

Consequences

Perhaps the biotech sector should have employed more philosophers.

Poul Anderson

The United States is merely the first country to confront the question. Soon others must. It might have been foreseen, but was not, any more than was the explosive growth of the Internet in the last century. You young people had better understand the situation. You will be coping with the results of whatever decision we make today. Let me tell you in simple words how it all came about. This ought to be common knowledge, but seems nearly lost in the current furor.

As usual, many factors operated together. The principal ones here, I think, were the synergistic advances of computer science, biochemistry, and nanotechnology. Even such bare beginnings as the sequencing of DNA would obviously have been impossible without great computer capabilities. Likewise for work at the molecular and atomic levels, such as the creation of assemblers and nanomachines. It seemed to most enthusiasts that the future, including the rise of artificial intelligence to consciousness, lay with silicon.

Yet carbon, mainly in messy, gooey proteins, had been nature's choice for nanotechnology. Several billion years of success spoke for it. Early experiments with biological computers held promise. However, rapid and stupendous progress in electronics and, presently, photonics overshadowed them.

Then it turned out that its curve was not exponential, but asymptotic. Although we seemed nowhere near the limit of data-processing capability, it was only as good as its programming. A machine could certainly do much of this, too. In the end, though, the business came back to humans. If nothing else, they alone could determine what purpose a program should serve — what it was for. No matter how awesome, inorganic computers lacked creativity, imagination.

Reluctantly, workers in the field were forced to admit that the thoughts of Roger Penrose in the twentieth century had been right. The conscious, originating mind is not totally algorithmic. Of course, this did not imply mysticism or vitalism. It meant just that the proper model was the human brain. Nature had, so to speak, known what she was doing when she went in for carbon.

Thanks largely to silicon, nanotechnology and biochemical knowledge had reached the point of biosynthesis. The technology was, indeed, already routine in many applications, such as the design and production of



microbes to destroy pathogens and malfunctioning cells. Making a brain to order would be a long step forward, but possible. It would be integrated with a computer, combining their functions to form an intellect that might prove half-godlike.

At first the results of the effort were disappointing. Again workers found themselves harking back to the twentieth century, in this case to the neurologist Antonio Damasio. He had explained that the human brain is not a calculator in the skull, it is part of an organism and, in fact, itself a gland. Emotions, motivation and inspiration do not spring from reason, but they are vital to it if it is to be effective. Furthermore, sanity requires constant sensory input, not merely through electrophotonic channels but through a whole body interacting with the whole world.

Thus it was necessary to develop a complete organism. We knew it could be simpler than we are. Evolution built on whatever happened to be there, yielding systems that were often needlessly complicated. For instance, most of the trace elements required in our diet were once toxins sequestered by the body. At the same time, the basic human animal is well engineered to experience reality and work upon it.

As you know, what we arrived at was the Linked Electronic–Organic systems, with radio relay connections to let the rather anthropomorphic creatures move freely about. LEOs do not, cannot, leap into existence fully knowing. Like us, they must have time to mature and learn. Also like us, they cannot do so without companions of their own kind. Hence today there are quite a few LEOs among us.

It goes without saying that our laws against cruelty always applied to them. Soon we could do no other than declare them fully human, with the same rights we enjoy. They reward us with their ideas and insights, which enrich us in many ways and which sometimes we more or less understand.

Now the LEOs want citizenship. After all, they point out, these days humans are conceived and gestated by a variety of processes. Why should theirs be considered special?

This looks reasonable, yes. But lately one of them has announced an intention to run for president. It would doubtless win.

What shall we do?

Or do we really have a choice? ■

Poul Anderson's novels include Operation Luna, Harvest the Fire and Starfarers, all of which are published by the Saint Martin's Press.