

- 15 K. Relander, "Austenitizierfalleines 0.18% C-2% Mo Stahles im Temperaturbereich der Perlitstufe," *Acta Polytechnica Scandinavica*, Series Ch, no. 34, Helsinki, 1964.
- 16 E. Baerlecken and H. Fabritius, *Archiv für Eisenhüttenwesen*, vol. 33, 1962, p. 261.
- 17 E. Szabo, *Brown Boveri Mitteilungen*, no. 49, 1962, p. 532.
- 18 R. J. Low, *Fracture*, John Wiley, New York, N. Y., 1959, p. 91.
- 19 A. M. Turkalo and R. J. Low, *Trans. AIME*, vol. 212, 1958, p. 750.
- 20 K. J. Irwine and F. B. Pickering, *Journal of the Iron and Steel Institute*, vol. 187, 1957, p. 292.
- 21 K. J. Irwine and F. B. Pickering, *ibid.*, vol. 201, 1963, p. 518.
- 22 M. Kroneis, R. Gattinger, and E. Krainer, *Berg- und Hüttenmännische Monatshefte*, vol. 106, 1961, pp. 434.
- 23 A. L. Smith, E. A. Jenkinson, D. J. Armstrong, and L. M. T. Hopkin, *Journal of the Iron and Steel Institute*, vol. 196, 1960, p. 117.
- 24 C. Roques, mentioned under [25].
- 25 H. G. A. Bates and K. A. Ridal, Joint International Conference on Creep, London and New York, Book I, pp. 1-99.
- 26 M. C. Murphy, D. Dubal, and A. Chitty, *Metallurgia*, vol. 71, 1965, p. 13.
- 27 G. J. P. Bucki, J. H. R. Page, and M. P. Sidey, *Journal of the Iron and Steel Institute*, vol. 203, 1965, p. 291.
- 28 T. Geiger, *Metal Progress*, vol. 87, June, 1965, p. 68.
- 29 E. Smith and J. Nutting, *British Journal of Applied Physics*, vol. 7, 1956, p. 214.
- 30 G. R. Booker, J. Norbury, and H. L. Sutton, *ibid.*, vol. 8, 1957, p. 155.
- 31 J. Plateau, G. Henry, and C. Crussard, *Rev. Metallurgie*, vol. 54, 1957, p. 200.

## DISCUSSION

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Have the authors done metallurgical work on creep specimens after the creep tests?

During creep there can be important structural changes and when the structure changes during the test you are not really comparing the properties of, for instance, upper bainite and ferrite.

### Authors' Closure

We have examined all creep test specimens under the optical and electron optical microscope. No doubt structural changes take place during the creep test such as, for example, precipitation, solution, and coagulation of iron and alloy carbides and recrystallization resembling phenomena in the matrix of, in particular, bainite and martensite. However, in the present case, emphasis was laid on the influence of the initial microstructure on properties because just the initial microstructure, which to quite an extent can be controlled by manufacturing processes, affects the impact and creep properties strongly.

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