Chapter 4

Literature, Language and Learning: Turing’s Paradox and the Metaphor of Caliban

Research Method: Art as a Source of Knowledge

One should not look for an historical portrait of Galileo, but for an analogy based on the contradictions which still exist within us, and to strive to overcome them. . . . The play begins with the potential of the instrument that was to hand – it begins with the telescope. And the telescope is the instrument which makes it possible for Galileo to think and see as he does; this shows that we cannot exclude the instrument from our calculations.¹

The director, Alf Sjöberg, attempted to interpret the epistemological effects of the picture of the world proposed by the modern natural sciences. He wished to produce on the stage a picture of the existential issues raised. Despite all the precise technical instruments which help us to make ever more exact definitions, there is always something which remains indefinable. This is the paradox of critical knowledge. Aware of this, Sjöberg wanted to see drama as a means of ‘burning your way through reality to reach an inner truth’, even if the answer thus arrived at is only a tentative one.²

Sjöberg produced Brecht’s Galileo in 1975. He described his interpretation of the play in an introductory lecture at a symposium on the theme of professional ethics held in March 1975.³

The symposium was part of the on-going case study of the County Agricultural Boards; there was still serious disagreement on the issue of the responsibility to be borne – in this case – by the forest rangers as civil servants. The purpose of the symposium was to create a forum for reflection on this matter. Sjöberg’s example opened the door for reflections on people’s moral reservations about the development of computer technology; in particular about the question of professional ethics which comes up when the work of various occupational groups is computerized.

The discussion at the symposium centered round the issue of what a systems expert should do when he discovers that the proposals for rationalization which he has been commissioned to produce will make many people’s jobs worse than they are today, and that the work force had been unanimously against the system ever since they found out what its effects would be.⁴ A variety of backgrounds and disciplines were represented in the discussion at the symposium: there were people from the theatre,
philosophers, lawyers, economists and representatives from working life. The discussion did not result in any general agreement, but Sjöberg's example of Brecht's *Galileo* stimulated a dialogue in which views on the points of disagreement were formulated and ideas for further reflection were discussed. As a result, more work was carried out on defining the relationship between art and science. We saw this as a step in the process of reflecting on the more profound and long-term aspects of computer processing, for example, changes over time in professional knowledge and professional ethics. A symposium was held two years later, at which the following questions were raised:

Are there things which the arts – some arts – can express that science cannot? Can art be given a place in pluridisciplinary work, helping to fill the space in fields that calculating science cannot reach? This symposium was on the theme of art and social change. In summing-up, attention was drawn to two very different views of the relationship between man and machine. One is an external perspective which describes technological change within the conceptual world of the natural sciences. The other is an internal perspective applying to people connected with technology. Art has a function here – to lift out and render visible the phenomena which require a more plastic language to become accessible for reflection. In other words, the language of art can be of help in the study of the long-term aspects of the relationship between man and machine.

The present chapter examines this double perspective in greater detail, beginning with the way in which the myth of an exact language reached a climax in the dream of reproducing all forms of human knowledge with the help of a machine, i.e. in artificial intelligence. The chapter continues with a discussion of the heuristic and pedagogical function of art, its value as a source of knowledge with which to understand human actions.

**The Turing Machine**

In 1936, Alan M. Turing, the English mathematician, wrote an article which has since become a classic. This article, entitled 'On Computable Numbers, with an Application to the Entscheidungsproblem', contains the basic mathematical theory for computing machines. The term 'problem of decidability' – 'das Entscheidungsproblem' was introduced by David Hilbert. It refers to the question whether there is a clearly defined method which will determine whether mathematical assertions are provable. The method must be a predictable mechanical process which may be applied independent of human judgment or choice.

Turing's work in 1936 was a contribution to the field of the mathematical theory of proof, but his theorems and symbols made it accessible only to experts in that specialist field. The following is a quote from a play by Hugh Whitemore called *Breaking the Code.* It is based on documentary material of Turing's life. In this speech from the play, the figure of Turing talks about a kind of machine which reads off mathematical symbols and processes them mathematically, in short, the principle of the computer: