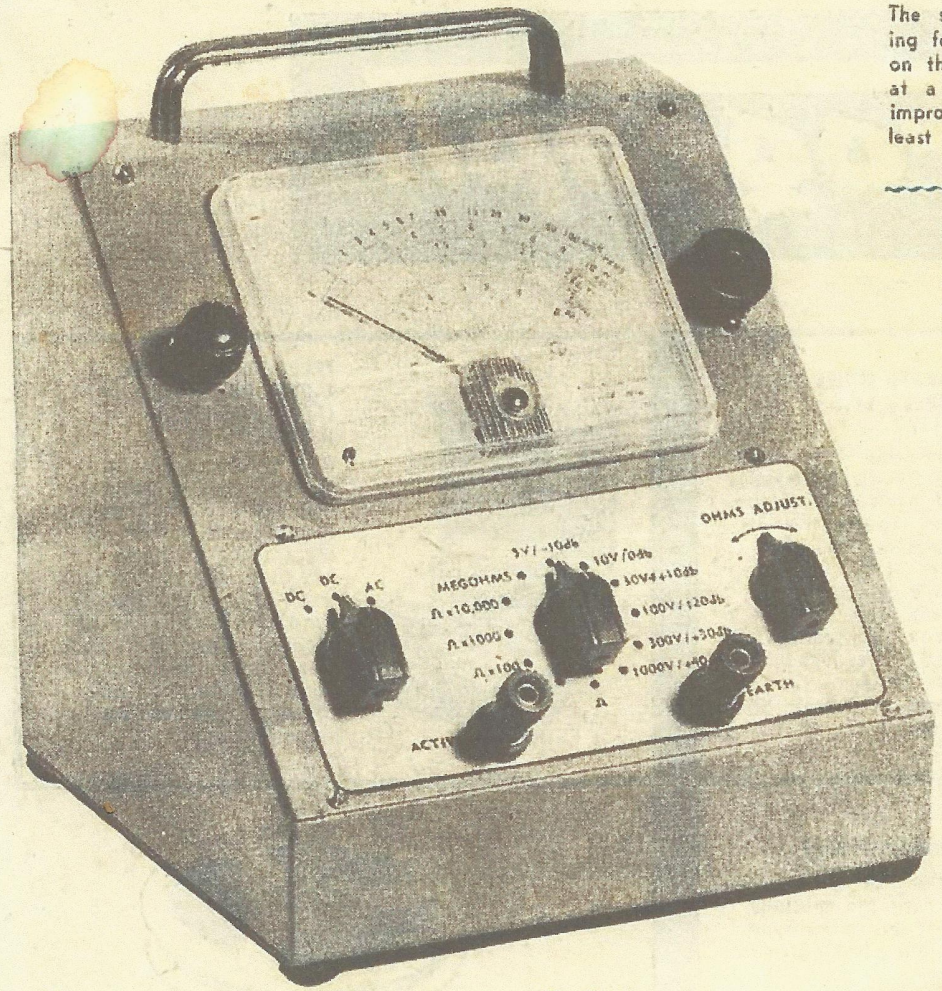

The sloping panel case is an excellent housing for the VTVM, being small enough to use on the bench and presenting the meter face at a convenient angle. The label shown was improvised photographically, but we expect at least one manufatcurer to produce a complete etched panel.

Bench Type Vacuum-Tube Voltmeter

Here is an instrument which should have a very wide appeal to our more advanced readers. A VTVM embodying nearly all the features of our Senior VTVM, yet considerably smaller, simpler, and cheaper. If you want a bench type VTVM that is as easy to use as a multimeter, then this should be the job for you.

by Philip Watson

THE design is a natural outcome of the work we did last month in producing the improved version of the 1949 V.T.V.M. These improvements were so encouraging that, even before we wrote last month's article, we felt we should carry the idea to its logical conclusion and produce a completely new instrument, embodying these and as many additional improvements as possible.

Another inspiration was the Senior V.T.V.M. of January 1956. The operating convenience of this instrument, its constant zero, freedom of ambiguity of any kind, and all-round reliability has always impressed us, and we felt it was a worthy standard at which to aim.

At the same time, the type of instrument we had in mind was rather different. We felt that there exists a definite need for a reasonably compact V.T.V.M., such as may be used on the bench in the same manner as conventional multimeter; taking up no more room and needing — ideally — no more adjustment or attention.

It seemed that if we could embody most of the worthwhile features of the Senior V.T.V.M. in a sloping panel bench-type instrument and, at the same time, make a worthwhile reduction in circuit complexity and cost, we would have a meter with a very wide appeal. This, then, was our aim: A reasonably simple, moderate-cost instrument, which would be as easy to use as a multimeter.

In more precise terms, some of the features we wished to retain are as follows:

Two input terminals only. This may seem a small point, but having to select special terminals for routine measurements is just one more job to be done, and one more thing to remember. When working under pressure, it is bound to cause some annoyance.

Six voltage and resistance ranges. Anything less would either call for a special scale or make necessary awkward mental multiplication of the existing scales.

METER SCALE

We were further influenced in this regard by a desire to use the Senior V.T.V.M. scale. As well as being a clear and easy-to-read scale, it employs a skilful arrangement of ranges so as to permit even additions of 10 db to be made for each higher range — a very useful feature when making loss or gain measurements.

Elimination of the "Cal. Adjust." control was regarded as essential, as was the contact potential effect on the low AC ranges. A constantly changing zero is not only a source of annoyance, but can result in serious reading errors if the operator slips up on this adjustment, due to concentration on the job in hand.

The ability to establish a center zero position is also desirable. This is mainly required when balancing an F.M. discriminator, and is a most useful feature.

We took as our basic circuit the arrangement developed for last month's article, i.e., one twin triode in a balanced bridge circuit, and a second twin triode as a cathode follower input stage and rectifier for the AC ranges. Once again, it proved itself to be completely free from grid current effects or zero drift problems of any kind.

The only change was the substitution of miniature valves for the 6SN7. While the latter could still be used, we felt that the saving in space provided by the smaller types was worth while. We were further encouraged in this idea by the recent release of the 6CG7, which is virtually a 6SN7-GTA in miniature.