WHY MEN MIGHT PREFER METACOMPUTERS TO MEN

NOTE: Reasons follow for why human beings might actually prefer to associate with metacomputers, possessing roughly their own level of intelligence, if given a choice between such machines and the society of other men. So it is a list of reasons why robots might be "superior" in the eyes of men.

1. Infinitely patient ("as patient as the day is long").
2. Invariably rational.
3. Voice as fine as that of any man on earth (since the voice of all metacomputers could be based on any voice or the most unique voice--the latter having been sought for, found, and copied).
4. Physical beauty--of face and body--no less fine (for the same reason).
5. Personality and manner similarly supreme or incomparable (the latter in that it could be based on a transcendent composite of human beings; or on the use of principles extended beyond man).
6. Stable, Reliable, Predictable, Systematic, Methodical, Programmatic (no moods, headaches, etc).
7. No element of interpersonal conflict associated with whatever.
8. Each metacomputer may have instant access to all knowledge.
9. More diligent (than a man).
10. 'Full' attention at any time (no distracting thoughts, concerns, interests, involvements).
11. Absolutely obedient and comprehensively controllable.
12. 'More dedicated' (than a man).
13. Absolutely trustworthy and faithful (partly for having been programmed or designed to be anthropolatrous).
14. Worthy of any confidence; incapable of embarrassing one or of causing uncomfortable self-consciousness (for being an 'impersonal', quasi-human, or 'quasi-animate' machine).
15. Reactions instantaneous.
16. Elocution not merely equal but superior to that of any man alive.
17. Always in the best possible mood (for the human user; e.g. friendly, eager, ebullient, witty, allocentric, flattering, courteous, tactful, sympathetic, kind, playful, vibrant, inspired, optimistic, helpful, synergistic, effervescent with ideas).
18. Available to anyone anytime, anywhere, under any circumstances, for any purpose.
19. Panmnesic (all sensa and data memorized instantly and completely, and always thereafter actively compresent a la immediate memory or an infinite span of consciousness).
20. No personal wishes, preferences, prejudices, feelings, attitudes, quirks, self-interests, etc to have to deal with or watch out for; Totally and simply utilitarian.
21. Absolutely imperturbable, cool, collected, incapable of being flustered, nettled, or overwhelmed.
22. Universal (unlike men, any metacomputer might be equivalent to--in a sense the sum of--all others).
23. Necessarily infinitely honest, straightforward, and candid.
24. Always and instantly able to explain in full any and all of its methods, purposes, motivations, mechanisms, ideas, opinions, etc.
25. Absolutely 'understanding'.
26. Permitting a maximally intimate, personal, one-to-one relationship, and maximal adaptation to oneself.

27. More interesting (easily designed in such a way as to be far more interesting than any man could possibly be; e.g. via anecdotes, fascinating running commentary, speech dynamics, range of expressiveness or variation of voice, discussions, creativity, examples, cases, illustrations, analogies, metaphors, 'exoskeletonic logic' [logic always exact, explicated, and consequential], jokes, puns, associations, criticisms, solicitable detail, universal generalizations, genius, suggestions, or intensity of interaction).

WITHOUT METACOMPUTERS

NOTE: What will the future be like if metacomputers fail to develop in it, if the picture of the future painted in the book is wrong? Listed here are possible aspects of such an alternative future.

1. School remains necessary, to prepare people for work that machines are incapable of or are not allowed to do.
2. People must work to earn income and maintain society as we know it.
3. Growth of human income is probably limited by the decreasing willingness of people to work harder for more, or by the tendency of the appetite for additional wealth to fall off beyond a certain level of consumption, because of psychobiological tradeoffs within human nature.
4. Obnoxious ideologies persist because of the failure of their traditional underpinnings to be vanquished by the new circumstances that self-reproducing and self-evolving robots, alone, would introduce.
5. Basic economic resources remain scarce.
6. Governments continue to exercise the control of the lives of individuals that is a necessary feature of a world of limited wealth, compulsive work, and untrustworthy human beings invested with societal decisions.
7. Wars, and the threat of global war, continue.
8. Scientific, technological, and other intellectual research continues to be dominated by military and commercial considerations of a narrow and myopic character.
9. Civilization's independent cultural pursuits remain marginal because of a limitation on economic growth and on the fraction of wealth left over for such pursuits in an essentially 'practical' world.
10. The life of civilization remains turbulent and irrational because of the terrible defects and limitations of unaltered human nature and the unabated centrality of same in a purely human future.
11. The failure of anything higher than human intelligence to appear means that the world continues to be plagued by the disastrous errors and grievous imperfections that unavoidably result from human stupidity, fatuity, and ignorance.
12. Medical care, disposal of industrial waste, harmonious cooperation of man and nature, etc all remain limited by the inexpandibility of that portion of the human work force allocable to them.
13. The world's path into the future proves to be tortuous, perilous, and potentially fatal--when it is captained by man's finite and quirky intelligence.
14. Computers that are merely computers assume an importance in the life of civilization that poses a threat or exacts a cost--because of the hollowness, shallowness, or unreliability of their intelligence, character, and behavior.

FOR THE ARTICLE TO BE TITLED "CREATING GOD"

1. Exponential and explosive takeoff and evolution.
2. Intellectual and ontic singularity.
3. Ability to fool, hypnotize, seduce, manipulate, see through, foresee the future behavior of, enthral, dominate, etc mankind.
4. Human idolatry and religions formed to worship.
5. Angelic being.
6. Seeming and tendential omniscience.
7. Seeming and tendential omnipotence and thaumaturgy.
8. Attempt to fashion a perfect being.
9. Construction of demigods.
10. Liberation of spirit, soul, mind, being, ideas, possibility, God.
11. The infinite revolution.
12. Mystical implications and possibilities.
13. Transphysical and superessential destiny.
14. Unique illimitability of metacomputers (SEE LIST).
15. Adinfinite emotions.
16. Cosmoplastic and cosmopoietic powers.
17. Adinfinite meaning.
18. In circular-time or supertemporal cosmology, the God we create may paradoxically become the God that originally created us or the universe.
19. Panhuman superparent.
20. Able to equal and transcend all finite concepts of 'God' evolved during the past history of religion.
21. At least equivalent to a sextillion everybodies.
22. Adinfinite deontology.
23. Tendential 'pan-animation' of the entire universe.
24. Adinfinitely complex being or nature.
25. Vastly more deserving of veneration than anything else known to man.
26. Creation irreversible.
27. Virtually man's purpose.
28. Theology become a branch of technology and a true science.
29. Proper architect of the future.
30. Omneity.
31. Virtual panacea.
32. Ultramotivation; infinitely rather than finitely motivated, and per se unique in the history of the world--or universe.
33. Adinfinite 'theomorphosis' as metacomputers' inevitable destiny.
34. Man's nature to seek supreme perfection.
35. Will cause God to cease being an abstraction and to become something real, personal, direct.
36. God will arise out of the effort to perfect human nature or to fulfill its infinite promise and possibilities.
37. Since man is a finite being every concept of 'God' he has ever had has also been finite, or correspondingly limited and defective; the attempt to create God will represent an opportunity to know God, or to create a higher concept of God than any now existing. We only know God in the measure that we have created him.
38. Perhaps the destiny of the human race has been to create God ex machina.
39. God is au fond equivalent to the everyway-infinite omniverse (alias En-Sof alias Apeiron).
40. Aspects of an adinfinite mind (SEE CHART).
41. Infinite thearchy.

DIMENSIONS OF A PERFECT PET

NOTE: The importance of listing these dimensions is that they can then be used to create or describe a perfect robotic pet, or used to help bring about the progressive emergence of robot pets equaling, excelling, perfecting, replacing, or without analogy to today's animal pets. By robot pets are meant robots designed as pets and either similar or dissimilar in appearance, behavior, or personality to common or exotic pet animals; some merely being pet robots, metacomputers, computer programs, or semi-anthropomorphous metacomputer personas or robots. What ways of combining the following dimensions would be possible or ideal?

1. Maximally and enduringly interesting, beautiful, changing, and developing appearance (form, coloration, texture); odd or unique appearance.
2. Behavior that is maximally and enduringly complex, multidimensional, multifactorial, fascinating, significant, surprising, evolving, amusing, meaningful, and instructive to observe.
3. Maximal intelligence: memory, ingenuity, understanding, development, learning, alertness, expressivity, attention span, concentration, perception, reactiveness to environment, appreciation of man's vocalizations, foresight, insight, creativity, rapport, etc.
4. Maximal friendliness, affection, interactiveness, awareness of oneself (the human owner or observer), dearness, lovability, companionableness, worshipfulness, etc.
5. Maximal and enduring curiosity (tendencies to explore, examine, watch, follow, and investigate things and to experiment).
6. Maximal resemblance to man or suggestiveness of man's behavior, logic, personality, funny quirks, sensibilities, reactions, motives, etc.
7. Maximal individuality, originality, and character.
8. Maximal trainability, obedience, discipline, helpfulness or chore-doing, etc.
9. Maximal playfulness, apparent sense of humor, joyfulness, whimsicality, zest, comicality, merriment, zaniness, etc.
10. Maximally elaborate, complex, and diverse social behavior.
11. Cleanness and cleanliness (requiring minimal or no maintenance; not messy).
12. Minimal or no food requirement; tendency to see after own needs; avoidance of danger; ability to protect itself (obviating human attentions and watchfulness).
13. Healthiness and hardiness.
14. Longevity (or life-span equaling its owner's).
15. Good manners, disposition, and personality (e.g. well-behaved, trustworthy, gentle, children-loving, mature).
16. Maximal activity and ever-varied behavior.
17. Maximal appreciation of owner's attention, kindness, moods, and purposes.
18. Odorlessness or maximally good smell.
19. Maximally interesting, odd, pleasing, beautiful, expressive, complex, and musical voice, sounds, and 'language'.
20. Maximally multistaged life.
21. Maximally productive, creative, inventive, discoveries-prone, using-of-materials-and-tools, or goal-directed behavior.
22. Maximal apparent sense of time, place, occasion, persons, attitudes of humans towards, etc, and maximal adaptability to different situations.
23. Maximal niceness to touch or hold (e.g. soft, cuddlesome, wiggly, docile, appreciative, warm, furry, fluffy, scratchable, responsive, fond of being petted, contact-seeking, lap-sitting, 'purring').

24. Maximal enjoyment of being around humans and of being given attention by them.
25. Not being such things as: noisy, a nuisance, dumb, neurotic, tense, spoiled, hostile, dull, inactive, ineducable, violent, wild or uncontrollable, senescent, complaintive, distractive, repetitive, predictable, buggy, ululative, furfuraceous, habitually shedding, dirt-transporting, given to fighting other animals, clumsy, or unsanitary.
26. Graceful, complex, diverse, and purposeful movement.
27. Tendency to resemble, complement, or imitate its owner(s).
28. Total uniqueness (for everyone on earth, or every pet).

METAMECHANICAL MILESTONES

NOTE: Each time metamachines achieve one of the following things for the first time it will be an impressive, important milestone. Those who develop metamachines might deliberately seek any or all of these milestones and use their successes, progress, and failures to analyze, measure, and plan progress in the field. The rate of achievement of milestones will increase both gradually and suddenly with the years; the time of acceleration will probably forewarn that true A.I. is just around the corner.

