The single crystal X-ray diffraction technique used by Mike Bown and Peter Gay between ~1951 and 1969.

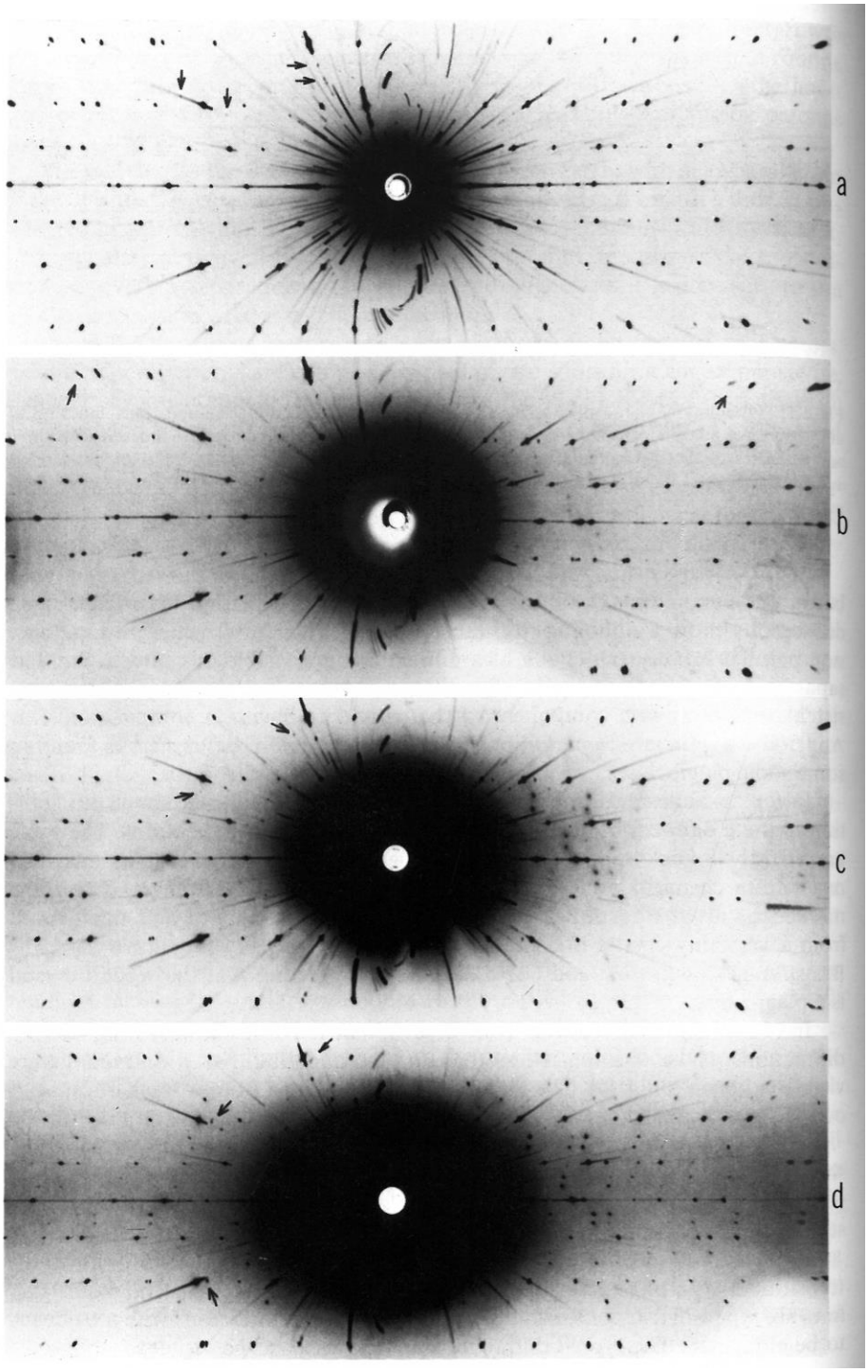
J.V.Smith was a long standing crystallographer friend of Mike's from their days together in the Department of Mineralogy and Petrology. He wrote in the X-ray diffraction techniques section of his book, Feldspar Minerals vol.1 (1974): "*Highly skilled crystallographers may wish to use the oscillation technique developed by Drs. M.G.Bown and P.Gay of Cambridge University, England. A 15º oscillation photograph about the c-axis allows ready identification of all the important diffraction phenomena of plagioclases. However, the preliminary identification of the c-axis and alignment of the crystal in the X-ray camera requires considerable skill*".

Figure 1 shows a picture of one of the oscillation cameras that Mike would have used for a substantial proportion of his research. The X-ray beam came in from the right to be diffracted from a crystal mounted on a glass spindle in the middle of the cylinder. Photographic paper lining the inside of the cylinder recorded the diffracted beams and the strangely shaped cams seen at the front of the instrument were used to make the crystal oscillate through carefully chosen angles. The horizontal microscope coming from the left was used to check that the crystal was aligned with the centre of the X-ray beam.

Figure 2 is a copy of pages 202 and 203 of J.V.Smith's book showing some of the original oscillation photographs of plagioclase feldspar crystals collected by Mike and Peter. Sharp eyed readers will be able to pick out the diffraction spots listed in Figure 3, which gives the definitive description of diffraction effects in natural plagioclase feldspar crystals.

Figure 1. A Unicam single crystal rotation and oscillation X-ray camera from the X-ray lab in the Department of Earth Sciences. It is an original instrument inherited from the Dept. of

Mineralogy and Petrology. As well as being used by Mike for his research it was used for many years by students learning single crystal X-ray techniques.



