Fig. 1. Dependence of effective area on pressure for steel piston–cylinder assembly of nominal area 0·02 sq. in.

so far as may be practicable, and some further interesting possibilities of the similarity method are under investigation. Full details of this work will be published in a further paper. From the nature of the method it seems that it should be applicable over virtually any range over which pressure balances can be used, and in which two materials having the necessary properties are available. The main difficulty in the method resides in the construction of the highly accurate pistons and cylinders which are required. Once these are available, the experimental work in determining the variation of effective area is simple, quick and convenient.

We have so far dealt only with the variation in effective area with pressure, but at some point of the scale the effective area must be measured in absolute terms. This link is most easily made at a low pressure where distortion is known to be negligible. The present procedure at the National Physical Laboratory is to use two independent methods to obtain this measurement : (a) direct measurement by balancing at a low pressure against a mercury manometer ; (b) by computing the effective area from the measured dimensions of the piston and cylinder.

These two methods of measurement have given agreement to within 2 parts in 10^5 ; but it is thought that this accuracy can be somewhat improved.

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