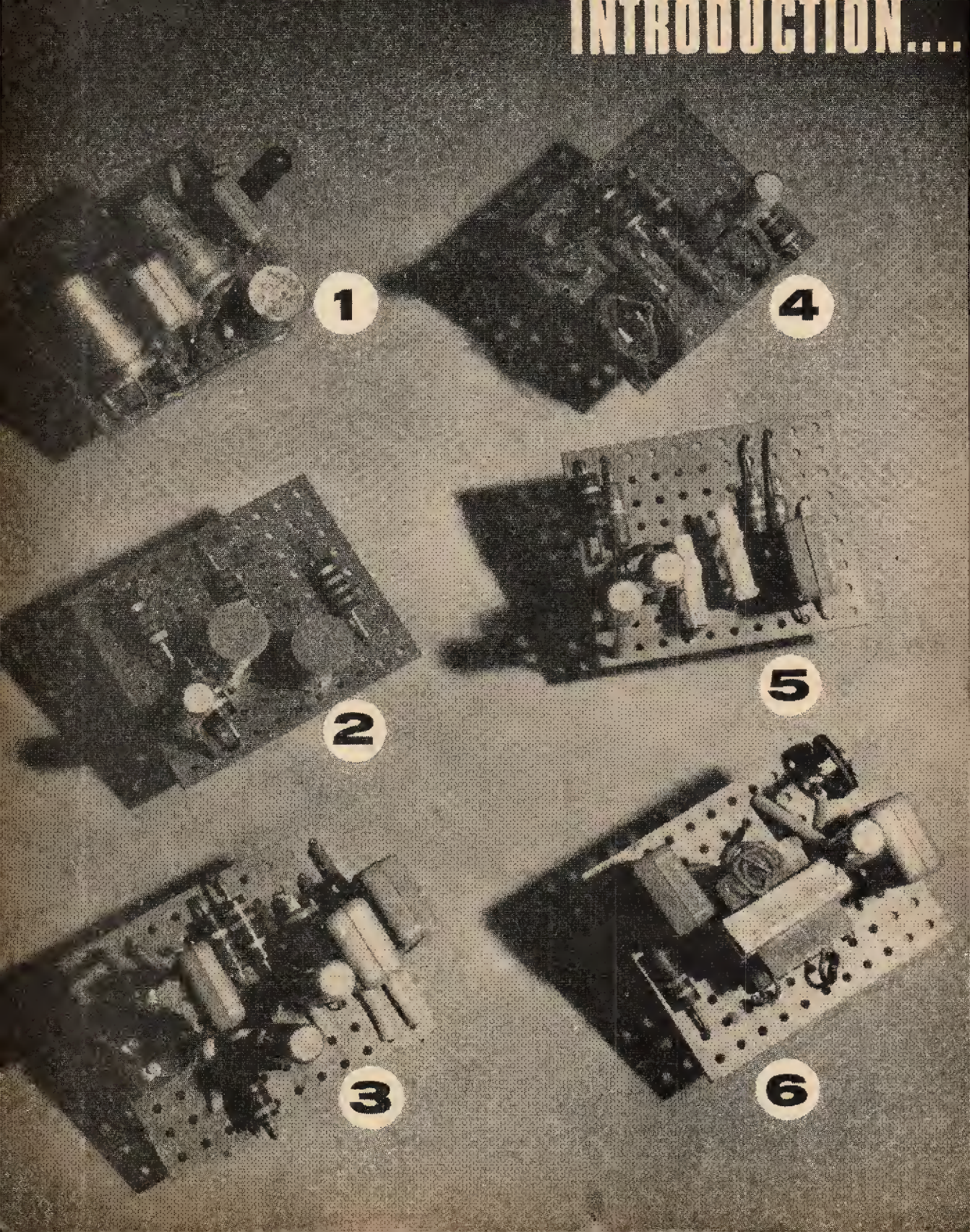
# INTRODUCTION.....



# ....TO LAMINATED WIRING BOARD

## By Gordon J. King

IN this month's issue we are giving a free sample of a modern type of laminated wiring board (Veroboard) which many readers will recognise from previous articles. The following articles illustrate, with practical circuits, some of the ways in which it can be used to provide inexpensive miniature units. We stress, however, that only *one* piece is provided *free*.

