mechanism are very striking. In the first place, when carbon is present on the surfaces the amount of arcing in any given electrical circuit is usually appreciably increased. The carbon particles which produce activation permit breakdown at contact separations which would normally be too great to permit any arcing at all to take place. Evidence is quoted which suggests that the carbon particles may, in many instances, move under the electrostatic force and so physically change the length of the contact path. These effects may be considered to be injurious as they may increase the total loss of contact material during operation. In many circuits, it may also be impossible to protect activated contacts against severe arcing by the conventional arc-suppression net-works.

On the other hand, activation may actually improve the performance of a pair of noble metal contacts by altering the distribution of wear. When carbon is absent, the usual effect of arcs at the making and breaking of clean contacts produces transfer of metal from one contact to the other in such a manner as to form a pit on one contact and a corresponding mound on the other. The arc tends to strike at the same region at each operation, and in some conditions the mound may lock in the crater and cause the contacts to seize together. When carbon is present on the surfaces, however, successive arcs occur at different places and the resulting erosion tends to be smooth, the electrodes being worn down uniformly all over their surfaces. This is because each arc burns off carbon at its centre and at the same time produces more carbon around its periphery where the metal is cooler. The next arc then strikes on a newly carbonised surface.

The conclusions reached from this work are of considerable practical and theoretical importance. The understanding they give of the mechanism of the contact behaviour of the platinum metals is likely to assist greatly in improving the performance of such contacts in service. They provide for the first time an understanding of the nature and origin of the mysterious black deposits which sometimes form on platinum metal contacts.

In low duty contacts, where these black deposits may be harmful by increasing contact resistance, it would appear that the deposits can be avoided by taking steps to keep all possible sources of unsaturated ring organic compounds away from the neighbourhood of the contacts and possibly also by providing free circulation of air. In contacts carrying heavier currents, where black deposits are less likely to interfere, a small amount of carbon formation may be helpful in encouraging uniform contact wear and preventing the formation of " spikes ".

# Platinum Alloy Permanent Magnets

The Director of Research of the Permanent Magnet Association, Mr. J. E. Gould, has written to point out that Columax, which has been in production in this country for some years, has a higher value of $(BH)_{max}$ ($7$ to $8 \times 10^6$) than any of the commercial permanent magnet materials quoted in the table accompanying the article on "Platinum Alloy Permanent Magnets" in our last issue. It thus can be said to provide permanent magnets as powerful as those which can be made from cobalt-platinum alloys.

Columax is the name given to Alcomax magnets which have been cast (by special foundry technique) in such a way that columnar crystals are developed oriented in the preferred axis of magnetisation.

It is fair to emphasise that the coercive force of cobalt-platinum permanent magnets, 4000 oersteds, is well above that of Columax (840 oersteds) and that the cobalt-platinum alloys, unlike any of the cast materials, are ductile before hardening and so can be readily fabricated.