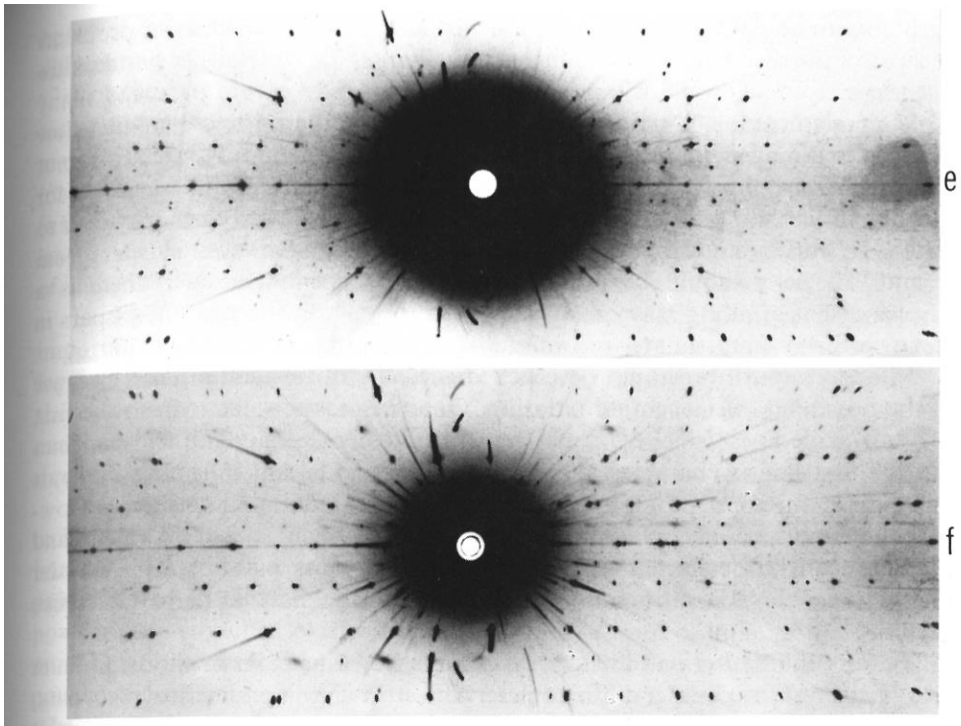


Fig. 6-16. X-ray oscillation photographs of plagioclases taken in the standard orientation of M. G. Bown and P. Gay. Approximately half of each photograph is shown. 3 cm oscillation camera. Filtered CuK radiation. a Albite, An_0 from Amelia, Va. b Peristerite, An_{12}, from Peekskill, N. Y. c Andesine, An_{37}, from Yosemite Valley, Cal. d Labradorite, An_{50}, from Essex Co., N. Y. e Labradorite, An_{64}, from Stillwater, Mont. f Synthetic anorthite. (From M. G. Bown and P. Gay, pers. comm.)

Figure 2. Single crystal X-ray oscillation photographs of plagioclase feldspars with different compositions, taken from pages 202 and 203 of J.V.Smith, Feldspar Minerals Vol 1 (1974).

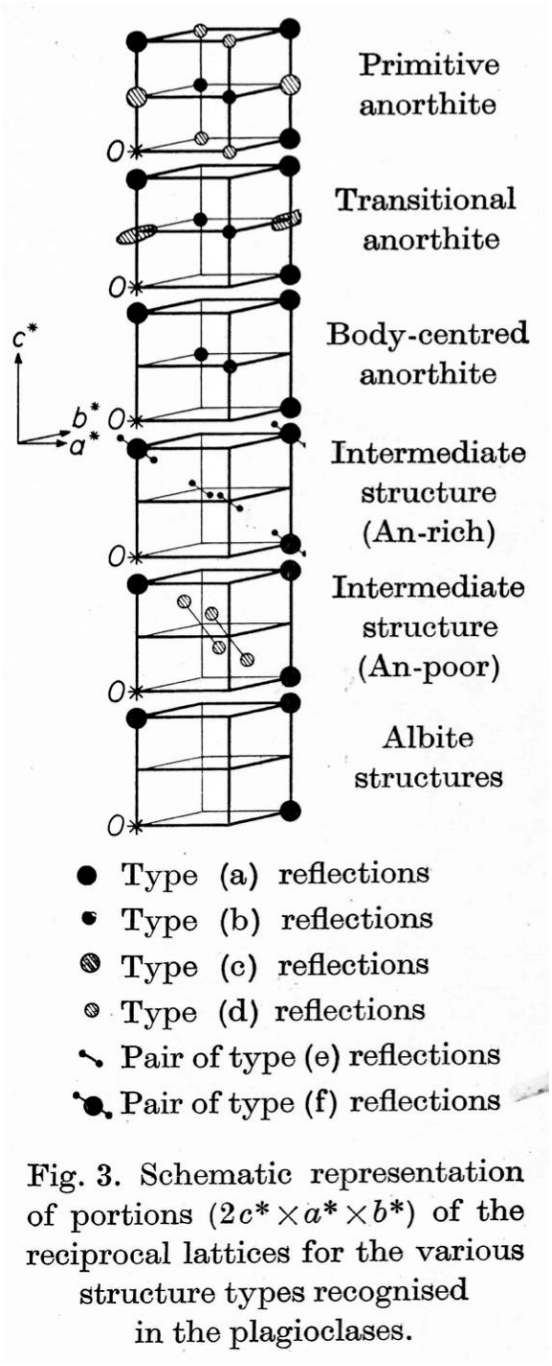


Fig. 3. Schematic representation of portions ($2c^* \times a^* \times b^*$) of the reciprocal lattices for the various structure types recognised in the plagioclases.

Figure 3. This is a figure from the original, definitive paper on diffraction patterns of natural plagioclase feldspar crystals: Bown and Gay (1958) Zeitschrift für Kristallographie vol 111, p1-14.