

The human genome project: science, society and superstition

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The publication of the rough draft of the completed sequence of the human genome on June 26 was an outstanding scientific achievement, the outcome of an international collaboration spanning a decade and involving hundreds of scientists. The researchers used the most advanced sequencing machines and analysed the resulting data with the aid of powerful computers.

Yet the official announcement of this scientific breakthrough became the occasion for the US chief of state and the head of the publicly funded National Human Genome Research Institute to invoke the almighty. At a White House news conference held by President Bill Clinton, Dr. Francis Collins of the Research Institute and Craig Venter of the privately owned Celera Genomics company, Clinton declared, "Today, we are learning the language in which God created life." He went on to add that "we are gaining ever more awe for the complexity, the beauty, the wonder of God's most divine and sacred gift."

Collins seconded Clinton's religious take on the event, saying, "We have caught the first glimpse of our own instruction book, previously known only to God."

Summed up in the press conference was a contradiction of modern life whose import can hardly be exaggerated—immense progress in the fields of science and technology existing side by side with the most backward forms of social consciousness.

The elaboration of the human genome sequence is a major step in demystifying the evolution of the human species and the workings of the human body. Aided by technology, such scientific discoveries puncture the clouds of superstition that surround human existence and weaken the grip of religion over the minds of men and women. But Clinton and Collins were at pains to present this achievement of science as a vindication of religion.

Any serious reflection on the genome project reveals the absurdity of invoking it to reinforce religion. If, indeed, the human genome is God's "instruction book," it is not very well written. A rational designer would hardly have written his instructions in such a complex and even confused way,

causing frequent "mistakes" in the way the instructions are "read." One result of such mistakes is the emergence of genetic disorders.

Scientists have revealed that DNA has a very complex structure that is largely made up of "junk" DNA. Most of the genome does not code for any proteins at all, and so has no apparent function. Genes for proteins have other genes, located on other chromosomes, to turn them on and off.

Such a complex situation can only be understood as a product of humanity's long evolutionary history. Life started four billion years ago from unicellular organisms that went through innumerable transformations, producing many organisms along the way. Of these, many are long extinct and only known to us through the fossil record or in the form of our developing embryos. Are we to believe that some supernatural power devised such a tortuous and laborious path of development? Are we, moreover, to attribute to God all the parasites and diseases which plague the human species?

In fact, the path which has led to the human genome sequence did not pass through heaven. Rather, it can be established through the work of particular scientists. There were milestones along the way:

In 1838 Matthias Jakob Schleiden and Theodor Schwann discovered the cell as the fundamental unit of life. In 1859 Charles Darwin published *On the Origin of Species*, which elaborated a mechanism of evolution and set a coherent framework for all the biological sciences. In 1865 the Austrian monk Gregor Mendel developed the foundations of modern genetics. T.H. Morgan in 1910 determined that genes are organised along chromosomes. In 1942 researchers established that genes are made of DNA, a chemical found in the cell nucleus. In 1953, James Watson and Francis Crick elaborated the structure of DNA. In 1973 Stanley Cohen and Herbert Brown invented genetic engineering by transplanting a gene between bacteria, and in 1990 the Human Genome Project began.

To attribute all this to God belittles mankind's struggle to understand nature, which has been achieved with enormous

sacrifice.

The mystification represented by the remarks by scientists such as Collins does not speak for the whole of the scientific community. At a reception where he was presented the Philadelphia Liberty Medal on July 4, James Watson argued that scientific investigation and knowledge were essential for democracy.

In his speech he opposed religious conceptions, declaring that “as a product of the eighteenth century intellectual enlightenment, Jefferson saw truth arising from observations and experiments. So he wanted his state of Virginia to select, for special educational enrichment, youths of inherent genius who were sprinkled as liberally among the poor as the rich. He saw the knowledge so learned as the ultimate safeguard of liberty.”

Watson continued: “Today, 224 years after Jefferson so eloquently expressed these ideas in the Declaration of Independence, biology is witnessing the completion of an intellectual renaissance that Charles Darwin began in the nineteenth century. Through his Theory of Evolution through Natural Selection, Darwin forever changed our view of human life. He saw ourselves as the products not of creation by a God as revealed in Genesis, but as arising through a series of evolutionary events going back to a common ancestor of many eons ago.

“Much more recently we have learned that the variation upon which natural selection acts reflects mutational changes in DNA, the molecule of heredity.”

How is one to explain the persistence of religious superstition alongside science and technology? The development of religious ideas occurred as an attempt by primitive man to explain phenomena which had a profound influence on his life, such as astronomical events, fire, the weather, the seasons and the migration of herd animals, in a period when a scientific understanding of the world was impossible. Karl Marx's co-thinker Fredrick Engels explained in his pamphlet *Ludwig Feuerbach and the End of Classical German Philosophy* that religion had its roots “in the narrow-minded and ignorant notions of savagery.”

This primitive stage of human development was superseded millennia ago, and mankind has not only elaborated a scientific explanation for his own origins, but also for how the universe itself was formed. Yet religious ideas stubbornly remain.

The most basic reason is that mankind has yet to consciously master his own social organisation. So long as the masses of people have not grasped the law-governed workings of society, and on that basis reconstructed society on more rational, humane and egalitarian foundations, superstition and religion will persist.

The great twentieth century Marxist Leon Trotsky wrote in

Literature and Revolution that “so long as man will not have mastered his social organisation, the latter will hang over him as his fate. Whether at the same time society casts a religious shadow or not is a secondary matter and depends upon the degree of man's helplessness.”

Karl Marx revealed the underlying laws of capitalist society and the ultimate source in the modern world of the contradiction between scientific and technological advance and social backwardness. The forms of capitalist society by their very nature obscure the real, objective relations within that society. Marx showed that under capitalism relations between people appear as relations between things, thereby masking a fundamentally exploitative relation between labour and capital.

The conflict between the progressive potential of science as expressed in the genome mapping and the existing social and political order is not only expressed in the attempt to wrap this development in a religious framework. It is also reflected in the way this advance is subordinated to the drive for profit.

Craig Venter's Celera Genomics is only one of numerous companies positioning themselves to exploit the genome. There is a scramble—a modern gold rush—to patent as much of the genome as possible. This will not only complicate research, it will place enormous obstacles in its way. Companies have already taken out hundreds of patents for genes in a bid to head off competitors. Researchers who wish to investigate a gene will have to pay substantial royalties for the privilege.

As important and potentially beneficial as this development is, it would be naïve to assume that it will automatically work to the advantage of the world's people. So long as science and technology are subordinated to the narrow and private interests of corporate owners, and the capitalist governments that serve them, the achievements of human intellect and industry can be, and usually are, perverted to produce tragic consequences. Last century the discovery of nuclear power had the potential to resolve the energy problems of society once and for all. Instead it was used to develop new weapons of mass destruction. Do we face a future which includes the deployment of “gene bombs,” capable of killing off certain genetic types while leaving property intact?



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