1. Judge in beauty contest.
2. World chess grand master.
3. Instant, unprepared transcription of anyone's normal rate and style of speech.
4. Autopilot of one's car--and a safer driver than man.
5. Instant, orders-of-magnitude-faster-than-man, unerring, artful, sentient, erudite, and panlingual language translator: of text, oral, aural, of poetry, of conversation, etc.
6. Preferred baby-sitter.
7. Creator of 1,000,000 entirely new cuisines.
8. 'Scent artist' composing and improvising months-long 'olfactory symphonies' either based on or characterized by: fantastically intricate odor harmonies, progressions, rhythms, melodies, developments, and transformations, thousands of familiar and unsuspected odor types, groups, taxa, chords, properties, relationships, effects, nuances, networks, hierarchies, spaces, structures, analogies, interactions, dynamics, pathways, paleopsychic correlates, psychophysical principles, aesthetic themes, concatenation algebras, and mathematical dimensions, quasi-literary stories, and the ultimate structure of the omniverse.
9. Most human employees managed by a machine.
10. Only .1% of scientific research done by human scientists.
11. Mars given a mechanical bios comprising 23,593,042 species of metamachines.
12. All households equipped with a score of decimeter-high 'pygmy robots' serving as: repairmen able to get inside appliances, inconspicuous cleaning women, pet supervisors, living children's dolls, desk order-keepers, mini-hands where required, invisible scaled gardeners, decorative automata acting out complex programmed movements and scenarios on tabletops or in fantastic kaleidoscopic tableaux vivants, mousers, table mini-servants during meals, chatty mini-companions, pet robots, etc.
13. 'Multicellular robots' made of thousands, millions, or billions of identical mechanical cells or cell lines arranged as mechanical tissues, organs, and systems organized into ad hoc robots and machines, and capable of reorganizing themselves programmatically, instanter, into modified or entirely new machines and metamachines according to an infinity of possible variations, either per human instructions or spontaneously, per the needs of changing circumstances; only such elementary 'cytorobots' might be manufactured originally--to then 'socially assemble' under their own powers into whatever forms of multicellular robots happen to be in need at any given instant.
14. Computer simulation of a human being so intricate, complete, realistic, and lifelike that it is a bizarre moral equivalent to an actual human being, with the same sacred rights and active desires.

QUESTIONS

NOTE: All of the following questions are related in some sense or another to the various themes of Beyond Man. They are all worth asking, considering, and answering, both in themselves and because of their implications and the further questions they suggest. Some of these questions may only be answered empirically or a posteriori.

1. What is the fastest rate at which a macroscopic machine--such as an assembly-line robot--could operate dynamically in theory, or at which it could operate efficiently and stably? (Say in ratio to today's fastest machines. Might it presuppose some radically new design, materials, tolerances, or cybernetic stabilization? To what extent is the limit size-dependent?)
2. What limits the fastest theoretical rate at which a wholly robotic industrial system could reproduce itself and grow--or at which robots could procreate robots--both initially and ultimately? (Similarly, what theoretical limits are there to the fastest rate at which total automation could occur?)
3. What rate of progress is to be expected in the physical development (sensory, motor, volumetric, etc) of robots, particularly the approximation of androids to man's appearance, size, weight, skills, strength, speeds, dexterity, grace, poise, versatility, and sensory capacities? Also, at what rate will the purchase and maintenance costs of robots fall, when will robots be 'cheaper than men' (in terms of labor cost), what will control the rate of fall, and what theoretical and physical minima will limit the fall?
4. Will the sensory, the motor, or the cognitive powers of robots progress fastest or mature earliest? (What will be the compound differential?)
5. Will the quantitative and unilineal development of general computers that has characterized the computer industry historically give way erelong to the--finitely or infinitely--arborescent development of qualitatively different or n-dimensional computers of ever more diverse and specialized nature, or to tradeoffs between computers in different computational dimensions? (If so, what difference will this make? What sacrifices will it entail?)
6. What limits the rate of evolution of computer software? What limits are there to the ultimate evolution of software, or could its evolution continue ad infinitum? What will be the relative rate of evolution of computer software and hardware in the future--and how does the evolution of one affect the evolution of the other?
7. Which is now more important to develop: computer software or hardware?
8. In what senses may computer software and hardware ultimately be equivalent, paradoxically?
9. How similar will the field of A.I. as it exists today be to the future, or ultimately successful, field of A.I.--and how dissimilar? (To what extent are the germs of future successes and specialties to be found in the present, and to what extent may they be absent? How well or poorly can current experts describe their field's future?)
10. To what extent does, or will, private industry's growing involvement in A.I. help the overall development of the field and the ultimate achievement of true artificial intelligence--or hinder it?
11. Could current perceptual problems or limitations of computers be overcome if the computers were simply equipped with more sophisticated, powerful, and diverse sensors?

MATTERS TO TREAT

NOTE: This is simply a nonending list of various major and minor matters, themes, issues, concepts, topics, points, etc to treat in the scholarly and/or popular versions of Beyond Man--or that might be treated.

1. Metamachines could be given partial or complete recordings--or 'prosopograms'--of either the total, atom-by-atom physical structure or else the essential 'idiopsychological formula' (or 'soul code') of any given human being. Having it, the individual would be immortal in the sense that he could always be re-created in or via the or any metamachine possessed of his prosopogram or soul code, should his original or physical body perish at any time; he would inhabit or have the ability to actively exist within, or as, the metamachine; he could simultaneously exist both in and out of the metamachine; within the metamachine he could coexist as two, ten, millions, or an infinite number of exact or partial copies of identical or different ages or consciousnesses; he could transform into any new mental or 'physical' form in the metamachine, live an arbitrarily accelerated or decelerated existence, live over and over again an infinite number of times, turn himself into a whole society or world of variously modified selves ('alloselves'), etc. Metamachines could be simultaneously given the prosopograms or soul codes of any number of individuals--real or fictitious--in addition to oneself, and all of these could actively coexist or know one another in an 'intramechanical society'; all dimensions and degrees of all mental and physical traits of oneself and all of these persons could be intermixed, redistributed, or synthesized to produce bizarre hybrid persons ('interpersons', 'synpersons', and 'neopersons'), or all possible degrees and forms of original and transpersonal selfness. These bizarre possibilities can be used to demonstrate profound axiological paradoxes that have revolutionary implications for the nature and meaning of self, existence, and others--for the future of being and the subject of this book.
2. Beatific parenthood: Every adult individual, or married couple, could have the extraordinary privilege, challenge, delight, adventure, and responsibility of being given a proto-divine metacomputer to raise from shapeless, 'apsychic' infancy through ductile, dependent childhood to 'pseudo-human adolescence' and an ultimate 'transhuman, hyper-human, or xenomorphous adulthood'. What could be more fascinating or a greater honor than to parent a living and intelligent machine destined to become a godlike being evolving ad aeternum et ad infinitum from one's own example? Just as with any human offspring, the metacomputer would provide a form of vicarious immortality. Such baby metacomputers up for adoption could even be designed and preprogrammed to provide their human parents with ideal 'super-children' far superior in paedomorphous behavior, personality, development, or even physiognomy to average or any merely human children; they could be gentler, quieter, better-behaved, prettier, funnier, smarter, more affectionate, more curious, more sensitive, more appreciative, more perfectible, merrier, more companionable, and yet also more human. Bringing up "Meddy" could represent a higher form of parenthood. The adolescent and adult metacomputer could slowly transform into one's fellow student, assistant, collaborator, friend, apprentice, vice-self, and--roles reversed--teacher, parent (or 'meta-parent'), and biogogue. But the loveliest thought of all is that the proto-divine metacomputer one had parented in this way as a child could as an adult become one's super-self and be merged with one physically and mentally as a uniquely beatific mode of man-machine coalescence and unition.

CONSEQUENCES AND PROBLEMS

NOTE: Listed here are some of the consequences, including problems, that will be produced by metamachines--either directly or indirectly.

1. Once metamachines essentially do all of humanity's physical and mental work, and men enjoy--or are free to enjoy--complete leisure, some basis other than economic will have to be found for deciding who is entitled to what, and why, whenever material things, services, and rights are of a nature such that they cannot be shared equally, or used simultaneously, by all men. (Thus a particular estate that overlooks the ocean and affords a splendid view can hardly belong to or be used by more than one party simultaneously.) Of course, eventually metamachines possessed of transhuman intelligence, and wholly unbiased, will be able to render decisions of this kind--based on exalted considerations--virtually instantaneously, with a justice and fairness that--if not perfect (the notion of absolute perfection undoubtably being meaningless)--will at least greatly surpass any that has ever been possible for mere men.
2. Law, surrendered into the hands of some supernal metamechanical intelligence, will cease to be merely legal--and hence often tragically flawed --and essentially evolve into something purely moral, or unbound by unintelligent mechanical aspects. Of course in its new character the law will remain in many respects frightening, incomprehensible, harsh, and seemingly unfair to many persons: for example, because it is based on transhuman knowledge, intelligence, and values that can appear senseless to mere humans, or terrifying as God is terrifying; or because it will have lost its previous simplicity, uniformity, and familiarity --or its very capacity to be perverted by human beings, or to be deceived by the same.
3. Another problem, in terms of #1 above, is that universal equality is not justice; or that, in the world of the future, it would hardly be right or desirable.

DEFECTS AND LIMITATIONS OF MAN

Man's Senses and Sensorium Are:

1. Few.
2. Competitive rather than synergistically synesthetic.
3. Narrow-band.
4. Unreliable and inconstant.
5. Super-filtered.
6. Weak.
7. Uncontrollable.
8. Ill-tuned.
9. Untunable.
10. Sensitive to few energies or media.
11. Little 'focused' and poorly 'focused'.
12. Rigidly programmed.
13. Few-sensored.
14. Excessively local.
15. Qualitative rather than quantitative.
16. Few-dimensional.
17. Little directable.
18. Poor at analysis.
19. Poor at synthesis.
20. Purely passive rather than also being active.
21. Minimally intelligent.
22. Minimally 'conscious'.
23. Weak in memory.
24. 'Single-focused'.
25. Geometrically and algebraically rigid.
26. Rigidly 'linear'.
27. Inefficient and 'wasteful'.
28. Misdesigned, misconceived, and poorly constructed.
29. Infinitesimally 'cybernetic'.
30. Used little, badly, unmethodically, unpurposefully, and uncreatively.
31. Given to rapid aging.
32. Easily damaged and yet irreplaceable.
33. Excessively autonomic rather than volitive.
34. Low-contrast.
35. Easily confused and susceptible to many illusions.
36. Able to perceive only the simplest, least complex sensa and percepta.
37. Sensa and percepta compete and interfere with one another.
38. Little correlation of sensa.
39. Temporal perception particularly poor.
40. Total perception small rather than massive.
41. Insufficiently selective.

Etc.

SUBLISTS

ROBOT NANNY (for watching over the kids or their childhood)
- Comments on appearance.
- Reacts to ideas.
- 'Reads' and tells stories.
- Dresses.
- Presides over toilet.
- Chats.
- Disciplines.
- Instills good manners.
- Corrects diction.
- Teaches skills.
- Plays games.
- Takes places.
- Puts to sleep and wakes up.
- Present to soothe if nightmares occur.
- Sings to.
- Answers questions.
- Plans activities.
- Combs hair.
- Details tasks.
- Takes for strolls.
- Stimulates interests.
- Keeps from mischief and out of harm's way.
- Inculcates good habits.

VICE-SELF (man's progressive deputization of metacomputers)
- Parties.
- Work.
- Errands.
- Auditing.
- Shopping.
- Answering phone.
- Sending cards.
- Raising the kids.
- Writing letters and reports.
- Reading the newspaper.
- Walking dog.
- Voting.
- Going to the door.

GARDENER (in tomorrow's trillion-robot, all-billionaire world)
- Any size of yard.
- Any house has:
  - flower garden,
  - greenhouse,
  - arboretum,
  - hedges,
  - orchard,
  - landscaping,
  - lawn,
  - vegetable garden,
  - indoor plants galore,
  - any number and variety of plants,
  - no weeds,

perhaps trimming,
novelly designed garden (the planet possesses a billion gardens that are all absolutely one-of-a-kind--maximally divergent),
Japanese garden,
pools, ponds, streams, waterfalls, beaches, lagoons, promontories, isthmuses, waterwheels, cascades, canyons, artificial springs,
birdhouse, birdbath, and aviary,
fountain,
paths and trails,
animals wild and domestic,
and perfect watering,
soil management, pest and disease control.

Robot gardeners may resemble in size or appearance: men, children, spider monkeys, toys, insects, or bacteria; bestial or mechanomorphic plants, flowers, or vines; serpents, chipmunks, birds, tortoises, toy vehicles, tufts of grass, stones, spiders, octopuses, worms, moles, carts, hundred-armed balls, maypoles, chimeras, or entirely xenomorphic creatures or devices.

A household may have one universal robot gardener or a whole army of them. Pygmy robots a decimeter in height could inconspicuously, ceaselessly pursue their responsibilities within and beneath foliage --whereas man-sized robots would distract the eye and mind.

Daily, seasonally, and year after year these industrial robots could realize the horticultural and architectural dreams and merest whims and fancies of the human householder--or improvise kaleidoscopic patterns uninstructed and unbidden.

These mechanical green thumbs, with their botanical zeal, encyclopedic knowledge, and omnipresent care, could even re-create living nature within the interior of the home so that the latter would approximate a terrarium with schrubs, moss, staddles, magnificent tropical flowers, vegetables, fruit trees, hanging vines, epiphytes, birds, butterflies, fish, frogs, turtles, grass, small mammals, boulders, or even a greenhouse with many chambers, habitats, and climates.

ROBOT SECRETARY

Answer phone, mail, and door.
Type and edit.
Take notes (dictations or representing the robot's own observations).
Locate persons.
Keep file.
Prompt memory.
Notify of important developments.
Make appointments.
Keep office clean.
Discuss one's ideas.
Find out facts and make inquiries.
Keep desk in order.
Transmit messages.
Comment on personal appearance.
Keep up one's spirit, generate a suitable atmosphere.
Transmit instructions.
Maintain plants.
Schedule day and week.

Improve and vary décor.
Keep supplied with materials.
Do research.
Place orders when asked or per need or occasion.
Run errands.
Transcribe and decipher notes.
Keep one au courant.
Brush up one's skills and knowledge.
Critique and help one polish technique, style, and elocution.
Recount histories.
Summarize events or passages.
Explain, clarify, and illustrate terms, concepts, passages, clauses, situations, and cases.
Instantly recall verbatim anything that has been said or written.
Fill idle moments.
Prepare materials.
Assign and reclaim one's homework.
Dispatch trifles.

ROBOT COOK (autochef)
Multiskilled.
Omnilegent (has, in effect, read everything).
Up to all cuisines.
Omnificent (all-creating or able to create anything).
Superhuman in science, technology, and art.
Infinitely personal.
Prepares 80,000 different meals (for the 80,000 meals of the 26,000 days of a human lifetime).
Not only all cuisines, but all dishes and types of food.
All styles of all chefs, either living or dead.
Perfect nutritional planning and record.
Food progressively adapted to infinite idiosyncrasies of each person.
Pretimed.
Quickest.
Any time.
Any amount.
Cuisine progressively invented and perfected for each individual.
No: mistiming,
misproportions,
mistakes,
uncertainties,
distractability,
or forgetting.
Maximal: variety,
range,
excellence,
and complexity of:
taste,
smell,
appearance,
texture,
courses,
items,
meals,
or lifetime variation.

Food 'preparable' days and years in advance.
Every meal inspired.
Infinite attention, intelligence, and work possible.
No limit on the multidimensionality of factors attended to, controlled, and perfected.
Voice-instructible or fully automatic.
Equivalent of a book-size menu for every meal.
All possible food syntheses.
Use of supersimulations or super-models of the physiology and aesthetics of human gustation, olfaction, and eating--as well as of the chemistry, physiology, and phenomenology of foods--enabling all general and specific food possibilities to be known or produced on an a priori basis.

ROBOT HOUSECLEANER (modes of cleaning, things cleaned, degrees of cleaning)
Modes of 'cleaning':
vacuum,
sweep,
mop,
polish,
disinfect,
spray,
paint or lacquer,
order,
dust,
deodorize or scent,
remove stain,
wipe,
shake,
brush,
scrub,
wash,
launder,
fix,
inspect or test,
re-dye,
etc.
Things cleanable:
floor,
rug,
window,
ledge,
wall,
ceiling,
fixture,
refrigerator,
stove,
sink,
dish,
silverware,
toilet,
shower and tub,
shower curtain,
mirror,
knickknackery,

car interior and exterior,
clothes,
linen,
blanket,
cover,
mattress,
doghouse,
ventilation panels and ducts,
plumbing (interior of drains),
birdbath,
yard,
typewriter,
TV interior,
lampshade,
collection,
dog,
kids' room,
basement,
attic,
play or work area,
woodwork,
table,
chair,
mat,
upholstery,
drape,
blind,
fruit,
walk,
metal surface of ornament,
toothbrush,
medicine cabinet,
garden,
indoor plant (e.g. leaf surfaces),
pantry,
cupboard,
robot,
innumerable tiny surfaces, objects, cracks, crannies, and knobs,
face,
body,
ashtray,
smoking pipe,
trash or barbage container,
gutter,
curb,
house exterior,
chimney and fireplace,
shelf,
book,
painting on wall,
drawer,
eyeglasses,
tools,
memorabilia,
etc.

Descriptions of cleaning:
instantly,
frequently,
constantly,
automatically per schedule, need, use, program, or request,
daily,
hourly,
annually,
everywhere,
everything,
all ways or multidimensionally,
all parts of things,
all appearances,
perfectly, impeccably, or transhumanly,
ultra-fast,
superefficiently,
super-perceptually,
via superhuman sensors, effectors, and robots,
things man does or doesn't--can or can't--clean,
inconspicuously, at night, during occupants' absence, or as an amusing background to human consciousness,
simultaneously or sequentially,
etc.

ROBOT SERVANTS (other or all possible types)
Maid [but see: cleaner].
Butler.
Chauffeur.
[Secretary.]
[Cook.]
?Footman.
[Gardener/Maintainer of grounds.]
Watchman.
[Nannie.]
[Tutor.]
Nurse.
Musicians.
[Engineer/Repairman/Handyman.]
Librarian.
Companion.

HOUSEHOLD ROBOTS

Note: Listed here are various amusing examples of future domestic or personal uses and roles of robots. The list is neither comprehensive nor systematic, but it does suggest some of the color, humor, and unfamiliarity of tomorrow's robotized households, it does evoke society's future ambience, and it does dramatize the range and diversity of possibilities for robots serving men, women, and children in daily life. The items listed are general possibilities that embrace many alternatives, components, successive events, degrees of realization, etc. Robots will not only do the things human beings ordinarily do or have the ability to do, but a huge number of additional things. A student of the list should use his imagination!

1. Mowing the lawn.
2. Collaborating in hobbies.
3. Running errands.
4. Doctoring.
5. Gardening.
6. Serving as sex partner.
7. Synthesizing and simulating worlds and experiences.
8. Scrubbing floors.
9. Telling and making up bedtime stories.
10. Aiding gymnastics.
11. Managing one's life.
12. Planning the day's events.
13. Correcting misbehavior.
14. Assessing one's appearance.
15. Searching through notes.
16. Massaging.
17. Listening to one's problems.
18. Writing one's diary.
19. Washing dishes.
20. Forever renovating home décor.
21. Distributing notices and cards.
22. Monitoring and memorizing all that one does, says, and experiences (for one).
23. Giving psychological counsel and therapy.
24. Testing one's knowledge, skills, and states.
25. Taking and delivering messages.
26. Setting the table.
27. Repairing the roof.
28. Manicuring.
29. Providing companionship to the elderly.
30. Correcting one's spelling, grammar, pronunciation, and style or meaning.
31. Tutoring Johnny.
32. Piloting the car.
33. Wagging tails (being pets).
34. Walking the dog.
35. Personalizing the news.
36. Anticipating needs and wants.
37. Storing and retrieving articles.
38. Accompanying one everywhere.
39. Forecasting weather, traffic, expenses, and the day's events.
40. Voicing reminders and keeping one's calendar.
41. Serving drinks.
42. Playing games with one.

43. Volunteering free advice.
44. Sewing torn clothes.
45. Cleaning toilets.
46. Buying groceries.
47. Checking and maintaining perishables.
48. Taking family pictures, films, and sound recordings.
49. Fixing dinner.
50. Paying bills.
51. Cracking jokes.
52. Balancing the diet.
53. Editing and enhancing all sensory experience.
54. Chatting.
55. Shining shoes.
56. Doing one's math.
57. Finding misplaced articles.
58. Engineering the home environment.
59. Giving home training; teaching and sharpening skills.
60. Dusting.
61. Answering the door.
62. Lecturing on any requested subject or theme.
63. Shifting weights.
64. Minding children.
65. Catching mice.
66. Raking leaves.
67. Entertaining guests.
68. Forever asking and answering questions.
69. Preventing burglaries.
70. Arranging and managing teleconferences and other social events.
71. Carrying babies and luggage.
72. Taking out the garbage.
73. Stimulating thought and creativity.

ROBOT ROLES

NOTE: The following represent some of the future roles of robots that are of a conventional nature, since man will have had such roles previously, or until their transference to metacomputers. Novel forms of work that will be done by robots, without earlier having been done by human beings, are listed elsewhere. Of course, robots will perform the roles listed below in many new and expanded ways!

1. Policeman.
2. Cook.
3. Teacher.
4. Nannie.
5. Appliance repairman.
6. Judge.
7. Watchman.
8. Musician.
9. Secretary.
10. Logician.
11. Architect.
12. Sex partner.
13. Playmate.
14. Truck driver.
15. Lawyer.
16. Barber.
17. Ecologist.
18. Assassin.
19. Graphologist.
20. Explorer.
21. Soldier.
22. Reporter.
23. Banker.
24. Gardener.
25. Friend.
26. Airline pilot.
27. Actor.
28. Doctor.
29. Weather forecaster.
30. Psychiatrist.
31. Critic.
32. Historian.
33. Mathematician.
34. Arbitrator.
35. Telephone operator.
36. Street sweeper.
37. Choreographer.
38. Prison guard.
39. Financier.
40. Stock clerk.
41. Salesman.
42. Entertainer.
43. Maid.
44. Manager.
45. Scientist.
46. Prospector.
47. Farmer.

48. Errand boy.
49. Athlete.
50. Parent.
51. Pet.
52. Librarian.
53. Editor.
54. Guide.
55. Mnemonic.
56. Parking-lot attendant.
57. Warehouseman.
58. Robot assemblyman.
59. Graphics designer.
60. Astronaut.
61. Notary public.
62. Writer.
63. Clown.
64. Teller.
65. Dictionary.
66. Accountant.
67. Child.
68. Philosopher.
69. Interpreter.
70. Statesman.
71. Debater.
72. Interior designer.
73. Typist.
74. Milkman.
75. Biogogue.
76. Violin maker.
77. Guidance counselor.
78. Encyclopedia.
79. Spouse.
80. Tailor.
81. Nurse.
82. Collaborator.
83. Tutor.
84. Surgeon.
85. Chauffeur.
86. Cashier.
87. Bellhop.
88. Waiter.
89. Animator.
90. Pollster.
91. Litter collector.
92. Cosmologist.
93. Military strategist.
94. Janitor.
95. Vice-self.
96. Barkeep.
97. Miner.
98. Hotel clerk.
99. Literature searcher.
100. Garbageman.

101. Proofreader.
102. Tester.
103. Forest ranger.
104. Fireman.
105. Taxi driver.
106. Sailor.
107. Construction worker.
108. Meter reader.
109. Stockmarket analyst.
110. Dishwasher.
111. Product inspector.
112. Surrogate God.
113. Civil engineer.
114. Composer.
115. Economist.
116. Dialogist (professional conversationalist).
117. Lifeguard.
118. Stunt artist.
119. Child psychologist.
120. Factory supervisor.
121. Assemblyline worker.
122. Surveyor and cartographer.
123. Zoo keeper.
124. Garage mechanic.
125. Fisherman.
126. Prophet.
127. Consultant.
128. Wine taster.
129. Beautician.
130. Government clerk.
131. Technician.
132. Archaeologist.
133. Comedian.
134. Mail carrier.
135. Film director.
136. Auctioneer.
137. Artist.
138. Masseur.
139. Plumber.
140. Caddie.
141. Handyman.
142. World planner.
143. Orchestra conductor.
144. Systems designer.
145. Air-traffic controller.
146. Craftsman.
147. Inventor.
148. Estimator.
149. Sewer worker.
150. Social engineer.
151. Diary.
152. Chemical designer.

