The mighty man-computer team

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If the Martians, Venusians, or Plutonians ever bother to observe the antics of their neighbors on the Planet Earth, they must be vastly amused by our attitude toward the digital automatic computer, the DAC for short. While professing to be completely baffled by the frenzied rush on the part of the lemmings to be drowned in the sea, we—earthlings—have perversely chosen to denigrate the unsurpassable human brain by affixing to a pile of wires and tubes that ludicrous title “The Thinking Machine.” What a churlish way to thank Mother Nature for our bountiful mental endowment which dwarfs into insignificance those fabulous gifts of magic, lavished upon their favorites by the doting fairy godmothers.

Let us take inventory of our divine heritage. The human cranium possesses a storage capacity equivalent to at least a thousand billion binary digits. Supplementing this opulent installation, there are five known input devices—our magnificent sense perceptions—and perhaps additional senses, of whose existence we are only dimly aware. Maintained by a superbly efficient system of physical organs, our mind is enabled to exercise an astounding number of sublime functions. The myriads of impressions, which we receive through our senses, are being constantly shuffled and miraculously combined into concepts, whose count exceeds by far the total number of elementary particles in the entire universe. Yet, this colossal aggregate is actually infinitesimal in comparison to the fantastic number of ideas which our brain can engender by continuously associating various concepts. We are thus led to the conclusion that should another Merlin arise, capable of constructing a lifeless contraption for simulating human thought, he would run out of all the material available in the Cosmos, long before he succeeds in completing his very first specimen.

The elation, which some of us may feel at such largesse on the part of Providence, rapidly subsides as we reflect on how few members of our species either fully appreciate, or strive to make use of, their prodigious birthright. Regard the humble amoeba. With its single tiny cell, it manages to find its proper environment; to gather, ingest, and digest suitable food; to eliminate its wastes; to grow, to mature, and to produce young. How many of the earth’s three billion human denizens care to utilize their stupendous mental powers for higher or nobler aims than the unicellular amoeba?

We trumpet with loud fanfare the blessings of our huge array of devices, invented for the purpose of extending and enhancing our natural prowess, as well as of freeing us from back-breaking, time-consuming tasks. Let us bear in mind, on the other hand, that every tool is a two-edged sword. If its wielder be animated by vicious motives, it can turn—in his hands—into an accrued weapon of wanton destruction. Impressed by man’s mighty intellect and the horse’s amazing strength, our ancestors were inspired to blend the two into the image of a devastating Centaur. It is now within our power to replace this violent monster by an incomparably more efficacious, yet supremely beneficent, Megataur. Embodying the awesome potentialities of the high-speed computer and guided, at all times, by the
highest dictates of an exalted human conscience, the new image could become a source of radiant hope for our strife-ridden, despair-laden world.

It is gratifying to learn that a group of high-minded medics have united to form “Physicians for Social Responsibility.” It is easy to predict, that the members of our profession, who were deeply stirred by the eloquence of John F. Kennedy’s inaugural address, or by the loftiness of Pope Paul’s plea for peace, or by the earnestness of President Johnson’s appeal to join the Great Society, would be eager to endorse the “Mega­tau for Social Responsibility.”

We might start by borrowing a custom of the ancient Hebrew scribes, who underwent an elaborate daily ritual of self-purification, before assuming their sacred task of copying the Scriptures. Before outlining what constitutes, from my point of view, a similar ritual for Automators, I would want to make sure that all visitors’ guns were checked at the entrance.

We are told that when the great de Forest—regarded as the father of television—observed the fare being dished out for the benefit of the captive viewers, he exclaimed in despair: “Heavens, what have they done to my child?” I suspect that the inventors of DAC are moved to utter a similar cry of distress, when witnessing the daily abuse and misuse of their illustrious brain-child.

It can hardly be a source of pleasure for them to be told that a prospective user of their wondrous prodigy requires only a brief exposure to mumbo jumbo in order to match the performance of an Isaac Stern on a Stradivarius. We are put in mind of the visitor to a European Museum. Glimpsing the piano of the composer Liszt, he decided to display his own virtuosity as a pianist; whereupon he voiced his conjecture that previous visitors must have been inspired to similar action. “I would not say so, sir,” remarked the attendant. “The last person who came through here was Paderewski. He claimed he was not worthy of touching the keys of this instrument.” Now I submit, ladies and gentlemen, that in order to become an accomplished automator, one must go through as much preparation and training, as—say—a skilled physician, or competent lawyer. Members of these and numerous other crafts have wisely established rigid criteria for licensing their applicants. From my point of view, it will be a red letter day in the annals of electronic computation, when means will be found to keep the rank amateurs away from our multimillion-dollar DACs. Those perennial bunglers tie up the machines with their error-laden routines which soon assume the visage of a ferocious hydra, since each time they undertake to correct one of their goofs, they manage to introduce seven brand new ones.

My next suggestion for a sacrificial offering will raise quite a few hackles. But remember, no shooting! The exceedingly simple and uniquely suitable language with which each inventor endows his DAC is calculated to secure maximum economy and expediency of performance. Yet it is consistently being discarded in favor of a spate of grotesquely time-wasting jargons. Disregarding the fact that superbly qualified teams of mathematical geniuses have not yet succeeded—after millennia of intensive effort—in creating an unambiguous universally accepted terminology for their science, the high priests of mumbo jumbo insist that their quest for artificial languages must go on, because of the great diversity of machine-code structures and the massive infiltration of the aforementioned breeders of hydras. I shall not take the time today to refute the fallacy of their contentions; instead, I should like to sponsor the alternate proposal of standardizing the machine codes. When Artur Rubinstein is invited to perform in Tokyo or in Moscow, it is not necessary for him to tote his Steinway to those distant places. Musicians have learned long ago the wisdom of regulating the basic notes of the scale, as well as the forms of the instruments that produce them. Although we have not yet reached the stage where our fraternity can undertake to compile a roster of instructions that will endure for all time, we have amassed enough experience and authority to agree on an excellent list which would serve quite well for at least a decade. I venture to predict that our demand for a universal adoption of this set would be greeted with a sigh of relief by all makers of DAC, since they would be liberated, at last, from the murderous treadmill of software construction and would be able to invest the considerable amount of money thus saved on truly effective data handling attachments.

