Trois études en duo
pour piano interactif
(dédiées à Georges Pludermacher)

by Jean-Claude RISSET

These *études* (1991) resort to a novel process: the pianist has a "partner" - but an invisible, virtual one. A computer program "listens" to what the pianist plays, and instantly adds its own musical part on the same piano: this part is not a mere recording, it depends upon what the pianist plays and how he plays. Hence we have a genuine duet: the pianist's partner, although unreal and computerized, is sensitive and responsive.

This process was first implemented in my *Eight sketches: duet for one pianist*, realized in the Media Laboratory at M.I.T. in 1989, with the invaluable help of Scott Van Duyne. It requires a special piano - a Yamaha Disklavier - equipped with MIDI input and output. On this piano, each key can be played from the keyboard, but it can also be activated by electrical signals: these signals trigger motors which actually depress or release the keys. Each key also sends out information as to when and how loud it is played. The information to and from the piano is in the MIDI format, used for synthesizers. A Macintosh computer receives this information and sends back the appropriate signals to trigger the piano playing: the programming determines in what way the computer part depends upon what the pianist plays. The present *études* were realized in the Laboratoire de Mécanique et d'Acoustique, C.N.R.S. Marseille. The programs were implemented with MAX, a powerful graphical software environment written by Miller Puckette at IRCAM.

The *études* explore three rather simple kinds of live interaction between the pianist and the computer.

Echo. The computer echoes the pianist - not as a mere repetition: the echoes are transposed in pitch and in tempo, and they can occur with different delays with respect to the original utterance. This etude takes advantage of the resonances on the same soundboard of notes played by either the pianist or his virtual partner.

Narcisse. Here the relation is akin to a mirror reflection: the pitch intervals are inversed -a fifth upward is reflected into a fifth downward and vice-versa. The center of symmetry is a note of the keyboard which varies throughout the piece. The reflection can also be retarded with different delays.

Mercure. In this kind of scherzo, the pianist triggers arpeggioes at different speeds. The speed is set either by the tempo of certain patterns played by the pianist, or by the pitch he plays, or by the loudness. The arpeggioes move through pitch space somewhat like shapes in a kaleidoscope.

The three *études* are dedicated to Georges Pludermacher, in tribute to his brilliant playing, his profound muscianship, and his brave willingness to confront the pitfalls of advanced technology.

J.C. R.