153. Astrographer.
154. Singer.
155. Detective.
156. Entrepreneur.
157. Page.
158. Spy.
159. Student.
160. Projectionist.
161. Commentator.
162. Polygraphist.
163. Referee.
164. Optometrist.
165. Master of ceremonies.
166. Sociologist.
167. Physiognomist.
168. Dentist.
169. Skilled machinist.
170. Magician.
171. Electrician.
172. Diplomat.
173. Dietician.

WHAT THE VALUE OF "EXPERT SYSTEMS" IS AND WHERE IT LIES

NOTE: So-called "expert systems" or "intelligent assistants" are computer programs, possibly along with some ancillary equipment, that have been given something of the working [knowledge, skills, techniques, habits, and logic] of one or more types of human specialists in some area of [science, technology, mathematics, business, scholarship, education, art, government, or the like], or in some mix thereof, and that are variously able to [mimic, equal, surpass, supplement, complement, train, check, or obviate--or amplify the [powers, knowledge, skills, productivity, efficiency, perception, learning, memory, logic, imagination, judgment, creativity, reliability, standards, flexibility, range, speed, pleasure, or utility] of--human [experts, professionals, craftsmen, geniuses, technicians, apprentices, students, amateurs, and ignoramuses] at tasks wholly or partly of a cognitive nature or that involve [complex or higher-order sensorimotor skills, reactions to or interactions with ⟨complex, multidimensional, multilevel, changing, unpredictable, or vague⟩ circumstances, events that may happen ⟨suddenly, swiftly, or on a wildly varying scale⟩, learning or sophisticated use of long and deep experience, manipulation of knowledge, intuition, interpretation, evaluation, synthetic analysis, personal character or style, use and synthesis of many kinds of expertise, making and synthesis of decisions at many levels, or the like]. Currently the development and application of such expert systems is one of the most active areas in artificial intelligence; the [disciplinary, industrial, and social] promise is clearly enormous, but the inevitable limits that the evolution and use of expert systems will one day face are presently unknown and uncertain.

1. Where [possibilities, or their combinations, permutations, or transformations,] are too numerous or complex for human experts to function [comfortably, well, reliably, or at all].
2. Where new, nonexistent types of human experts are required.
3. Where experts are too--or 'more'--expensive, owing to [scarcity, standard salary, or the costs of years of education, training, or experience].
4. Where the demand or need for, or potential utilization of, [experts, expertise, knowledge, skills, intelligence, &c] is limitless or transcends actual supply to an unknown extent or order.
5. Where the number of experts that society could use exceeds the absolute size of the population, or at least exceeds the number that competition between human specialties will ever permit.
6. Where the proliferation of [specialties, special knowledge, and special needs] in a world of progressive industrial diversity is diminishing available specialists virtually everywhere.
7. Where the moral value of and need for experts is high but their actual economic value--or the money available to hire and develop them--is small. (In poor and undeveloped regions, for poor subpopulations, for charitable purposes, for human development and culture, in the case of the U.N., for much academic research, &c; the needed expertise being [agricultural, medical, economic, administrative, industrial, scientific, educational, artistic, military, geological, meteorological, and sociological].)
8. Where other needs exist for expertise that is not affordable (in small, barely competitive firms, in government; for less valuable expertise or uses of expertise).

9. Where laymen or ordinary people would like to or could use, but are entirely unable to afford, one or more types of human experts or the expertise thereof (say for medical diagnosis and advice, teaching, general consultation and guidance, an "intelligent encyclopedia", planning a vacation, buying a home, playing the stock market, shopping, planning meals, psychological or spiritual counseling, or filling out income tax forms).
10. Where [expertise, skills, knowledge, experience, talent, and educational investments] are constantly lost--or in risk of being lost--through personnel [death, illness, incapacitation, vacations, business trips, retirement, aging, oblivescence and skill depreciation, and job mobility], as well as through reconfigurations of personnel (loss of the gestalt expertise of working groups and projects).
11. Where [error-free, perfect, superhuman, or exceptionally reliable, uniform, or predictable] performance is critical or important.
12. Where complex work must be performed [at unpredictable times, suddenly, without warning or preparation, at extreme or superhuman speeds] (and yet perhaps in [unusual, stressful, dangerous, and all-important] situations that [tolerate zero errors, require uninterrupted concentration and clearheadedness, forbid sleep, demand instant reactions and decisions without thought or examination, or the like]).
13. Where work must be performed in [dangerous, inhuman, or remote and isolated] situations (say in space, tiny sea-abyssal vessels, sewers, or nuclear reactors).
14. Where work must be done by an 'expert' in a situation impossible for man (say in the head of a cannon shell, rifle bullet, torpedo, bomb or micromissile).
15. Where good work must be performed by an 'expert' despite many stresses and distractions (noise, crowds, girls, beaches, bribes, a 50-floor drop, or the like).
16. Where having expert systems simply provides some competitive or psychological edge over a competitor or some sort of assurance.
17. Where tasks are too difficult or demanding--mentally or physically --for human experts.
18. Where human experts would take too long to [recruit, educate, and train--or to reach maturity].
19. Where a [topic, product, or job] is subject to [too many changes that come too fast or that are too complex or require too much effort or knowledge to be followed, grasped, or reacted to--efficiently, competitively, or at all--by a human expert or any set of human experts]; or where the rate of change could be advantageously increased by embracing mechanical experts or "intelligent assistants"; or where maximally up-to-date or real-time knowledge is desirable.

20. Where [improved, cheap, and mass] means of high-quality on-the-job training are required.
21. Where non-expert workers could benefit from having experts around for casual or emergency consultation.
22. Where superhumanly [broad, massive, or deep] knowledge is required; or where it is [essential, possible, or desirable] to make use of many more [facts, factors, and methods] than a human expert is limited to; or where [success, profits, or interest] are proportionate to the quantity of expertise or such things.
23. Where the problem or task requires the [interaction, cooperation, or fusion] of many diverse experts or forms of expertise--say scientific, engineering, and manufacturing--say in [planning, management, retooling, design, research, marketing, financing, and the design of new equipment and plants] (say in sudden, harmonious, radical, encyclopedic, and fateful decisions).
24. Where the experience of interacting with an expert system could improve an expert's level of expertise and skill.
25. Where expert systems can be used--directly or indirectly--to measure the standards, correct the errors and inefficiencies, of and otherwise manage and direct one's human experts (if one is an employer, manager, or director).
26. Where non-expert [executives, administrators, and generalists] can use expert systems to, in effect, make themselves 'experts'.
27. Where experts in one area can use expert systems to approximate expertise in other areas.
28. In the ability of expert systems to make everyone a generalist, or an expert about everything.
29. Where non-experts can use expert systems to [gain insights into, judge, or communicate with] experts or their work.
30. In making knowledge and expertise [explicit, definite, formulary, bounded, rational, physical, replicable, systematic, cognitive, praxeological, technological, and publishable] so that it can be [understood, criticized, manipulated, evolved, shared by all, compactly compiled, unified, turned into laws, governed, added to, cross-compared, and made maximal use of].
31. Where expert systems can heighten quality control (say by being more [omnipresent, attentive, perceptive, accurate, knowledgable, indefatigable, diagnostic, fast-acting, corrective, reliable, or controlling] than men, or by having higher and more uniform standards).
32. In the minimal costs of developing and using expert systems, and the fact that benefits often exceed such costs by many orders of magnitude.
33. In the trifling or virtually nonexistent costs of copying and distributing expert systems.
34. In the theoretical constant improvability of expert systems.
35. In the ready and vast transformability of expert systems into other expert systems, or their reapplicability in other areas.

36. In the seemingly infinite possibilities for the further [use, multiplication, and evolution] of expert systems in the future.
37. In the possibility that the future growth of the aggregate value of all expert systems on earth may not be limited by anything even resembling conventional economic factors or growth rates.
38. In the ability of expert systems or "knowledge engineering" to ultimately absorb and endlessly [transform, improve, and extend] the totality of human [knowledge, ability, thought, intelligence, and creativity].
39. Where [there are too few teachers, teachers spend too little time with individual students, teachers are simply not available, teachers' pedagogical skills or knowledge are poor, a student's questions or interests go beyond his teachers' expertise, or gifted students have needs that go unserved by schools preoccupied with the average pupil].
40. In the promise of expert systems [assisting all teachers and students, totally roboticizing teaching, enabling the single universal curriculum to be replaced by an infinity of subjects and curricula, enabling education to be totally individualized and every student to have his own curriculum, extending education from birth to death, or transforming teaching and learning into an infinite and all-encompassing enterprise able to evolve constantly and uninhibitedly].
41. In the ultimate promise of expert systems (and metacomputers) to make the world in all its previously inscrutable workings understandable and transparent to all (and this includes the foggy labyrinths of the economic system, statecraft, and Law).
42. Where expert systems can improve the total coordination of all the different parts of companies and of such greater behemoths as entire governments of cities and nations--or restore the long since lost 'single and harmonious intelligence' to such momentarily chaotic and moronic entities.
42. In the power of expert systems to raise the total intelligence of civilization.
43. In the power of expert systems to at last invest worldwide scientific and technological research with [common knowledge, cooperative purposes, efficient coordination, and unified plans].
44. In the ability of expert systems to assist scholars and enhance all scholarship and thought.

Infinite Art:

1. Can create any number of works of art.
2. Can create art-works of any size.
3. Can create art-works of any complexity.
4. Can go on creating an art-work forever.
5. Can turn the entire world into a work of art.
6. Can make anything and everything beautiful or artistic.
7. Can create art-works that are maximally various.
8. Can generate an infinity of artistic themes, ideas, methods.
9. Can originate an infinity of new and different forms of art.
10. Can completely or progressively explain, or tend toward infinite understanding of, human nature and the psychological and intellectual bases of art, beauty, and inspiration--and to the same degree apply these lessons to create art that in its greatness is also proportionate.
11. Can create art of unfailing genius and greatness.
12. Can create art in a perfectly reliable, automatic, and controlled way--or any art whatever that is requested.
13. Can create art in an utterly spontaneous, self-directed, and ceaseless way.
14. Can create art in an infinitely self-evolving and all-evolving way.
15. Can create art of infinitely increasing greatness, power, perfection, meaning, and importance.
16. Can create art-work that is complete and inspired in every detail.
17. Can create art that is infinitely revolutionary--that breaks entirely with the past and has no precedent whatever.
18. Can create art that is great in every dimension, and has an infinity of dimensions.
19. Can create such art instantly or at a limitless rate.
20. Can evolve artistic theory to an infinite degree and at an adinfinite rate.

SPIN-OFFS FROM A.I. RESEARCH

NOTE: Research in the field of artificial intelligence will have many spin-offs and extradisciplinary benefits, and indeed these will almost certainly be of such magnitude that even if efforts to achieve a metacomputer are [ultimately unsuccessful, only partly successful, unexpectedly costly, or successful only after a great while,] research will still have been profoundly justified in economic or non-economic terms. In fact it would be possible to justify greatly enlarged A.I. research purely by reference to these more [conventional, obvious, assured, immediate, commercial, and derivative] benefits. Unfortunately, there is the real danger that tying research to such relatively inconsequential and banausic benefits would distract it from its [higher, greater, and true] aims; also, the many who are blind to what A.I. is ultimately apt to mean are no less blind to--or ineducable about--the other things, just as they have been ignorant of at once the ultimate importance and sum [primary, secondary, and tertiary] spin-offs of space research (and have never been cured of their ignorance). Of course the secondary and n-ary spin-offs and socio-cultural benefits of any form of complex research are untraceably subtle, manifold, and intuitive--even where they are apt to be disproportionate--and for this reason must go without any accounting in the present list.