If I still have any friends left in this audience, I hope they will bear with me, as I mention still another method of self-purification. The Russian people have an apt saying: “The house is still in the process of completion, and the rightful owners have not yet moved in, but the cockroaches are already in full possession of the premises.” Our vital and honorable profession is in grave danger of being invaded by a horde of self-ordained geniuses who, under the guise of earnest seekers of scientific truth, may succeed in foisting their spurious wares upon generous but gullible sponsors. As an example of a field, highly susceptible to this sort of infestation, I might mention Information Storage and Retrieval, including Machine Translation. The only hope of attaining even a modicum of success in this and similar endeavors lies in the complete and cordial cooperation of all interested parties, not merely on the
national, but also on the international, level. No isolated, uncoordinated group of workers can ever come up with an acceptable answer to the heartbreakingly complex problems involved in those fields, just as no set of isolated, local meteorological observations could possibly yield reliable long-range weather forecasts. Let us make quite sure, therefore, that the ironic tale of the "The Emperor's New Clothes" is not reenacted right in our midst, lest we acquire the unsavory reputation of unscrupulous schemers and heartless muclters of the public till.

The precious machine time now being scandalously wasted on the sprawling monsters of the milksop coders; on the gibberishes, broadcast from the Tower of Babel; on the devious machinations of the Emperor's tailors—might be almost sufficient to compute the location of that elusive fulcrum sought by Archimedes in order to move the world from its orbit.

As soon as we shall have succeeded in putting our own house in order, we can start setting up the Megataur for the vital business of cleaning out the Augean stables of human misery. Each generation is prone to put the blame for the hideous state of those stables upon the bigotry, hatred, and greed of its predecessors and to insist that an army of Herculeses would not suffice to cope with the accumulated filth. In fairness to our forebears, it should be pointed out that they did not possess DACs to help them solve the staggering social and economic problems which have been plaguing humanity for countless centuries. Lacking such equipment, even their noblest efforts had to resemble—performe—the awkward performance of a tyro mathematician as, pencil in hand, he struggles to calculate a solution by the method of relaxation. Unable to assess properly the impact of all the conditions existing in the pertinent domain, he pounces upon some troublesome spot and labors assiduously to relieve the tension in its immediate neighborhood. Unfortunately, he only succeeds in raising a far greater protuberance in another, hitherto calm, region. He rushes to the new center of disturbance to apply the same panaceas, and this time causes a huge geyser to erupt in still another portion of the domain. The purity of his intentions is unquestionable, the diligence of his efforts is admirable, but the quality of his results is deplorable. If we now expand our vision to embrace the entire gamut of human activity and watch, in dismay, the vast mass of mankind, writhing and seething under the lash of unremittent hunger, pain, and indignity, we realize that any attempt to calm down permanently this restless agitation is quite futile without the aid of titanic implements that can help us analyze and remove its underlying causes.

The present models of the sadly miscalled "Giant Electronic Brain," though quite adept at smoothing out the bumpy domain which had confronted our tyro mathematician, is pitifully inadequate for tackling the formidable complex of matrices representing the all but hopeless tangle of human affairs. However, anticipating the advent of its far more overpowering successors, we may now dare to aspire to the solution of some of the most pressing problems facing our fellowmen. For the present, we can rely only upon the penetrating force of an exalted dream. I shall not presume to spell out for this audience what the nature of that dream ought to be. In the words of President Kennedy: "For this, every man must search his own soul." I would like, however, to relay an anecdote about Abraham Lincoln, which throws an interesting light upon the topic of self-interest.

While riding with a friend along a country lane, Lincoln was engaged in a discussion relating to the various motivations that underlie human conduct. The friend maintained that only altruism may be regarded as an acceptable guide for man's behavior, whereas Lincoln argued that the dominant impulse necessarily resides in selfishness. Suddenly the air was rent by the piercing squeal of a pig trying to extricate its head from the slats of a farmer's fence. As Lincoln jumped out of the buggy and ran to deliver the animal from its plight, his friend taunted him good-naturedly: "I suppose you are going to tell me that freeing this pig was an act of pure selfishness on your part." "It most certainly was" asserted Lincoln. "If I had failed to come to the aid of that poor creature, I would not have been able to sleep all night."

I think all of us will agree that Lincoln's interpretation of selfishness may serve as an excellent definition for "social responsibility." Over a period of countless generations, the term "reaching for the moon" was used as a synonym for an absolutely unattainable ideal. Yet recent events have deprived it of such connotation. One need not be a Walter Mitty to imagine the dizzying heights which may be reached by humanity, if each of us resolves to adhere to the principles of social responsibility at all times and under all circumstances. Such unswerving dedication is bound to instill in our subconscious minds an abiding habit that would automatically impel us to seize upon every opportunity to elevate the stature of the Megataur.

Let us take for our motto, then, a paraphrase of the immortal words, uttered by our beloved leader, martyred two years ago: "Ask not what the machine can do for you. Ask what you, in conjunction with the machine, can do for your country and for the world."