it is about 95°. The general distribution of intensities in diffraction patterns from rotation about corresponding short axes of the two forms are distinctly different, particularly in subcell regions. Though insufficiently sharp for accurate measurement, there is no doubt of the existence of different structures. These will be compared when more satisfactory data on the high-temperature form have been obtained.

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Conical crystals of graphite.

By TAKURO TSUZUKU, *Technical Research Laboratory, Tokai Electrode Manufacturing Company Limited, Daigiri, Fujisawa-City, Japan* and TSUTOMU KOMODA, *Hitachi Central Laboratory, Kokubunji, Tokyo, Japan*

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In the course of an investigation of artificial graphite, using a three-stage electron microscope (HU-9 type made by the Hitachi Company Limited), we found apparently circular crystals (Fig. 1(*a*)) in addition to hexagonal crystals (Fig. 1(*b*)) (Tsuzuku & Komoda, 1955). The specimen examined was prepared from carbon black by a heat treatment at about 2500° C. A circular crystal gives spotty electron-diffraction rings accompanied by ellipses and diffuse bands (Fig. 1(*c*)), while an hexagonal one produces the ordinary diffraction pattern of a graphite monocrystal, i.e. an hexagonal net pattern accompanied by Kikuchi lines.

The spotty rings suggest that the circular crystal is a stack of thin graphite layers, each of which is successively rotated about a common axis in the *c* direction (Wilman, 1950). Moreover, the ellipses and diffuse bands suggest that the stack is not a plane disc but is slightly conical, somewhat like a lotus leaf. The conical form of the crystal is proved by the fact that the folded crystals do not show perfect semi-circles; for example, in Fig. 1(*d*) the two radii along the folded lines make an angle of about 167° instead of 180°. Such a conical crystal can be formed by spiral mechanism (Frank, 1949) if after mechanical buckling a thin layer of graphite overlaps, forming a cone (Fig. 2(*a*)). In the specimen shown in Fig. 1(*d*) it is easy to calculate that the angle formed by the overlapping is about 26°, which also represents the orientation difference between the adjacent layers in the stack. The circular loops observed in Fig. 1(*a*) seem to be the growth front, which is centred by the screw dislocation.

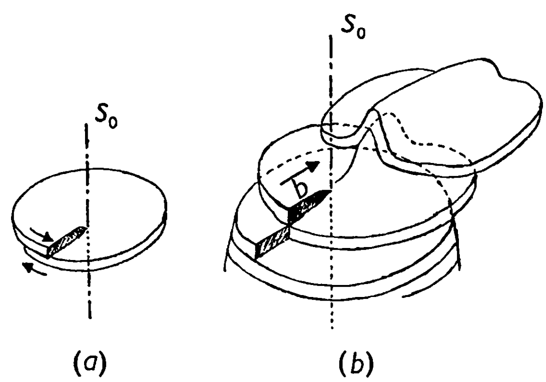

Fig. 2. (*a*) Deformation into a cone (S_0: screw dislocation). (*b*) Gliding of a helical stack of conical crystal sheets.

A remarkable gliding of an apparently circular crystal is reproduced in Fig. 1(*d*). At first it seems improbable that circular discs glide away from a helical stack of conical sheets. However, this is possible by the mechanism illustrated schematically in Fig. 2(*b*). According to this mechanism, the initial screw dislocation is successively cancelled in each disc (Dawson & Anderson, 1953) and a fairly sharp fold should be produced at the same time. It is most striking that the fold is generally observed as in Fig. 1(*e*). In Fig. 1(*f*) we can see some split sheets at the position indicated by the arrow *A*, which may suggest that the gliding in this case is not smooth. It is supposed that the initial screw dislocation is not cancelled in this case, but is cut into some shorter segments through the collapse of the stack, holding a spiral structure in each cleft sheet. The arrow *B* indicates a point of emergence of such a dislocation segment on a cleavage surface.

Finally, it is remarked that the gliding leads to the intersection of moving dislocations with the initial screw axis, which may occur in a very special manner owing to the characteristic conical structure. A detailed description of this mechanism, together with that of the experimental observation, will be published in the near future in the *Journal of the Physical Society of Japan*.