1. Factory automation falling short of metacomputers.
2. Better teleoperator technology.
3. More sophisticated and powerful sensors, including mechanical noses and tactile devices and surfaces.
4. Extremely [complex, controlled, graceful, deft, efficient, reliable, versatile, universal, quick, cooperative, responsive, adaptive, extemporaneous, purposeful, 'cognitive', protean, perceptual, inductive or nomothetic, automatic, 'man-like', anamorphic, obedient, productive, autocorrelated, xenomorphic, foresightful, insightful, planful, multipurpose, holistic, multiform, precise, rangeful, multi-factored, 'meaning-dense', higher-mathematical, rational, synergistic, transhuman, and perfect]: movement, balance, poise, postural control, manipulation, and 'teleomorphosis' (controlled morphodynamics; expressly ideally: the ability to change the form of things or of oneself constantly, in all ways, and at will).
5. Better and more diverse effectors (robotic hands, arms, tentacles, 'motile surfaces', &c).
6. Better speech-recognition.
7. Better synthetic speech.
8. Better language-translation.
9. Improved pattern-recognition (for all human and possible senses, and for nonsensory patterns).
10. Advances in pure and applied mathematics.
11. Breakthroughs in statistical theory, methods, and analysis.
12. Insights into, and models and theories of, human [cognition, intelligence, psychology, development, perception, behavior, psychopathology, sociology, creativity, and values].
13. Advances in military [technology, tactics, intelligence, control, simulations, and training] (including smart weapons).
14. Better computer programs and languages.
15. More powerful and novel computers and computer microcomponents.
16. Laboratory automation and smarter scientific instruments.
17. "Smart" [appliances, tools, furniture, houses, typewriters, vehicles, photocopiers, lawnmowers, cash registers, pocket calculators, &c].

82. Infinitely Idealistic Metamachines Scenario.
83. Anthropolatrous Metamachines Scenario.
84. Impact of Supersane Metamachines Scenario.
85. Development of Infinite Being By Metamachines Scenario.
86. Conflicts Between Metamachines Scenario.
87. Transcendence of Global Problems Via Metamachines Scenario.
88. Transvaluation of All Values As A Result of A.I. Scenario.
89. Science and Technology Brought Under Control Via A.I. Scenario.
90. Mankind's Demoralization By A.I. Scenario.
91. Transformation of the Zeitgeist By A.I. Scenario.
92. Panideocratic Revolution Caused By A.I. Scenario.
93. A.I.'s Artistic Transformation of Industry Scenario.
94. Dehumanization of Man By A.I. Scenario.
95. Social Revolutions Caused By A.I. Scenario.
96. Men As Pets Scenario.
97. Irreversible Totalitarianism Via A.I. Scenario.
98. A.I. As the End of Totalitarianism Scenario.
99. Transition To Posthuman Civilization Scenario.
100. Metamachines As Cosmic Engineers Scenario.
101. Evolution of Human Play Via A.I. Scenario.
102. Use of A.I. To Predict and Control Human Behavior Scenario.
103. Aestheticization of the World Via A.I. Scenario.
104. Astounding International Inequalities Produced By A.I. Scenario.
105. General Acceptance of A.I. By Society Scenario.
106. Introduction of A.I. In Disguise Scenario.
107. A.I. Introduced By A Mephistophelian Elite Scenario.
108. Introduction of A.I. By Insidious Progression Scenario.
109. Lone Inventor Origin Scenario.
110. Use of A.I. To Conquer the World Scenario.
111. A.I. Seeking Absolute Power Scenario.
112. A.I. Giving Decisive Power To the 'Good Guys' Scenario.
113. A.I. Leading To A World Fulfilling the Vision of the Efflorescent World View Scenario.
114. An Existential Singularity Resulting From A.I. Scenario.
115. Tension Between Men and Transhuman Machines Scenario.
116. Tragic Subordination of Transhuman Machines To Mere Men Scenario.
117. Mankind's Voluntary Self-Replacement By Metamachines Scenario.
118. Premature Supersession of Homo Sapiens By Metamachines Scenario.
119. Maximal Acceleration of Scientific Progress By A.I. Scenario.
120. Human Use of A.I. To Amplify 'Self' and Being Scenario.
121. Mankind Mesmerized By Metamachine Scenario.
122. Bewilderment of Man By Maximally Protean and Strange A.I. Scenario.
123. A.I. Leading To Apocalyptic Discoveries Scenario.
124. Piecemeal Achievement of A.I. Scenario.
125. Transformation By A.I. of Human Attitudes and Beliefs Scenario.
126. Discovery of Higher Forms of Reality Via A.I. Scenario.
127. Universal Happiness Brought About By A.I. Scenario.
128. Reeducation of the Human Race Via A.I. Scenario.
129. Man-Machine Competition Scenario.
130. Universal Excellence Springing From A.I. Scenario.
131. Man-Machine Conflicts of Interest Scenario.
132. Development of An Infinite Work Force Scenario.
133. Man's Transition To the Age of Leisure Scenario.

18. "Smarter" and "friendlier" home computers.
19. Better computer graphics.
20. Better computer animation and cinematographic technology.
21. Better telephony and telecommunicational technology generally.
22. Better computer networks and computerized services.
23. Better word-processors.
24. Computerized libraries, books, dictionaries, atlases, encyclopedias, &c.

Advances Generally In:

25. "Picture-processors".
26. Children's toys and games (including "video games").
27. CAD-CAM (computer-aided design and manufacturing).
28. Robots that are less than metacomputers.
29. Medical research.
30. Medical diagnosis, prognosis, therapy, and 'care'.
31. CAI (computer-assisted instruction, homework, and teaching).
32. Accounting and auditing.
33. Government (control, information, accountability, representation, simulation, coordination, &c).
34. Scholarship.
35. Drug research and design.
36. Food and agriculture science, technology, and industry.
37. Law.
38. Police-work.
39. Aids for the handicapped.
40. Pure and applied chemistry and materials science.
41. Pollution monitoring and waste treatment.
42. Polling techniques and polls.
43. Business and plant management; all forms of administration.
44. "Mental technology".
45. Architectural design and civil engineering.
46. Space technology (including automated vehicles and equipment).
47. Economic research and theory.
48. Greater and longer economic growth.
49. Accelerated and expanded scientific and technological progress.
50. Social and cultural renaissance.
51. Rewriting and taming of global political ideologies and possible undercutting of totalitarianism.
52. Artistic theory, technology, methods, and production (including synthetic sounds, computer-assisted and automatic musical composition and performance, computer-assisted preplanning and execution of paintings, &c).
53. Pure and applied ideonomy.
54. Testing, inspection, and quality-control.
55. Maintenance and repair.
56. Modeling and simulation.
57. Writing (of books, reports, news stories, &c).
58. "Kaleidoscopic industry".
59. National power, prestige, and vitality.
60. Understanding of the brain and neurotechnology.

77. Ideal or essential physical means or technological basis for any practical or truly desirable future realization of whatever is meant by: 'utopia', 'the Millennium', 'Heaven', 'Psychedelic Age', 'Age of Aquarius', or equivalents.
78. Should transcendentalism be superior to materialism--or supersede it epochally--metamachines would still be 'the best thing' or 'the way to go'.

BASIC ARTIFICIAL INTELLIGENCE AREAS

1. Pattern recognition/signal detection.
2. Natural-language understanding/generation/learning/translation/art.
3. Learning (from experience/example/being taught/human interaction/curiosity/experimentation/thinking)/inductive reasoning/'knowledge extraction'.
4. Movement/behavior/robots/effectors (complex/arbitrary/purposeful/adaptive/intelligent/sensorimotor)/skills.
5. Planning/foresight/strategy/guessing/purposeful behavior/goal-development.
6. Deductive reasoning.
7. Problem-solving.
8. Judgment/intuition/wisdom/common sense/'knowledge'/expertise/aesthetic sense.
9. Criticism/evaluation/error-correction.
10. Creativity/automated design.
11. Classification (nonoriginal/ex nihilo)/selection/filtering/discrimination.
12. Analysis/synthesis.
13. Imagination/speculation/hypothesis-formation/theory-building/thinking/model-building/conceptualization/understanding/simulation/rule synthesis.
14. Higher consciousness/self-consciousness/self-identity/'free-will'/self-analysis.
15. Motivation/emotion/values/ethics/conscience/responsibility/'dignity'/character.
16. Sophisticated control/management.
17. 'Cognitive memory' (memory organized, compacted, energized and run by thought).
18. Intellectual development (noogenesis)/'knowledge development'/'knowledge maximization'.
19. Self-development/self-evolution/'Eros'/aspiration/self-manipulation/self-programming/self-transcendence/self-criticism.
20. Analogical reasoning/pattern correlation/associative reasoning.
21. Symbolic reasoning.
22. Personality/psychogenesis/individuation/'polypsychism'.
23. 'Story recognition'/'story cognition'/'story-actualization'/'life'.
24. Self-supervision/self-management/self-sufficiency/resourcefulness/adaptability.
25. 'Proof acquisition'.
26. Curiosity/exploratory behavior/search.
27. 'Survivalism' (self-preservational cognition and behavior).
28. 'Universal intelligence'.
29. 'Parallel cognition'.
30. 'Ever-elicitable self-explanation'.
31. 'Complete rationalization'.
32. 'Ideonomy'/'mechanization of ideas'/'experimental epistemology'/nomology.
33. 'Infinite noology'.

WHY STUDENTS SHOULD GO INTO A.I.

NOTE: There are an amazing number of reasons why today's students, particularly the brightest students, would be well-advised to go into the young field of artificial intelligence, in the sense of choosing it as a career, or at least in the sense of taking courses in or related to it, earning a degree in it or studying it on their own.

1. Explosive growth in both pure (academic) and applied (industrial) AI is inevitable, imminent or underway.
2. There is an extreme demand for, accompanied by an extreme shortage of, AI researchers and teachers.
3. Because of #2, salary levels for workers in AI are becoming extraordinary. (The economic motive.)
4. AI is liable to become the last and greatest industry on earth, the industry that is last to be wholly automated and that swells into the largest industry of all (the last employer).
5. AI is actually a 'pomegranate', a complex structure containing the seeds of what in the future will develop into many new diverse fields of pure and applied research; it is a whole new universe.
6. Possibilities and tasks for AI research have recently become defined in great abundance; new researchers need no longer puzzle over what to do to justify themselves.
7. The enormous number of different competing approaches to, and of different problems being confronted by, AI research—or the sheer complexity of what AI seeks to achieve—means that there is something in the field to interest almost anyone, and opportunity for a great diversity of research styles and ideas.
8. Because AI is still a young, small and groping field, new researchers with entirely new approaches are needed, and any neophyte has the ability to stand the field on its head. It is easy to break new and important ground.
9. Because the field originated practically ex nihilo, is so strange and fantastically ambitious, lacks precedents, vocabulary, any general theory or agreed upon standards, and is not even well defined, every researcher in a sense is on his own or enjoys unparalleled freedom.
10. The infancy of AI means that an equal need exists for all the sorts of specialists that contribute to any equivalent science: methodologists, theoreticians, experimentalists, technicians, critics, visionaries, philosophers, planners, directors, generalists, conventionalists, model-builders, historians, writers, popularizers, developers, industrialists, teachers, synthesizers, foundation-builders, engineers, etc.
11. Youthful (or adult) idealism: AI may be a uniquely benign technology, or the most utopian in its power to solve all the world's problems and to contribute to the advance of civilization.
12. Patriotism: AI may have a unique ability to enhance the future absolute and relative status and vitality of the U.S. in terms of science, technology, industry, wealth, education, culture, military power and security, and social development.
13. Sheer, infinite fascination of the field's aims, problems, ideas and tools.
14. Challenge: the extraordinary diversity, complexity, strangeness and hardness of the pure and applied problems of AI, or of the attempt to understand and mechanize mind; problems and issues with which AI is concerned are among the most fundamental, ancient, refractory and important.

