This instrument works from A.C. mains and operates a six-figure counting train, one unit corresponding to one microvolt-hour. The integrator is arranged to handle electromotive forces ranging from −150 to +300 microvolts. A description of the apparatus is being prepared for publication.

A. F. DUFTON.

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Method of Registering Multiple Simultaneous Impulses of Several Geiger's Counters.

PROF. W. BOTHE in the *Zeitschrift für Physik* (vol. 59, p. 1) describes a method for registering simultaneous impulses of two Geiger's counters, which depends principally on the working of a two-grid thermionic valve. Lately, I have had the opportunity of experimenting with a circuit which perhaps is simpler and at the same time has the advantage that it can be extended also to the registering of triple

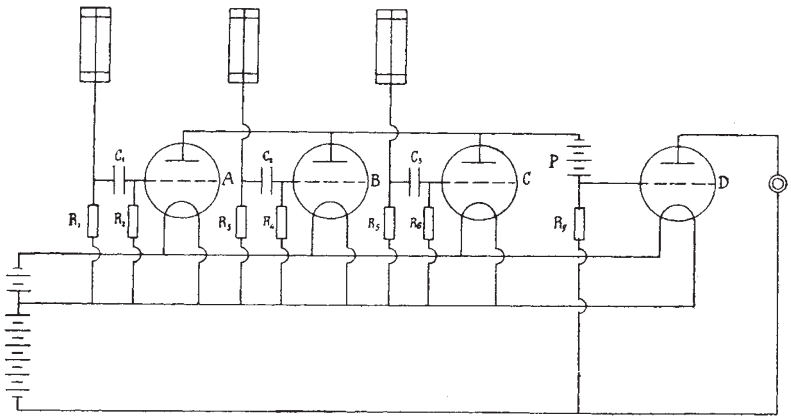

FIG. 1.

simultaneous impulses or even more. The circuit adopted (for triple coinciding impulses) is shown in the accompanying diagram (Fig. 1).

$R_1, R_3, R_5 = 5 \times 10^9$ ohms.
$R_2, R_4, R_6, R_7 = 8 \times 10^6$ ohms.
$C_1, C_2, C_3 = 10^{-4}\ \mu F$.

The positive electrodes of the three counters (in my experiments I have used Geiger's wire counters) are electrostatically coupled to the grids of the three valves *A*, *B*, *C*. In normal conditions these grids have a zero potential; whenever a discharge occurs they become negative, thus interrupting the current flow.

As the resistance R_7 is very great compared with the internal resistances of the valves *A*, *B*, *C*, their anodes are at a potential near to zero. The grid of the valve *D* (for the introduction of the auxiliary battery *P*) is at a slight negative potential. This potential varies very little when only one or two counter tubes are working, while it undergoes a sudden rise when, for the simultaneous working of the three counter tubes, the current is interrupted in all the three valves.

The consequent variation of the anode current (eventually amplified by a fifth valve) is acoustically detected by a telephone.

The circuit arrangement, in regard to the counter tubes, is perfectly symmetrical, a condition which is not fulfilled in the circuit of Prof. Bothe, because the grids of the two-grid valve have rather different characteristics.

It appears that the triple coincidences method is the only one available for studying the form of the paths of cosmic rays, and I mean to employ it in experiments on the magnetic deviation of these radiations.

BRUNO ROSSI.

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the University of Florence,
Arcetri, Italy, Feb. 7.

The Conversion of α Benzilmonoxime into the β Oxime by Animal Charcoal.

DURING the course of an investigation into the properties of the isomeric monoximes of benzil, we have made the following somewhat startling observation.

We have been able to devise a method for estimating mixtures of the α and β oximes and have shown that the α oxime shows no appreciable change into its isomer (which is the more stable of the two) in solution in alcohol or benzene at 50° in a period of thirty-six hours, and that the change is not accelerated by acids or alkalis when present in small concentration. On the other hand, if a benzene solution of the α oxime is boiled with animal charcoal for a few seconds, the change is complete and no α oxime can be detected in the solution.

Finely powdered soft-wood charcoal and powdered silica gel showed no such effect, the α oxime being recovered unchanged. Finely divided calcium phosphate is also without action. That the conversion does not arise from the action of catalysts dissolved from the charcoal by the benzene is shown by boiling some benzene with animal charcoal, filtering off the charcoal, and using the filtrate as a solvent for the α oxime; there is no conversion into the isomer.

This observation suggests that care should be exercised in the use of animal charcoal as a decolorising agent in the purification of isomers of the type of this α oxime. A full account of our work on this subject will be published later elsewhere.

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Fluorescent and Phosphorescent Substances.

SUBSTANCES which fluoresce strongly under the influence of X-rays are barium and magnesium platinocyanides and cadmium tungstate. The formulæ of these compounds, as given by Werner, are as follows:

$[Pt(CN)_4][Ba(H_2O)_4]$,
$[Pt(CN)_4][Mg(H_2O)_7]$,
$[WO_4]Cd$.

An atom of high stopping power with four light atoms or radicals arranged about it, perhaps tetrahedrally, and a bivalent positive ion, are present in all.

With the first part of the formulæ may be compared the structure of zinc sulphide and diamond, which phosphoresce in X-rays; phosphorus and yellow arsenic exhibit phosphorescence on oxidation, and arsenious oxide is luminous on crystallisation from acid solution.

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