From strain-energy considerations,[11] the array and the intersecting dislocation are interpreted to have Burgers vectors $\frac{1}{2}\,a\,\langle 111\rangle$, such as $\frac{1}{2}\,a\,[111]$ and $\frac{1}{2}\,a\,[\bar{1}\bar{1}1]$; these dislocations may combine to form an $a\,[001]$ dislocation, which constitutes the third set in the network.

The observed network also permits an approximate estimation of the energy of the dislocations: In order for an $a\,\langle 100\rangle$ dislocation to be stable with respect to dissociation into two $\frac{1}{2}\,a\,\langle 111\rangle$ dislocations, the condition $E_{100}<2E_{111}$ must be satisfied. Geometrical configuration of the network imposes an even more stringent energy requirement of $E_{100}<\sqrt{2}E_{111}$, in order for the $a\,[001]$ segments to form.

For local equilibrium at point A in Fig. 1(b), the condition $\cos(\theta/2)=x=E_{100}/2E_{111}$ must be satisfied. Also, regardless of the orientation of the plane in which the dislocation array lies,

$$L_1/L_2=-2x^2/(2x^2-1). \tag{1}$$

Now, the observed dislocation network indicates that $L_1\cong L_2$. Therefore, from Eq. (1), $E_{100}\cong E_{111}$.

Again, the energy E of a mixed dislocation may be expressed[12] as

$$E=E_{\text{core}}+Ab^2(1-\nu\cos^2\alpha), \tag{2}$$

where A is a term involving elastic constants and crystal size, b is the magnitude of the Burgers vector, ν is Poisson's ratio, and α is the angle between the Burgers vector and the dislocation line.

Now, from the above interpretation, $E_{100}\cong E_{111}$ of the experimental observation, and from Eq. (2) even the most unfavorable combination of screw-edge characters of individual dislocations yields a maximum permissible value of E_{100}/E_{111} of 1.9. Comparing this with the previous estimate that a straight $a\,\langle 100\rangle$ dislocation with $E_{100}/E_{111}>2$ is unstable, evidently a straight $a\,\langle 100\rangle$ dislocation is stable in this system.

Thus, combining two $\frac{1}{2}\,a\,\langle 111\rangle$ dislocations to form an $a\,\langle 100\rangle$ dislocation is seen to be energetically favorable in a bcc stainless steel. However, probably because of a high Peierls' barrier[13] for glide of the $a\,\langle 100\rangle$ dislocation and/or more frequent nucleation[14] of the $\frac{1}{2}\,a\,\langle 111\rangle$ dislocations, the $\frac{1}{2}\,a\,\langle 111\rangle$ dislocation is commonly observed as the principal slip dislocation.

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[1] M. J. Whelan, Proc. Roy. Soc. (London) **A149**, 114 (1959); *Fourth International Conference on Electron Microscopy* (Springer-Verlag, Berlin, 1960), p. 539.
[2] P. B. Hirsch, P. Partridge, and R. Segall, Phil. Mag. **4**, 721 (1959).
[3] H. M. Tomlinson, Phil. Mag. **3**, 867 (1958).
[4] J. Silcox, *Fourth International Conference on Electron Microscopy* (Springer-Verlag, Berlin, 1960), p. 552.
[5] J. W. Menter and D. W. Pashley, *Structure and Properties of Thin Films* (John Wiley & Sons, Inc., New York, 1959), p. 112.
[6] G. A. Geach and R. Phillips, *Fourth International Conference on Electron Microscopy* (Springer-Verlag, Berlin, 1960), p. 571.
[7] J. Venables (unpublished); photomicrograph reproduced by P. B. Hirsch, J. Inst. Metals **87**, 406 (1959). D. McLean (unpublished); photomicrograph reproduced by N. P. Allen, J. Iron Steel Inst. (London) **191**, 1 (1959).
[8] A. S. Keh, J. Appl. Phys. **31**, 1501 (1960).
[9] J. M. Capenos, J. J. Hauser, and B. R. Banerjee, ASTM Spec. Tech. Publ. "Symposium on electron metallography" (to be published).
[10] J. J. Hauser, J. M. Capenos, and B. R. Banerjee (to be published).
[11] F. C. Frank, Physica **15**, 131 (1949).
[12] A. H. Cottrell, *Dislocations and Plastic Flow in Crystals* (Oxford University Press, New York, 1956).
[13] R. Peierls, Proc. Phys. Soc. (London) **52**, 34 (1940).
[14] D. Kuhlmann-Wilsdorf, Phil. Mag. **3**, 125 (1958).

Errata: Influence of Arsenic Pressure on the Doping of Gallium Arsenide with Germanium

[J. Appl. Phys. **31**, 2065 (1960)]

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THERE are sign errors in Eqs. (2) and (5). These equations should be as follows:

$$N_{\text{Ge}A}/N_{\text{Ge}B}=K_2N_{VA}/N_{VB}; \tag{2}$$

$$\frac{N_{\text{Ge}A}}{N_{\text{Ge}B}}=\left(\frac{P_B}{P_{BO}}\right)^{2r}. \tag{5}$$

Errata: Impedance of a Top-Loaded Antenna of Arbitrary Length over a Circular Grounded Screen

[J. Appl. Phys. **35**, 553 (1954)]

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THERE are errors in sign in Eqs. (14) and (15). These equations should be as follows:

$$H_\phi^\infty(\rho,0)=\frac{iI_m}{2\pi}\left[\frac{\exp(-i\beta r)}{\rho}\cos(\beta h-\alpha)-\frac{\exp(-i\beta\rho)}{\rho}\cos\alpha+\frac{ih}{\rho}\frac{\exp(-i\beta r)}{r}\sin(\beta h-\alpha)\right]; \tag{14}$$

$$\Delta Z=-\frac{\eta}{2\pi\sin^2\alpha}\{\cos^2(\beta h-\alpha)I_5+\cos^2\alpha I_6-h^2\sin^2(\beta h-\alpha)I_1 -2ih\cos\alpha\sin(\beta h-\alpha)I_3-2\cos(\beta h-\alpha)\cos\alpha I_4+2ih\sin(\beta h-\alpha)\cos(\beta h-\alpha)I_2\}. \tag{15}$$

Equation (16) is obtained from Eq. (15) by specifying that $\alpha=\beta h$. For this particular value of α, the two terms which are in error in Eq. (15) vanish; therefore, Eq. (16) is correct.

Books Reviewed

Prompt, noncritical reviews appear in this column. Critical reviews of many of the books described here will appear in Physics Today, The Review of Scientific Instruments, *or* American Journal of Physics.

Theory and Application of Ferrites. Ronald F. Soohoo. Pp. 280. Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1960.

This book combines theory and application of ferrites at microwave frequencies with those of ferrites below microwave frequencies. It includes, in addition to data already available in some form, considerable material that is original with the author. The author's treatment is comprehensive, but sufficiently introductory to serve as a self-study aid for junior physicists and engineers.

Part I treats the theory underlying the theory of ferrite behavior; applications are discussed in Part II.