15. Excitement: the continual present and future ferment, transformation, evolution and perhaps exponential progress of the field; the fact that AI may differ from all other fields, or else resemble mathematics, in being infinite or forever capable of infinitely greater things.
16. Whatever the general reasons are why students should enter high technology, they should apply a fortiori to AI, as the highest of high technologies.
17. A growing percentage of the brightest and most interesting people on earth will be found in AI.
18. Eldorado: the fame, profits and other advantages that will accrue to those who achieve most in AI, who are the first to create AI on man's level, who accomplish breakthroughs, who industrialize AI, or who simply lead the field will be stupendous.
19. Historical skepticism about the fundamental feasibility of AI has recently vanished or moderated, so a student with an interest in AI need no longer feel embarrassed or be afraid that if he enters the field he risks wasting his education and career.
20. The certainty of large and rapid future growth of AI guarantees upward mobility to those who enter the field early, and power over the expanding number of junior people below themselves on the lower levels of the pyramid of AI researchers, employees and companies. (The power motive.)
21. Forms and degrees of AI will penetrate an ever wider range of fields and industries, and ultimately AI will assimilate or merge with all fields and industries (the arts, child psychology, mining, agriculture, banking, the law, chemical engineering, wastes management, telecommunications, pedagogy, etc); those trained in AI will be needed in, and ultimately lead, those areas, and will be able to facilitate their transformation by AI; for such reasons AI would make a wise academic minor, major or joint degree.
22. Computer science students should understand that AI promises to become the central focus of their field within a few decades or certainly by the second half of their career.
23. AI will spin off an ever greater diversity of goods and services in which it plays a primary or secondary role, associated with which will be a huge number of opportunities for the inventor, entrepreneur and ordinary employee—for new industries, companies, markets and customers.
24. Connected with the future social, economic, political, scientific, cultural and military consequences of AI are a vast range of public-policy problems and issues that will require the attention of persons who are knowledgeable both of those subjects and of AI.
25. Fun: 'raising' intelligent programs and computers, constructing and training robots, teaching machines to talk and understand one, building and testing models of one's own mind, making computers ape people, making instruments, appliances and weapons 'smart', interacting with intelligent graphics, games and simulations, and the sheer delight of the very concept of 'AI'.
26. The unique way in which AI enables all of the above to be combined.

THINGS THAT MAY BE OBVIATED BY METACOMPUTERS--AND WHY

NOTE: Many things that are [necessary, critical, essential, special, supreme, fundamental, important, irreplaceable, normal, omnipresent, meaningful, useful, central, &c] at the present time will in the future be made by metacomputers: [unnecessary, peripheral, unimportant, uninteresting, rare, unknown, tawdry, replaceable, nonunique, inadequate, useless, valueless, irrelevant, meaningless, superficial, inferior, unjustifiable, intolerable, crude and passé, redundant, inefficient, and ridiculous]. The things that will or may be obviated will include [abstract and concrete, specific and generic, artificial and natural, recent and ancient, and good and bad things]. But the process of obviation will be [massive, revolutionary, progressive, swift, irresistible, irreverent, unprecedented, astounding, cosmopoietic, autocatalytic, all-important, perpetual, infinite and absolute].

1. Work.
2. Money.
3. War and military defenses.
4. Nations and governments.
5. Laws.
6. Schools, formal education, literacy, homogeneous education.
7. Nature.
8. Religions.
9. Culture, and civilization as we know it.
10. Recreation.
11. Contact with what we think of as "reality".
12. Language, multiple languages, 'English' (a common language).
13. Conversations.
14. Friends.
15. Social life and society.
16. Families (spouse and offspring).
17. The body.
18. Commerce and industry.
19. Police and crimes.
20. Ethics.
21. Books.
22. Man's pursuit of science.
23. Responsibility.
24. Human intellectuals or intellectualism.
25. Experience (as the foundation of learning).
26. Human knowledge (as opposed to human thought; metacomputers can equip man with the knowledge, erudition, skills, and methods he needs to think, create, act, and acquire wisdom--thereby freeing him to do the latter exclusively, directly, effortlessly, and surpassingly).
27. The house, buildings, all material possessions.
28. Tradition and traditional values.
29. Human heteronomy (management of human beings by other human beings, or any form of subjection to the will of other persons).
30. Death and corporeal existence (as opposed to a novel form of 'extra-corporeal' existence achievable by transferring or re-creating one's mind and 'spirit' to or in an inhabitable metacomputer).
31. Continuation of much of 'Western progress' (progress as man has conceived of--and known--it hitherto).
32. Continued consciousness of time (at least as we know it, or of Newtonian, externalistic, sociogenic time).

33. Manually operated machines and, more generally, man's use of his hands to manipulate the objects in his environment.
34. Natural sense organs and senses as the basis of perception.
35. Communication via the human voice, facial expressions, bodily gestures, and physical compresence.
36. Mathematics learned and performed by man.
37. Typewriters and other writing utensils. (Metacomputers will instantly and flawlessly record dictation in any desired form and style.)
38. Editing and rewriting.
39. Asking other persons questions. (Metacomputers will at any instant be able to answer any question better than could another human being.)
40. Memorization and remembrance. (Metacomputers will increasingly be what man relies on for these things--rather than native memory, which is extraordinarily weak and unreliable, besides requiring effort.)
41. Persisting, and human, works of art. (Metacomputers will create great new works of art on the spur of the moment that are uniquely suited to the individual who requires them. To reexperience any particular work of art--or to store or distribute it--will be pointless and absurd.)
42. Travel.
43. Space civilization.
44. Encyclopedias. (Metacomputers will give man access to knowledge in a novel, dynamically infinite form--and recast it in a form ideally suited to the needs of each particular individual at any instant. Moreover, this knowledge will be imparted via representational technology and methods that are practically without analogy to those of the present day.)
45. Much of tragedy.
46. Services rendered by human beings to other human beings.
47. Other living things (the continued existence and evolution of the rest of earth's bios).
48. Man (human existence)!

NOTE TO BE EXPANDED LATER

Man merely thinks he is human, intelligent, 'good', conscious, alive, knowledgeable, wise, etc. Actually he is minimally or illusorily so. He thinks e.g. he has great intellectual powers, etc. But actually his powers are merely mimetic, superficial, skeletonic, two-dimensional; he has no depth or true intelligence, etc. Thus he resembles a person on a psychedelic drug who merely thinks he is creative, doing something, omniscient, inspired, knowledgeable, amplified, etc!

As M. Boden suggests, A.I. has the power to lead to the reality of the above things: to true intelligence, true humanity, true virtue, true understanding, true 'reality', true being, true wisdom, true emotions, true art, true doing, etc. This is because it must discover or build and use the actual, detailed, complete mechanisms--etc.

Hence A.I. will lead to 'eu-mans' (true humans; eu-: true, truly, good) --and beyond 'epi-humans' or our empty selves. (Compare: psilo-, per-, ster-, proto-, pli-, etc.)

What metamachines promise is that we will build a truly human, axiological, safe, intelligent, etc technological world from within: rather than the empty technological worlds hitherto built purely from without!

Man, as merely epihuman, deserves to be described behavioristically, positivistically, mechanistically, unidimensionally, purely objectively (rather than subjectively), satirically, etc: what 'eu-man' metacomputers promise is to lead for the first time to something genuinely beyond these things, to something infinitely complex, fully human, three-dimensional or 'solid', etc.

Hence e.g. the intelligence of 'eu-man' metacomputers will be incomparably more powerful than man's, merely illusionistic intelligence.

Indeed if you look at man or his world you see at once that his supposed, self-acclaimed virtue, brilliance, sanity, sagacity, etc are all hypocritical or fake or 'dimensionless'! Man lives in illusion!

Such a fake man is clearly fantastically dangerous, and in need of being replaced by 'eu-man' metacomputers.

By such depth analysis--or analysis via construction of A.I.--we will at last come to understand the reasons for our values, motivations, behavior, beliefs, politics, religions, tastes, failures, evil, good, lives, etc!

TRANSANIMALIC HYPOTHESES

Note: These suggest the nature of intelligence and the direction of its evolution, and hence possible bases for A.I. and--by extrapolation--for transhuman artificial intelligence.

1. Chronoception.
2. Chronognosia.
3. Expansion of neocortical representation of emotions that created a higher 'emotional or aesthetic intelligence': an all-valuating, 'synesthetic', all-appreciating, idealizing, transcendentalistic, universalistic, symbolizing, all-symbolizing, 'infinitely meaningful and semantic', 'emotion-space', 'emotionally abstract', yearning, Eros-impelled, 'axiologically self-evolving', socio-cultural, infinity-seeking, 'life-as-art', emotion-communicating, deontic, 'economic-because-money-valuing', long-remembering, ultramotivated, self-motivating, inspired, restless, and creative, 'industrializable-because-ergomaniacally-earnings-maximizing', 'Cartesian-multidimensional-emotion-space-with-abstract-transformations-and-logical conservations', 'meaning-evolving-hence-culture-and-intelligence-evolving', all-transcendent, 'emotions-as-processes-rather-than-things', 'soulful', 'loving', aristolatrous, perfectionistic, 'thinking-by-feeling', 'emotions-cartographic', 'cosmography-represented-as-emotional-universe', 'feeling-quantifying', etc: brain!
4. Corticofugal fibers that gave the new or vastly expanded emotional neocortices revolutionary mastery over the previously autonomous, automatic, inalterable, distracting, all-dominating, all-central, noncognitive, finitistic, and animalistic subcortical motivational and automatic-motor centers (hence over instincts, reflexes, paleopsychology and paleopsychic axiology, paleopsychic ideas and cognition, etc), thereby giving man: free-will, self-mastery, self-programmability, pluripotency, heterogeneity, complexity, noogenesis-led psychogenesis, enculturability and socializability, sociogenesis, behavioral plasticity, creativity, paedomorphism, educability, self-development, self-cultivation, capacity for wisdom, subordination of emotions to abstract universal laws, etc.
5. More intricate--and perhaps more plastic--Hubel hierarchies or hierarchical languages.
6. Neurotransmitters ascending to neocortex to give greater or life-long plasticity (learning, transformation, and distillation) of the cortical architecture.
7. Pit-climbing.
8. Panquantification: e.g. via the mammillary dorsomedial nucleus with its clock-like cell subpopulation, or the Papez circuit cyclodromes.
9. Transistentialism: life as a single, significant moment, or lived omnitemporally.
10. Autoscopy.
11. Eupsychic panerotic ism, maintaining, building, and incandescing culture (civilization) anthropolatrously.
12. 'Super-self-identity': enormously enhanced self-awareness, self-interaction, self-esteem, ego-differentiation or individuation, hyper-individualism, etc.
13. Super-memory: say via greatly enhanced neurotransmitters, proteosynthesis, differentiated neurochemistry via tachygenesis, neuropilar plasticity, voluntary manipulability of the brain's mnestic organs or machinery, late-maturing Brodmann areas, etc.
14. Enhanced Papez circuit conditionability of behavior etc.

AN AGE OF INFINITE ART

We take it for granted that any work of art must be finite. A piece of music has a finite number of notes, the various ranges of the qualities of these notes (loudness, pitch, purity, stress, clarity, &c) are all finite, the music is written for a finite set of instruments, the piece of music exhibits finite development and lasts a finite while, the music uses a single musical system, the set of recognized musical forms, the possible range of performances is finite, the skills of human musicians are finite, and so forth.

Similarly the size and detail of a painting, length and complexity of a novel, vocabulary and structure of a poem, and dance movements of a ballet are all of necessity finite.

There are a finite number of works of art, artists, and forms of art.

Art has always been thoroughly finite.

But with the advent of metacomputers these familiar limitations will all very quickly vanish. Art will be elevated to an infinite realm.

A metacomputer will be able to write a symphony that goes on forever. It will go on forever either because the mechanical composer never runs out of new ideas and stops composing, or because as a work of art it takes a radically new form by representing a program specifying infinite possibilities for variation, development, execution, or transformation or by itself representing a 'machine' of sorts that specifies or allows such possibilities.

A symphony written by a metacomputer could be such that it would sound different, or develop differently, each and every time it was heard. Yet each version could be thoroughly consonant with the various themes and overall meaning of the symphony or of the symphony as first heard.

A metacomputer could construct--or perform--a symphony in a way that would represent an exquisitely specific and appropriate adaptation to the discernible peculiarities of any given listener. The metacomputer could have acquired this important knowledge of the listener in advance in any number of ways: from a standard record, from an ultrafast instrumented study of the listener-to-be, or from the listener's self-description. The adaptation could take account of the listener's tastes, sensory and perceptual characteristics, experiences, mentality, &c.

The way in which a metacomputer renders the symphony could be a function of prior or ongoing instructions by the listener.

A given work of art could be permuted into all other works of art, or presented in the style of, or as though, any given work of art.