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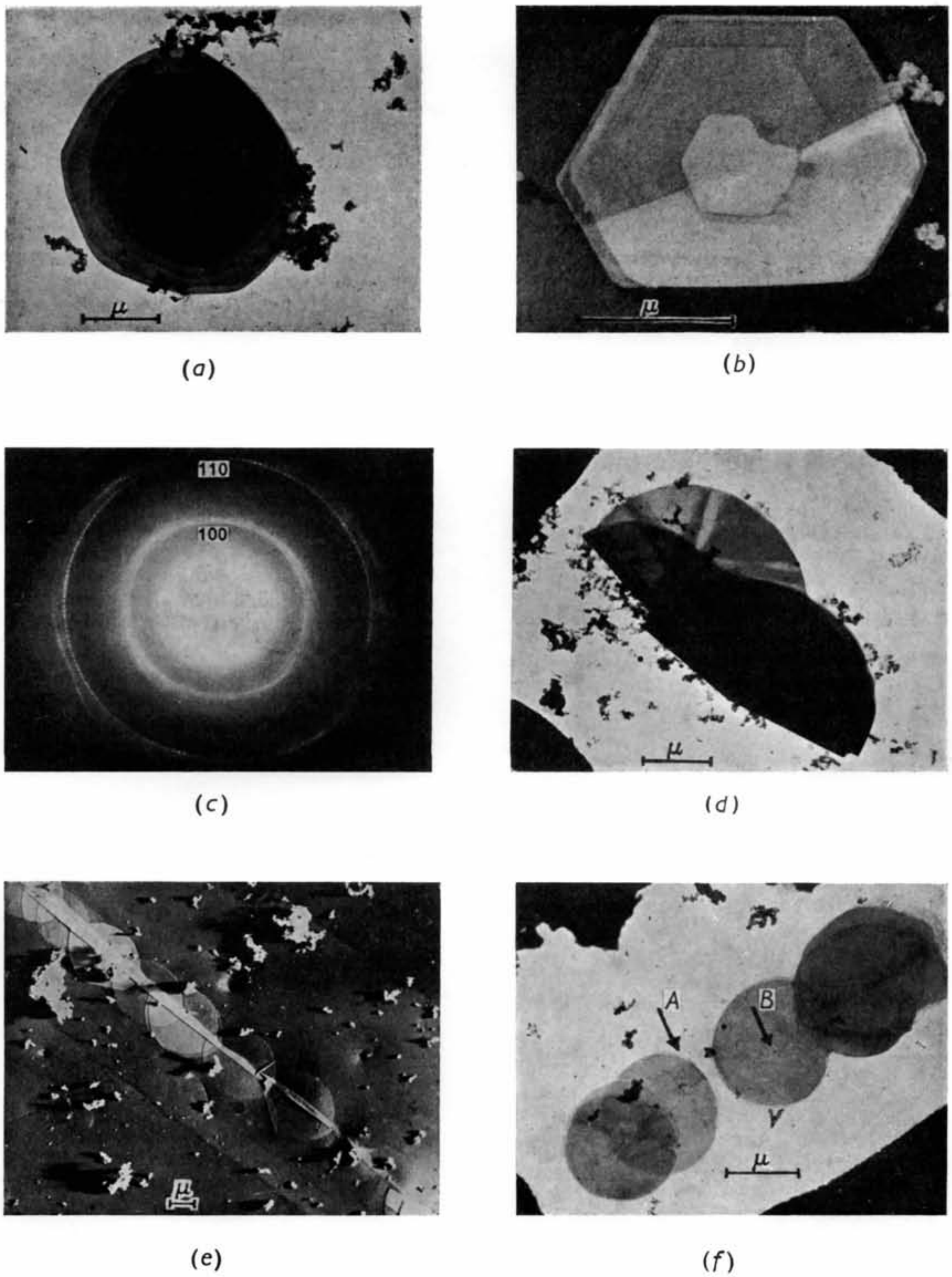

Fig. 1. (*a*) Apparently circular crystal. (*b*) Hexagonal crystal. (*c*) Diffraction diagram corresponding to (*a*). (*d*) Folded conical crystals. (*e*) Typical gliding. (*f*) Cleft sheets holding spiral structure.