thesis advanced by Pask (3), react with the silicon atoms in the glass less strongly. The surface energy of the interface would increase and this would reflect itself in an increased contact angle.

Such a hypothesis does not completely explain the low change of contact angle with temperature, nor does it account for the apparently fixed and permanent character of the conditioned platinum surface unless this were protected by an undetectable, impermeable glass layer. The results of some wetting tests now being undertaken at very low partial pressures of oxygen might help to resolve some of these apparent anomalies.

From the viewpoint of the technologist in the glass industry the implications of the present experimental results are perfectly clear. Pure platinum is generally employed as a batch melting crucible. The interior of such a crucible, being constantly in contact with molten glass, should remain passivated. Although the glass will change the equilibrium contact angle would correspond roughly to the upper curves in Fig. 9 and should therefore change little with temperature.

Summary and Conclusions

Contact angle determinations made in air on a specially designed hot stage microscope have demonstrated the complexity of the high temperature relationships between pure platinum and molten glass. The first test results seemed to indicate that the equilibrium contact angle, after decreasing rapidly above 900°C, arrived at a minimum close to 1100°C and then increased with rising temperature. This effect, however, appears to be caused by irreversible changes in the characteristics of the platinum surface. Fresh glass added to platinum that has been previously conditioned in contact with glass at high temperature very rapidly assumes an equilibrium contact angle which is almost invariant with temperature. Glass melted in contact with platinum which has not received this "conditioning" treatment first assumes a lower contact angle and then tends to approach the equilibrium value at a rate which depends on the temperature level. The two types of apparently stable contact angle seem to reflect differences between platinum surfaces with and without adsorbed layers of oxygen and these results suggest profitable lines for further investigation.

Acknowledgments

The glasses used in this research were supplied by Mr R. C. Jewell, of Pilkington Brothers Ltd, to whom the authors would like to express their thanks for continued interest and encouragement. Acknowledgments are also due to Mr J. Barker who carried out many of the earlier determinations.

References

1 M. G. Cherniak and G. G. Naidus, *J. Tech. Physics, U.S.S.R.*, 1957, **27** (10), 2268–2272
2 Private communication from Mr R. C. Jewell
3 J. A. Pask and R. M. Fulrath, *J. Am. Ceram. Soc.*, 1962, **45** (12), 592–596

Anodic Protection for Sulphuric Acid Tank Car

The technique of anodic protection as a means of preventing corrosion has been described in this journal (*Platinum Metals Rev.*, 1960, **4**, 17 and 86; 1963, **7**, 94) and a number of successful applications of the method have been reported in the literature. An unusually interesting example of this simple and inexpensive method has now been reported by the Anotrol Division of Continental Oil Co, who have for some time made available suitable equipment for this purpose.

For over a year one of these units has been in operation on a stainless steel tank truck used to transport 93 and 99 per cent sulphuric acid. The equipment includes a potential controller, a reference electrode, and a platinum cathode, current being derived from the normal battery in the truck. The protective film on the stainless steel is maintained by a pulse of 25 to 30 amp for one or two seconds every ten minutes. The installation reduced iron pick-up in the acid carried from around 10 to 15 p.p.m. down to 2.5 p.p.m. for the 99 per cent and 1.6 p.p.m. for the 93 per cent acid.