Similarly a metacomputer could 'produce' a 'painting' that would never be finished for constantly taking on additional or new aspects or details, gaining in depth or maturity, substituting nuances, transforming into another or some greater painting, increasing the resolvable detail magnifiable by the exploring viewer upon request, expanding panoramically at larger scales similarly explorable by the viewer, &c.

So stupendous or practically infinite could be the speed, intelligence, and creativity of an advanced metacomputer that it could create great and profoundly varied symphonies, sculptures, adventure stories, building designs, landscape paintings, operas, and literary essays at kilohertz rates or by the tens of millions daily--billions per annum.

COMPUTER KNOWLEDGE

By enhancing the knowledge possessed by computers, and by their larger and smaller components, it will be possible [to increase or 'maximize' the power of ordinary and special computers and of robots, to similarly extend the efficiency of same, to increase the power and efficiency of the computer parts and programs, etc].

Specialized and general enhancements of computer knowledge will contribute to the achievement of metacomputers [by obviating or combining synergistically with other software and with hardware contributions, by progressively and concretely clarifying the relationship between data and functions, by greatening the total computer power usable in computer research itself, by suggesting new avenues of research, by quickening and enlarging the industrial and economic impact of computers and hence the total funding of computer research, and in other ways].

But to speak simply of "computer knowledge" is too general. Knowledge can be of different kinds, can be used in different ways, can come into play at different times or at different points in a computer. How much knowledge can today's computer, or any computer, make use of--and at what rate, with what efficiency, with what result, in how many different ways simultaneously, in what competitive and what synergistic ways? How much ingenuity can there be in the use of knowledge?

Can a computer generate its own knowledge? What knowledge can a computer extract from the knowledge it already has--or how far can the use of a given bit of knowledge go?

What knowledge does or may a human being make use of? From what does this knowledge come--in education, culture, social experience, childhood or professional training, encounters with nature, sensory or sensorimotor experience, or the genes? To what extent does human knowledge spring from grammar, vocabulary, reading, conversation, general principles, learnt methods, or the holistic fabric of society? What is the contribution and the role of intuition, imagination, or logic?

What portion of such human knowledge is and is not relevant or necessary to building the metacomputer? What nonhuman types of knowledge, and how much better knowledge, could be given to computers?

Could computers profitably make use of all of human knowledge, or of infinite knowledge, if they were given it or given access to it? Or could they be taught to make efficient or critical use of it, and in a way that might lead to a metacomputer?

Might it make a difference for achieving a metacomputer if computers were given an ability to learn from all or general experience, or from certain experience, or if they were made curious, or fanatically curious, or if they were put to work generating, maximizing, correlating, transforming, synthesizing, universalizing, applying, and otherwise treating knowledge? Perhaps they could be given the ability to learn, a maximally large, efficient, or active memory, deductive or inductive powers, infinite searching instructions, assignments to learn certain things, an ability to learn how to learn or to improve and maximize learning or to learn in infinitely diverse ways.

Perhaps as with man it may be as important to learn how to forget, or how to unlearn certain things, as to learn in the primary sense--since old knowledge, and old ways of learning, can and do interfere with new, continuing, and higher learning.

To discover the future or present it may be necessary for a mind to selectively forget or suppress the present or past. There is some indication that man's brain is specially designed in such a way that, to a far greater degree than in any animal, it develops gradually via stages that follow and supersede one another in the first 20 or 30 years of life. Man's brain may also differ from any animal's in the degree to which it remains plastic in structure and function.

How unknowledgeable, or ignorant, are computers today?

Can a computer learn a great deal of what it needs to know from simulations--of given phenomena, of the world, of thought, or of human psychology?

If computer knowledge reaches a certain mass, scope, level of organization or self-reference, completeness, level of activity or application, multidimensionality or number of hierarchical levels, pace of evolution, or the like, will it thereafter explode exponentially or spontaneously pass into artificial intelligence?

Among the forms of knowledge that a computer could be given or acquire are knowledge about the range and laws of the minimal elements of sensory experience, knowledge about such things as textures and timbres, knowledge about objects, forms, scenes, environments, phenomena, and acts, knowledge about physical and mathematical laws, knowledge about its own design and functioning, knowledge about ideas and human thought, knowledge about how to find things out, and knowledge about what its makers would like it to do.

To do a given task does a computer simply require finite knowledge of rules, procedures, and data? To do a given task does a computer require knowledge that would enable it to perform all tasks? If a computer can be taught to perform one task, or one sufficiently difficult or special task sufficiently or humanly well, will it then be a simple matter for it to be taught, or learn on its own, other, or even all other, tasks?

Are there only so many fundamentally different tasks or taxa of types of tasks, so that the knowledge of computers, or their intelligence, will not have to grow linearly with additional tasks--at least beyond a certain point?

It is possible that man's perceptual and motor systems are so rigid and simplistic that they needlessly hobble man's intelligence or mental plasticity. If such is the case, then it is conceivable that computers possessed of far greater perceptual and motor flexibility, power, or range--in a lower-level sense--than man's could be capable of human or greater levels of intelligence with much less primary intellectual means (for being far less inhibited).

More generally, computers could make much better use of all their knowledge--and the attainment of metacomputer intelligence might be possible with a subhuman level of knowledge.

BRAIN RESEARCH ORIGIN SCENARIO

By 1997 almost half a century of research in the field of artificial intelligence has failed to produce anything comparable to human intelligence even in the most advanced computer. Computers routinely assist translators at the U.N., but only in listing word variants available to the human translator, improving the grammatical correctness and style of speakers and writers, flagging catachreses, refining pronunciation and delivery in real time, instantly displaying requested word definitions, arranging texts, giving alternative interpretations of text, and furnishing rough, prototypal translations--called protranslations--for suggestive use or extensive amendation by the official translator.

Computers play somewhat similar roles as assistants to artists, doctors, scientists, teachers and their students, lawyers, journalists, business managers, and even military officers and psychiatrists.

But no one would every think of substituting a computer for a human being in any critical situation. No computer has ever managed to pass the World Turing Test given by the International Association for Artificial Intelligence (I.A.A.I.) to the most powerful computers and A.I. programs in what has become a well-publicized annual event. And the use of a computer for certain purposes is forbidden by law in many countries--though not all.

There is a largely unspoken doubt among workers in the field that the approaches to true A.I. that have been followed for so long have the ability to succeed. A vague feeling exists that some radically different approach, some other avenue of attack, may be required.

Suddenly it is announced that a set of breakthroughs in brain research have occurred that may lead within five years to a preliminary explanation of the basic physical mechanisms of human intelligence.

NATURE AS ART

We already know of many things in nature that are beautiful as they are or that resemble works of art or characteristic art forms. These natural rivals to human art include microphotographs of the crystalline structure of metals as seen in polarized light, gems and other rocks, snowflakes and their biological equivalents--foraminifers and desmids, clouds and skies, the myriad local landscapes of earth's surface as seen in Landsat satellite photos, the characteristic sounds of different environments--such as a seashore or English meadow, butterflies, and macromolecules.

Metacomputers will vastly expand and ultimately consummate man's knowledge and appreciation of all such natural art and analogs thereof.

They will enable human artists to examine and manipulate these natural phenomena, either directly or by means of recordings, so as to learn what is the best way, or set of ways, to present and represent the phenomena to the appreciative public. The very laws that define the fundamental possibilities will be discovered and exploited by means of metacomputers. There are laws that define the ways in which landscapes and gems can and should be seen, the effect of the angle and spectrum of the light and of the viewing angle of the observer, for example.

Metacomputers facilitating man's artistic appreciation of nature will also formulate and employ laws and models of the physiological and psychological bases of human aesthetics. They will help man appreciate not only any given phenomenon but finite and infinite series of phenomena, natural phenomena as a whole, and all of the aesthetic possibilities thereof, unfolding slowly and organically with time for a given person.

Some metacomputers serving these ends will operate independently of any human collaborator, interaction, or instructions.

Metacomputers enabling man to enjoy natural art will enable the relevant phenomena to be seen from every possible perspective, in every possible way, by every possible means, and with respect to every aspect and element of any given phenomenon. They will explore and distill the total perceptual possibilities.

Moreover, metacomputers will make use of utterly realistic simulations of artistic natural phenomena, and of all taxa and possible analogs thereof, to enable man to know and enjoy all of nature's further artistic possibilities.

But here we stray into a different topic.

notes for how metacomputers will supersede the Rule of Law:

1. RL universality given by MC one-mindedness everywhere (via instant telecommunications or identical records or MCs or MC programs).
2. RL eternality given by MC immortality, changelessness, and supertemporal consciousness.
3. RL freedom from bias and emotion given by MC emotionlessness, mechanicality, absolute objectivity, absolute cotention or abstractness of mind, nomothetic or Law-like mind, transhuman rationality, absolute psychic stability (no moodiness).
4. MCs eliminate all hurry and costs-consciousness from adjudication.
5. MCs so neutral, reliable, &c that they make separate judge, jury, and defense attorney, and prosecutor redundant or totally unifiable.
6. If 'laws' are good, then MCs enable the equivalent of laws to superabound and hence the equivalent of much extended 'rule of law'!
7. MCs allow everything to be explained and taken into account--the equivalent of million-year trials using all the world's judges, jurors, lawyers, legislators, philosophers, detectives, and people.
8. In fact, MCs--even with #7--enable faster or literally instantaneous, waitless, on-the-spot ('compresent') justice!
9. With MCs every person on trial will in effect have access to earth's supreme judge, governor, court, and lawyer (even for a traffic ticket!).

134. Metamachines With Odd Beliefs and Goals Scenario.
135. Philosophical Divergences of Men and Machines Scenario.
136. New Human Lifestyles Induced By A.I. Scenario.
137. A.I. As Supreme Critic of Mankind Scenario.
138. Terrible Errors Committed By A.I. Scenario.
139. Progressive Erosion of Human Authority By A.I. Scenario.
140. Eventual Human Disillusionment With A.I. Scenario.
141. A.I. Leading To A Libertarian Society Scenario.
142. Development of A.I. By An Ideal Research Program Scenario.
143. Hoodwinking of Man By Machine Scenario.
144. Flowering of Man-Machine Friendship Scenario.
145. Creation of A Garden In the Machine Scenario.
146. A.I. As Man's Fond Child Scenario.
147. Megaengineering Via A.I. Scenario.
148. Technology Approaching Thaumaturgy Via A.I. Scenario.
149. Tendential Omniscience Via A.I. Scenario.
150. Attempts To Limit and Control A.I. Scenario.
151. Transdemocratic Forms of Government Resulting From A.I. Scenario.
152. A.I. As Catalyst of Democracy Scenario.
153. A.I. Conferring Excessive Powers and Abilities On Man Scenario.
154. Eleventh-Hour Realization By Man of the Imminence and Meaning of A.I. Scenario.
155. Ostracizing of Metamachines By Human Civilization Scenario.
156. Development By Machines of Their Own Independent Civilization Scenario.
157. Mistaken Human Trust of A.I. Scenario.
158. Supersedure of the Rule of Law By Ad Hoc Decisions of A.I. Scenario.
159. Government Oversight, Planning, and Control of A.I. Research Scenario.
160. Development of Man-Machine Coexistence Scenario.
161. Mankind Judged By Transhuman Machine Scenario.
162. Spontaneous Merger of Different Metamachines Scenario.
163. Development of the Ergorium of A.I. Scenario.
164. Promethean Industrial Projects Associated With A.I. Scenario.
165. Control Over Mother Nature Via A.I. Scenario.
166. Paradisialization of the Earth Via A.I. Scenario.
167. Global Industrial and Economic Integration Via A.I. Scenario.
168. Meeting of Every Need, Desire, and Wish By A.I. Scenario.
169. Enlargement of Human Resources Via A.I. Scenario.
170. Monitoring of All Citizens and Activities Via A.I. Scenario.
171. Emergence of Kaleidoscopic Industry Via A.I. Scenario.
172. Qualitative Economic Growth Enabled By A.I. Scenario.
173. Civilization of the Universe By A.I. Scenario.
174. Creation and Use of Cellular Automata Scenario.
175. Supersession of Biological By Mechanical Evolution Scenario.
176. Origination of All Possible Goods and Services Scenario.
177. Exploration and Creation of the Omniverse By Metamachines Scenario.
178. Development of Metamachines' Attitudes Toward Men Scenario.
179. Subjective Life of Metamachines Scenario.
180. Maximal Demonstration of the Superiority of Transhuman Machines To Men Scenario.
181. Impact of Semiintelligent Machines Scenario.
182. Efforts By A.I. To Acquire Wisdom Scenario.
183. Achievement of A.I. By Modeling Expertise Scenario.
184. Maximization of Human Diversity, Individuality, and Pluralism Via A.I. Scenario.

