The newly developed equipment for micro-region analysis was designed to be installed with a micro-pinhole and an imaging plate (IP: Fuji D.I.I.T.) reading system, even though the equipment is placed in a vacuum chamber to avoid air scattering. A diffraction pattern from different crystal orientations can be obtained without opening the chamber. Micropinholes with diameters of 5 and 10 μm are prepared and set just after the collimator. The distance between the pinhole and the sample is 7 mm, and the detector using 15 covers from 30 to 165 degrees in two-theta range with camera radius of 100 mm. This apparatus with a 1 μm pinhole was initially applied to olivine (B. S. U.) included in a thin section of meteorite and also in micrometer-sized silicon grains on a semiconductor material.

There are many methods for adjustment of the single crystal. Among these, the Laue method is the most general one for the determination of orientation and symmetry of crystals [Wood, Crystal Orientation Manual, Columbia University, New York, 1963]. In order to reduce the time required for conventional Laue back-reflection methods, we have developed COMPUTER-AIDED CRYSTAL ORIENTATION (CACP).

Procedure and main points of CACP are briefly described in the following.
1. Mount the crystal to be oriented on a goniometer, take a Laue photograph.
2. According to the spatial arrangement and intensity of spots on Laue photograph, select a major spot (X', Y') which is not only a strong reflection but one through which many zones pass. Define the corresponding Miller indices to be (h'k'l'). Move (X', Y') to the centre of the Laue photograph, transform other spots. Display the transformed Laue photograph on screen.
3. Calculate positions and intensities of Laue spots and simulate a Laue back-reflection pattern.

**Fig. 1 Schematic flow chart of CACP.**

The relative intensity of each reflection is calculated by using the structure factor F, the Lorentz factor L, the absorption correction, the geometric factor, and Kratschmer's formula [Kratzschmer, Rev. Crime. Atlas, John Wiley, 1979].

4. Compare the simulated pattern with the transformed photograph on screen.
5. If the simulated pattern coincides with the phototograph, the assumption in step 2 is correct, the crystal orientation is finished; otherwise the procedure is repeated, go to step 2.

The computer program of CACP is written in BASIC and designed to run on IBM-PC/AT or compatible computers. It can be used not only for orienting single crystals, but also for plotting Laue back-reflection diagrams and stereographic projections of any crystal structure. By changing some details, CACP can also be applied to transmission Laue method.