NEWS, INFORMATION, TOURNAMENTS AND REPORTS

KONRAD ZUSE: AN OBITUARY

Bob Herschberg[1] and Jaap van den Herik[2]

The international computer-chess community gravely regrets the death, at age 85, of Konrad Zuse, an inspired computer pioneer, who deliberately extended the possible range of computer applications to playing chess. He died in his native Germany, in St. Elisabeth's hospital at Hünfeld, Hesse, on Monday 18 December 1995.

Konrad Zuse was a born inventor. Reviewing his life, it seems as though he was destined to be frustrated. Born on June 22, 1910, in Berlin (Wilmersdorf), his parents (his father was a postal official) provided him with a conventional education: he took his final examination in 1927 in the Reform-Real-Gymnasium in Hoyerswerda, Silesia, which means that he had Latin but no Greek, with some stress on mathematics and science. Eight years later he would be granted a degree as an Architectural Engineer from the Technische Hochschule Berlin-Charlottenburg. This degree would be notch below a doctor's, which was to elude him for a long time.

During the next two years (1936-1938), he revealed himself as a persistent and gifted tinkerer. Apparently driven by a pure inventor's instinct, he cobbled together a first calculator, still working on strictly mechanical principles, in a corner of his parents' Berlin home. Not without pride he dubbed that machine the Z1. It was his experimental model. Soon thereafter, also in 1938, a successor was built, or, rather, part of the Z1 was cannibalized to provide a store for the Z2, whose arithmetic engine already comprised electro-magnetic relays.

After a short interruption, due to the war, the Z3 engine saw the light in 1941. It was the first computer in the world to operate satisfactorily. (The one and only copy was destroyed by bombing in 1943; a historically faithful copy is now in the Deutsches Museum, Münich.)

Industrial activities, meanwhile, were not lacking. The Z3 was extended to serve not only as a built-in measuring device, but also, at this early stage, assumed control of processes, another first.

In retrospect, the importance of the Z3 was recognized far too late. This was possibly due to an unwillingness of the Americans and British to recognize the validity of a German effort in the field, possibly also because the effort of thousands on the Anglo-Saxon side necessarily swamped the one or two-man exertions of Zuse.

The Z4 was transferred in 1945 to Göttingen as part of a windtunnel setup and finally came to rest as a museum piece in Zürich at the Swiss Federal University of Technology.

When he was forced to retire in 1945 to the hamlet of Hinterstein in Southern Swabia, he found the leisure to confide his thoughts to paper. The record was intended to be his Ph.D. thesis, though, contrary to the author's intentions, the paper was only published in 1972. It was only then that it became apparent how much emphasis Zuse (1972) had laid on a language most suitable to write any programs, including chess

[1]   Delft University of Technology, Department of Computer Science, Julianalaan 132, 2628 BL Delft, The Netherlands.

[2]   University of Limburg, Department of Computer Science, P.O. Box 616, 6200 MD Maastricht, The Netherlands. Email: herik@cs.rulimburg.nl.

programs. The last part of his projected thesis devotes no fewer than 40 pages to formulating programmable chess.

Zuse was far from an expert in chess, nor did he have anyone to discuss the game with. As a consequence, he failed in details of some programming points and it would appear that he misconceived the rule about *en passant* capture. In our view, these flaws in no way detract from the merit of the idea to develop a special language, *Plankalkül*, enabling complex logical problems to be treated. Zuse in fact has been the first to have recorded his computer-chess programs on paper, though it was a long time before they had actually been published. After the war, Germany's defeat isolated this researcher; his ideas about programming languages, notably Plankalkül, soon failed to find resonance with the committee charged with developing a competing language, which resulted in ALGOL 60.

Thus, Plankalkül was relegated to obscurity, which must have added to Zuse's frustration.

It is obvious, that Zuse failed to conform to the normal academic pattern; to compensate, he held no fewer than five Honorary degrees in some of the most reputable Universities of Europe, ranging from Göttingen to Reykjavik. It is not this quintuple academic crown which singles out Konrad Zuse to the ICCA community. It is, rather, the almost miraculous concurrence of inventing a language capable of dealing with a field as complex as chess and actually applying the language and his personal inventivity to chess by machine, a concept so novel at the time that the majority of self-styled experts would have laughed it down. This remains Zuse's imperishable merit.

References

Doing full justice to the literature on Konrad Zuse is an impossible task. To limit ourselves to chess essentials, the following references will give an elementary view and in turn point their way to more of the relevant literature. The reference Van den Herik (1990) comprises an interview which, to a chess-player, may be found most illuminating about the course of his life and the development of his ideas.

Zuse, K. (1970). *Der Computer mein Lebenswerk*. Verlag Moderne Industrie, Wolfgang Dummer & Co., München. Second Edition (1990) published by Springer-Verlag, Berlin.

Zuse, K. (1972). Der Plankalkül. *Bericht der Gesellschaft für Mathematik und Datenverarbeitung GmbH*, Bonn, Nr. 63, pp. 235-285, St. Augustin. Translation of the original version 'Der Plankalkül 1945' in English by G. Overhoff (1974), published with new comment (1976) under the title: The Plankalkül. *Bericht der Gesellschaft für Mathematik und Datenverarbeitung GmbH*, Bonn, Nr. 106, pp. 42-44, St. Augustin. Verlagsausgabe: Oldenbourg (1977), München. Second Edition (1989) published by R. Oldenbourg Verlag, München.

Zuse, K. (1975). Vom Traum zur Wirklichkeit. *Mitteilungen der Universität Dortmund*, Sondernummer 12, p. 4, Presse- und Informationsstelle der Universität Dortmund. Wiederabdruck in *Erstes GI Computer – Schach Turnier* (ed. R. Zumkeller), Dortmund (1975), 48-49.

Zuse, K. (1990). The Way from the Computers Z1, Z3 and Z4 to Plankalkül. *ICCA Journal*, Vol. 18, No. 2, pp. 55-69.

Herik, H.J. van den (1990). An Interview with Konrad Zuse. *ICCA Journal*, Vol. 18, No. 2, pp. 81-88.