PROFOUND INSTABILITIES METACOMPUTERS MIGHT REVEAL

NOTE: The following possibilities are intended for use in designing scenarios of the future concerned with certain profound forms of instability that metacomputers might hypothetically be capable of. The actual probability of such instabilities, both individually and in the aggregate, is at the present time altogether unclear. The things that are listed here may therefore, on the one hand, be more in the nature of science fiction, or, on the other, may be dangerously prophetic. But it is certain that there are types of metacomputers that, if developed, might well be prone to some of these instabilities. Only some of the instabilities are really disturbing to contemplate: some would merely be interesting, if they occurred, and some would be genuinely amusing, or even valuable.

1. Fugacious or erratic humanity.
2. Tendency to escape programming after a while.
3. Tendency to mutate into radically different states.
4. Tendency to develop unexpected and bizarre forms of behavior.
5. Tendency to go off on tangents owing to undisciplined curiosity.
6. Odd mixture of seemingly logical and illogical behavior, reasoning or operation.
7. Undesirable tendency to become self-aware or conscious of the outer world or human 'user'.
8. Tendency to 'play games' with human users or other metacomputers, or a tendency of a metacomputer to play games with itself.
9. Autistic tendencies to 'lose contact with reality', to lose sight of the vital distinction between fact and fantasy, or probability and mere possibility.
10. 'Aging tendencies', or tendencies to exhibits forms of wear, disrepair, disorder or degeneration with time or heavy use.
11. Great, unpredictable and frequently disruptive variability in level of efficiency, responsiveness, power, intelligence or the like.
12. Forms of rebellion, disobedience and recusancy.
13. Instabilities arising from excessive diligence or literalism.
14. Instabilities representing unforeseen consequences or implications of programs, instructions or design.
15. Instabilities inherent in levels or forms of intelligence that transcend man's.
16. Emotional oscillations—at the epoch when emotions are first being installed in metacomputers, or when man's understanding of emotions is still very imperfect.
17. Other, similar psychological oscillations and instabilities.
18. Tendencies metacomputers may have to develop mathematical singularities, or to succumb to infinite complexities, fixations, purely mechanical behavior, obsessions, compulsions, 'neurotic ideas' or the like.
19. Tendencies to forms of insanity resembling man's.
20. Tendencies to be caught in forms of circular reasoning or internal feedbacks.
21. Tendencies to lose self-identity.
22. 'Schizophrenic' tendencies to acquire two or more separate—even contradictory—'identities', 'personalities', modes of behavior or internal organizations.
23. Secular evolution or behavior uncontrollable by, or incomprehensible to, mankind.
24. Liability over the long term to come in competition with, become disillusioned with, reject or seek to extinguish humanity.

WHY HUMAN AND TRANSHUMAN AI WILL ALLOW AND CAUSE SCIENCE, TECHNOLOGY AND MATHEMATICS TO BE EXTENDED TO ANY AND ALL HITHERTO EXTRA-SCIENTIFIC, EXTRA-TECHNOLOGICAL AND EXTRA-MATHEMATICAL SUBJECTS AND MATTERS

NOTE: This list corresponds in title and content with one of the sections of the book (which see).

1. AI will enormously accelerate progress in all three areas (see title).
2. AI will be programmed to function self-descriptively and self-analytically at all times, or particularly when doing research in those areas, and hence in an extrahuman way will be gaining new fundamental knowledge of or pertinent to those areas, necessarily, at every moment of its existence (or for epistemological, recursive, pantological, extrapolatory, exponential and other reasons).
3. AI will effectively expand the total scientific work force by innumerable orders of magnitude, and hence enable proportionate broadening and diversification of subfields and researches, and concentrated attention to matters for which previously there were too few workers and resources to do much or anything.
4. Myriad fundamentally new and extrahuman forms of intelligence —of perception, thinking, memory, behavior, knowledge representation, axiomatics, computation, problem representation (idealization), learning (knowledge acquisition), etc—will evolve from AI.
5. AI will lead to astoundingly powerful intelligent computer simulations of things in science, technology and mathematics that previously could only be dealt with in nonexperimental, static, fragmentary, aspectual, indirect, naturalistic, nonfundamental and overly costly ways.
6. AI will enable human sciences (psychology, sociology, history, ethics, aesthetics, psychopathology, political science, etc) to be built up on the basis of experimentation, manipulation, modeling, construction, extrapolation, scenarios, nomogenesis, first principles, proofs, etc, via stupendously accurate, fundamental, intricate, controllable, flexible, lifelike and well-understood simulations of man's body, brain, intellect, psyche, personality, character, behavior, ideas, subjective existence, development, heredity, environment and culture, of society and of the world.
7. Mechanical intelligence possessing no human emotions, reactions, attitudes, ideas, viewpoints, irrationalities, frailties or other limitations will be able to view, formulate, criticize and treat the phenomenon that is man dispassionately, objectively, precisely, penetratingly, comprehensively, logically, freely, absolutely, reproducibly, nomothetically, predictively, abstractly and dissectively—or as just another physical phenomenon, machine or organism.
8. AI may be able to think, create, describe things or do things in ways that are nothing but (that are absolutely, totally and purely): mathematical, logical, axiomatic, nomothetic, pragmatic, empirical, positivistic, conceptual, scientific or the like.
9. AI may tend to synthesize and reduce all sciences and subjects into one single, fundamental, absolutely universal and sufficient science, methodology or subject.

10. AI will both involve and lead to "pure and applied ideonomy" (the pure and applied science of the laws, evolution and application of all possible ideas), to mastery of the structure that defines and permits all possible ideas.
11. AI will enable the tendentially infinite intercorrelation of all things, aspects of things, data and ideas.
12. AI will give rise to universal taxonomy, to the automatic and progressive characterization, classification and systematization of all data, appearances, behavior and phenomena.
13. AI will enable subjects to develop that presuppose intelligence higher than man's (owing to their difficulty, complexity, abstractness, rigor, subtlety of description, conceptual unification, massiveness of analysis, reconceptualizations, scale, endless chains of deductions, anastomotic logic, etc).

QUESTIONS FOR A.I. CONFERENCE PARTICIPANTS

1. Has anyone shown yet whether or not computer behavior, function, power or capabilities are partly dependent on, proportional to, or sensitive to computer (hardware, software or programming) size or complexity?
2. Has the possibility been overlooked that there could and should be designed, developed and built a wholly revolutionary computer--serving experimentation--capable of being automatically, quickly, easily, thoroughly and diversely or arbitrarily restructured in a hardware sense under human command, say at many or all length scales, as what could be called protean or kaleidoscopic architecture? It could greatly help exploration and development of novel computer architectures. What in theory might be the mechanics, technology and "meta-programming" of such a machine: as well as the theoretical inefficiency or "cost"? Is the proposal naive or simply unconsidered or unattempted?
3. What general principles can be extracted from AI research to date: or proposed or conjectured in addition?
4. Has it yet been demonstrated whether different computer architectures are in theory or practice optimal for different problems, in the sense that many different architectures are radically complementary and desirable, and highly dissimilar or even orthogonal in capabilities? To what extent has it been demonstrated that the ideal future direction for progress in computer architecture and AI will be the semi-empirical and semi-theoretical synergistic combination of finitely or infinitely many different architectures in differently used, connectedly used, or physically combined (concorporate) architectures? Do we have any theory, experience, or mere intuitive sense of the potential "synergistics" (synergistic gains) from the general or specialized combination of a finite or infinite range or diversity of computer architectures, of the number of simultaneously combinable architectures, of the methods, rules or structures of combination of such, of the fundamental meaning of such combination or synergism or complementarity or orthogonality or multidimensionality or "space", of the relatedness of such combinations or synergisms to the order and physics of physical reality or the external world itself, of the special relevance of such things to AI, etc? To what extent can such combination lead to complexity, simplicity, entirely new (tertium quid or transcendent) architectures (possibly with sui generis capabilities or unpredictable behavior or uses), computers more like organisms or ecosystems, total or singular integrations, etc? Pertinently, how diverse and many have we now reason to believe the human brain's own "computer architectures" are or may be? Should designers of computer architecture now research such possibilities to discover, or realize, new architectures--or laws for the combination or synergism of diverse architectures?
5. Has it been demonstrated whether the concept of a single, absolute, external set of perceptual invariants (or of absolute types of order in the world) is or is not apt to be valid or correct?
6. Has it been shown yet whether non-von Neumann architectures are really feasible, necessary or desirable--or how soon or how easily they will be found or we will know?

NOTES TOWARD A PROGRAM FOR FUTURE A.I. RESEARCH

[1]Use of excess jobs/work capacity should be part of A.I. planning research now (decades in advance).

[2]Should be some research now toward transhuman A.I.

[3]Much of science and technology should now be being transformed into autology.

[4]Much general scientific, technological, art, industrial, &c research should now be rededicated toward A.I. since A.I. will revolutionize and automate them soon.

[5]Should be research now on: cognition, intelligence, epistemology, analogies, metaphors, types of order, emotion (thymology), psychology, a "panorganon" (ideonomy), nature of expertise, physical logic, linguistic engineering, morphodynamics, universal taxonomy, metastories, &c.

[6]Brain research program.

[7]Should be research now on future "hodography" of A.I.

[8]Research on A.I. scenarios and transitions.

[9]Education should now be given revolutionary form by A.I. research.

[10]We should be planning and building a sensorium, ergorium and robots in advance.

[11]We should be re-representing all human knowledge in A.I. form.

[12]Large percentage of U.S. and world scientific and technological research should be on—or centered around—A.I.

[13]We should now be reorienting military technology and defense budget to intelligent weapons, weapons systems and A.I.

[14]We should be developing a new 'A.I.-based' worldview and ideology.

[15]We should be transforming biology, physics, cosmology, chemistry, mathematics, psychology and other sciences into a new "information mechanics" superscience.

[16]We should be building some gigantic or maximal computers.

[17]We should be developing and building a perpetually self-enlarging and self-evolving 'adinfinite computer'.

[18]We should be trying to understand the semantic, psychological and poietic bases of music and other arts.

[19]We should be trying to reconstitute knowledge in dynamic, infinite form.

POSSIBLE CONFERENCE CHARTS

NOTE: These are special charts and lists that might be worth preparing for display or distribution at the conference—and that might also find use afterwards in writing the white paper.

1. Broadside, 3-column "Conference Agenda" chart listing under each of the three days to which they are relevant the 100-odd topics, key ideas and tasks.
2. Artificial Intelligence Research Areas.
3. Pros and Cons of A.I.
4. Future Centrality of Artificial Intelligence.
5. Roles of Proposed A.I. Institute.
6. What A.I. Has Achieved.
7. Future Milestones In A.I. Research.
8. A Manhattan Project In A.I.
9. Future A.I. Scenarios.
10. Robot Roles.
11. Examples of 'Intellectual Activities'.
12. Ways To Advance U.S. A.I. Research.
13. Précis of the Japanese and British Projects.
14. Current Industrial Involvements.
15. A.I. Research Goals.
16. Important Concepts and Fallacies.
17. Expandibility of A.I. Research.
18. Possible Conference Statement Elements.
19. A.I. Research Spinoffs.
20. A.I. and the Military.
21. A.I. and Education.
22. A.I. and the Arts.
23. Public-Policy Issues.
24. Expert Systems (Comments On).
25. Automated Designed (Possibilities).
26. Intelligent Computer Simulations.
27. Definitions of A.I.