

# Crystal Ball Computer Input Device

It looks like a fortune-teller's glowing red crystal ball, but a new computer input interface device developed by a Tokyo Institute of Technology team is actually a plastic hemisphere. When a forefinger touches its surface and moves to the right, a cube appears on a display screen and also moves right. When a forefinger and thumb are placed on the input device surface and the forefinger rotates in a clockwise direction, the cube also turns clockwise. When the distance between the forefinger and thumb widens, the cube expands; when finger and thumb slide together, the displayed cube contracts.

This explanation was given by Prof. Yasutaka Shimizu, leader of the team, and Takanori Maesako, a research assistant. The reason why the team adopted the semispherical shape, Shimizu went on to say, is that lightly resting the hands on a curved surface puts less strain on arm and hand muscles than does placing the palms flat on a desk top. The crystal ball interface device can thus be used by the physically handicapped, for instance,

by muscular dystrophy patients who are unable to lift their hands to clasp something. Because they still have strong tactile sense and are able to move their fingertips, this device was developed.

To operate a computer, the instruction to "do something" must be given. Personal computer operation requires two keyboard instructions, one to "do" and the other for the "something." The crystal ball interface can give the two instructions in a single, simultaneous operation.

On the underside of the hemisphere there is an array of light-emitting diodes (LEDs). These LEDs are the light source for the red glow of the surface. When a finger is placed on the surface, red light is reflected on the ball of the finger and caught by a fisheye lens beneath the hemisphere to locate the finger's position. This becomes the origin of the two-dimensional coordinates through which the computer confirms the back and forth or left and right finger movements and moves the cube on the display screen accordingly.

Although the crystal ball device is in-

tended for image processing it can also be used as an input device for music by positioning the fingers according to the steps of the music scale. Stronger finger pressure results in greater volume (for example, fortissimo), while lighter pressure yields softer sound (pianissimo).

In addition, the device can enter letters into the computer based on patterns traced on the hemisphere's surface. Such wide-ranging applications extend the utility of the crystal ball interface and assure it a place in the computer field in future.

(Akira Shoji, staff writer with Kyodo News Service)

The crystal ball computer input device was designed for use by the physically handicapped.



# Japanese-English Conversation through Blissymbols

A team led by Professor Sadamu Ohteru of the Department of Applied Physics, Waseda University, has developed a personal computer communications system for the handicapped who cannot communicate through speech. The new system makes use of the Blissymbol system of ideograms common worldwide. The Waseda system allows physically handicapped children to communicate with others and learn languages.

Blissymbols are ideograms developed in the 1940s by Australian C.K. Bliss, which use *kanji* (Chinese characters) as a reference. The Blissymbol system is made up of about 1,800 symbols that enable people to communicate with foreigners even if they have no language in common. The system has been utilized mainly among physically handicapped children in Canada.

In Sweden, a system utilizing computer technology has been developed for translating Blissymbol sentences into Swedish, Spanish, Finnish, French, German and Chinese, and then converting the translation into speech using a

voice synthesizer. However, there has been no previous system for translating Blissymbol sentences into Japanese.

The system developed by Ohteru's team uses a personal computer, a digitizer that enters Blissymbols into the computer, two cathode-ray tube (CRT) displays (one for Japanese and the other for English) and a voice synthesizer. Blissymbol sentences are first translated into English, and then the English is translated into Japanese by translation software. Both English and Japanese can be heard from the voice synthesizer. Because the written English and Japanese are displayed on the device along with the synthesizer's "voice," the speech handicapped can communicate with foreigners who do not know Blissymbols.

According to Prof. Ohteru, the structure of Blissymbol sentences is grammatically close to English, making it difficult to develop the software for translating Blissymbol sentences into Japanese. Ohteru stressed that the system can also be applied to study a foreign language on one's own.

He also said he hoped that the system

will prove useful to the physically handicapped who may not be able to develop their conceptual and thinking abilities without using speech.

The system may also be used in long-distance conversations between the physically handicapped over communications circuits, since the basis is a common, commercially available personal computer. Improvements in the input device are on the drawing board to allow utilization of the system in speech rehabilitation and therapy.

(Tsukasa Fukuma, staff writer with Kyodo News Service)

A personal computer communications system designed for the speech handicapped