This sample piece has been manufactured specially for PRACTICAL ELECTRONICS and is *not* generally available in the size given. However, among the larger sizes available the most suitable for general circuit construction are as follows:

| | | |
|---|---|---|
| Type 42/1503 | 2·5in × 5in | 16 copper strips |
| 43/1504 | 2·5in × 3·75in | 16 copper strips |
| 45/1507 | 3·75in × 5in | 24 copper strips |
| 46/1508 | 3·75in × 3·75in | 24 copper strips |

Before going into the details of the individual units, it may be of interest to discuss some of the methods which have been used in electronic circuit construction in the past, followed by a brief description of Veroboard itself.

Our counterparts of a decade or two back found it necessary to commence a project in electronics first by creating a metal chassis, on which the circuit in mind could be tailored. Prior to this, a slab of timber (hence the term "breadboard", which is used still today) or ebonite formed the foundation of the construction exercise.

In this present age of the printed circuit and solid state electronics, we no longer need to resort to the vintage breadboard methods of our fathers. We can, if we wish, etch printed circuits to our own requirements. This is not an unduly difficult task, but it does demand the use of chemicals and a certain amount of drawing experience.

An alternative method features perforated resin-bonded laminate and terminal pins. The pins are designed to push tightly into the holes in the board, as required by the circuit design.



The wires on the components are then soldered to the pins; the circuit wiring is processed beneath the board. The mechanics of this method are similar to those of the printed circuit board, since the components are held by their connecting wires and electrically connected by soldering. The conductors in this case, of course, are ordinary wires and not printed wiring.

A good compromise between perforated boards and home-made printed circuit boards, from the point of view of the practical experimenter in electronics, is Veroboard. This is essentially a universal wiring panel which follows a set pattern of straight parallel copper strips bonded to a piece of s.r.b.p. (synthetic resin bonded paper). Assembly and soldering techniques, similar to those used in printed circuit wiring, can be adopted without the need for detailed planning and etching.

A study of the sample piece (1⅝in × 1¾in, 99 holes) presented with this issue will reveal that a set pattern of holes has been provided making up a matrix with a pitch of 0·15in × 0·15in between adjacent centres. The copper strips are 0·1in wide, 0·0015in thick and spaced 0·05in apart.

They form the interconnecting wires between components, which are laid across the board on the plain side (see later articles). The component wires are bent as required, passed through the appropriate holes and soldered to the copper strips. Any surplus wire can be cut off. A variety of component layouts can be achieved by cutting the copper strips and using wire links where necessary.

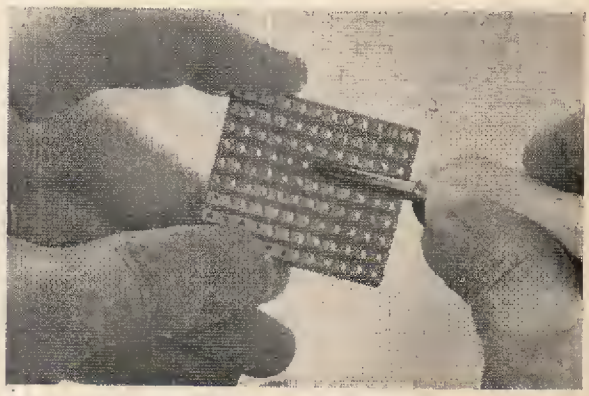


*Fig. 1. Breaking the copper strips. The spigot on the end of the tool is located in the appropriate hole; the tool is then turned clockwise to cut the strip*

*Fig. 2. General view of the tool with an enlargement showing the details of the cutting edges. The inset drawing shows the effect of using the tool on the copper strip*

## COPPER STRIP BREAKS

It is not unduly difficult to process the breaks in the copper strips. There are a number of obvious methods of doing this which do not call for skill.

There is a special tool which can be used if a neat clean finish is required (see Fig. 1). As will be seen from the photograph in Fig. 2 it looks like a short twist drill, with a spigot in the centre for locating in the hole of the board. It is available from the makers of Veroboard (Vero Electronics Limited, South Mill Road, Southampton) and from a number of retailers under part number 2030/3011.

An alternative method is to use a sharp thin bladed penknife, adopting a backward and forward "sawing" action. The piece of copper to be removed should be cut on either side of the hole. It can then be lifted by inserting the blade carefully under the copper.

**The following articles will be concerned with showing how a piece of Veroboard of such small dimensions can be used to build a number of interesting and useful electronic devices.**