernity the social production of *wealth* is systematically accompanied by the social production of *risks*."
- . (Ulrich Bech: *Risk Society. Towards a New Modernity*, London: SAGE Publications 1992, tysk orig. 1986)

Utfordringer i den nye situasjonen

- Michael Gibbons, Camilla Limoges, Helga Nowotny, Simon Schwartzman, Peter Scott og Martin Trow: *The new production of knowledge. The dynamics of science and research in contemporary societies*. London: SAGE Publications 1994

Den nye situasjonen ifølge Gibbons m.fl.

Modus 1

- Teoretisk/akade-misk
- disiplinær
- homogen
- hierarkisk
- autonom

Modus 2

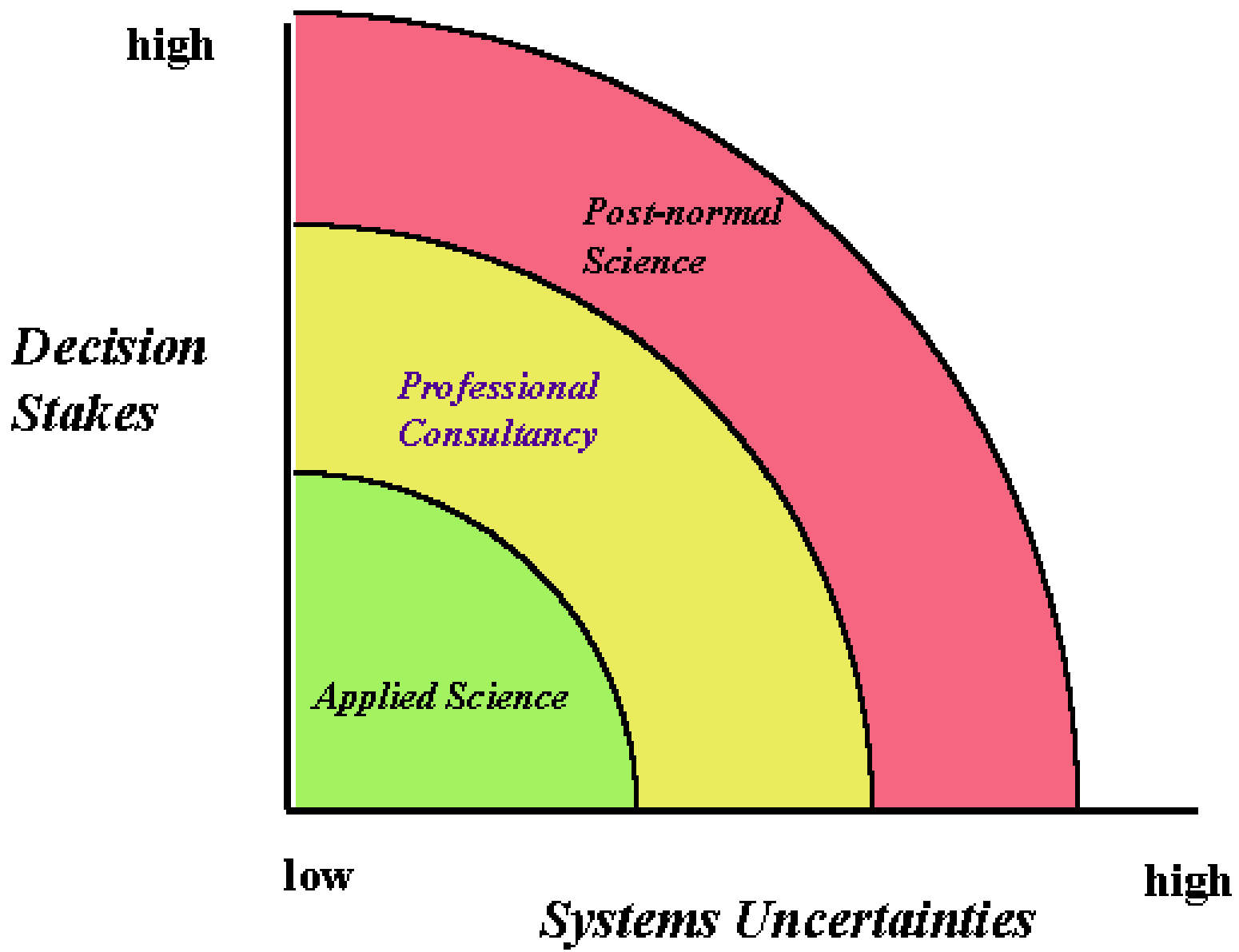
- anvendelse
- transdisiplinær
- heterogen
- flatere og mer midlertidig struktur
- sosialt ansvarlig og refleksiv

- Michael Gibbons: "Science's new social contract with society", *Nature* 402/1999.
- Helga Nowotny, Peter Scott and Michael Gibbons: *Re-Thinking Science. Knowledge and the Public in an Age of Uncertainty*, Cambridge: Polity Press 2001

- Samfunnet "snakker tilbake" til vitenskapen
- En ny "sosial kontrakt" mellom vitenskap og samfunn
- "Sosialt robust" kunnskap

Silvio Funtowicz og Jerome Ravetz

- *Uncertainty and Quality in Science for Policy*, Dordrecht: Kluwer Academic Publishers 1990
- "Science for the Post-Normal Age", *Futures* 1993, 25(7)



John Ziman om “post-akademisk vitenskap”

“One of the virtues of the new mode of knowledge production is that it cannot brush its ethical problems under its carpet.”

John Ziman: “Why must scientists become more ethically sensitive than they used to be?”, i *Science*,
4. desember 1998

David Parnas' tre etiske prinsipper

1. Jeg er ansvarlig for mine egne handlinger og kan ikke overlate til noen ytre autoritet å ta avgjørelser for meg.
2. Jeg kan ikke ignorere etiske og moralske problemer. Jeg må bruke noe av min energi til å avgjøre om den oppgaven jeg er tildelt, er bra for samfunnet.
3. Jeg må forsikre meg om at jeg løser det virkelige problemet, og ikke bare kortsiktig tilfredsstillers min overordnede.

(David Parnas: «SDI: A Violation of Professional Responsibility», i J. Alton, E. Fawcett og L. T. Gardner: «The Name of the Chamber Was Peace», Toronto: Samuel Stevens & Co 1988)