HERBERT A. SIMON (1916-2001): A LIFE'S APPRAISAL

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> No man is an *Island*, entire of it self;
> every man is a piece of the *Continent*, a part of the main;
> …
> And therefore never send to know for whom the *bell* tolls,
> It tolls for *thee.*
>
> John Donne
> Meditation XVII

Herbert Simon thought of himself as a Renaissance man. He was involved in many enterprises, and had a knack for appearing at or near the top in most of them. In 1978, he received a Nobel Prize in economics for nearly forgotten work he had done decades before, and he slept in unheated barracks in China and learned to read Chinese in order to acquaint himself with the Mainland way of doing things while offering what he could.

His detractors would say he dabbled a great deal, could always be counted on to be there at the finish line, could provide a reprint of any of the thousands of papers he had ever written at a moment's notice, and was arrogant in a very refined kind of way.

For me, Herb Simon was the guy who in 1956 at his inaugural address as President of the Operations Research Society of America predicted that within 10 years a computer would be World Chess Champion unless it were barred from the competition. I had seen the articles on the Rand Corp. chess program authored by Newell, Simon, and Shaw that this prediction was based upon, and I laughed, because I knew too much about chess, and did not see anything resembling the kind of play that was required to even play at the Master level. Here again was a situation typical of Herb's career. Many looked in wonder, and many looked with disdain. To make such a prediction was not a very scientific thing to do. The program had never played a tournament game. Even when playing against people who were touted as being champions of something-or-another it showed rather serious weaknesses. But Herb always liked being there first.

In later years when I discussed this prediction with him (he vehemently rooted for computers ever after, even if, as DEEP BLUE, they did not play chess in the style of *Cognitive Psychology*), he always said that it was important for science to make such predictions as they galvanized the field toward certain important goals. And he would point out DaVinci's drawings of man flight, and other things. To him it was important to push the ball along, and just how scientific it was, could be left for future appraisals. Yet Herb was one of the first members of the National Academy of Science to come from the ranks of the *soft* sciences rather than from Engineering, Physics and Chemistry. As such he opened the door for things that this nation (US) sorely needed to examine.

I first met Herb at a meeting in 1967, where he was an invited speaker. I chatted with him after his presentation, and was surprised to find that he knew who I was. I indicated that after the formidable work of Greenblatt, I had been encouraged to try to write a chess program on my own time at IBM, where I was then employed. He was very interested, and when I mentioned that I did not intend to stay at IBM too much longer, he was quick to suggest that I should visit Carnegie-Mellon University and see what they had to offer there. In due course I did visit, and in 1969 entered there as a first-year graduate student in Computer Science. He was on my committee when I did my thesis which demonstrated how a computer could do very complicated analytical things in the *Human Style*. But typical of Herb, he was not involved in the nuts and bolts, and the main credit for my guidance must be given to Allen Newell.

While a graduate student at CMU, I had ample opportunity of interact with Herb and Bill Chase who was a Post-Doc and later a professor in the Psychology Department there. It was there that I got involved in the Human Perception of chess which built on the work of the Russians in the 1930s and of De Groot in the 1940s. I was very impressed by the machinery that clearly existed in the human head and made it possible to

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remember positions almost perfectly even after having seen them for only 2 seconds. What was even more interesting, was that errors in reconstructing the position had a definite pattern to them. For instance, a Bishop may be misplaced in the reconstruction, but it would still be on the critical diagonal, and thus retain its function on that diagonal whatever the function was. This insight has been incredibly important in my career, and is seen clearly in the program CAPS, in my book *The System*, and in other writings presently under way.

Herb was excellent in pointing these things out and in developing the interpretation that allowed further progress into insights of what our brain machine was really doing. For me, it was very exciting to watch and wonder. Of course, what was missing at that time was a method of emulating human learning without which we would be faced with infinite twiddling of data by a human being who could just not grasp the complexity of all he was twiddling. Thus, until neural net learning came along, there was really no hope of building a program that could play in the *human style*. Yet, without people such as Herb, it is likely that no one would have tried. Now, with the success of the brute force method, it is doubtful anyone will ever try it. The fact that neural nets can be the difference is documented by the success of Tesauro's backgammon program that learned strategies that almost no one new, and became a top player by playing millions of games against itself. To do that in chess would have been much harder, but humans were doing it.

Herb Simon's role in all this is not at all clear. He was always there to discuss things with genuine interest, and had an amazing repetoire of facts that could be pertinent of the situation. One would come away from such a session with months of research leads to chase down. Not too many people could have done that. I will miss you, Herb.

"I come to bury Caesar, not to praise him.
The evil that men do lives after them,
The good is oft interred with their bones;
So let it be with Caesar."

Shakespeare

Herb Simon receiving the Nobel Prize.

Photo by courtesy of Carnegie-Mellon University.

Herb Simon in action.

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