38. On the Stability of the Tube Potentiometer.

Toshio Yoshida, Takuji Yanabu, Yoshiaki Uemura and *Kiichi Kimura.*

In the present experiment, the stability of the DuBridge and Browns' balancing circuit of a single tube potentiometer with UX 54 tube is studied. The balancing conditions of this circuit are:

i) $e=0$

ii) $\frac{de}{dI_f}=0$

where e is the potential difference across the galvanometer, and I_f is the filament current. It has been found that there were two cases where the above conditions were satisfied, namely, $\frac{d^2e}{dI_f^2}>0$ and $\frac{d^2e}{dI_f^2}<0$. We are going to know which is preferable for the practical usage.

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39. An Attempt to Eliminate the Natural Counts of the G-M Counter. (II)

Kiichi Kimura, Takeo Hayashi, Yoshihide Ishizaki and *Kiyoshi Nishikawa.*

Whenever we measure very weak radioactivities with the G–M counters, we are used to be troubled by their natural counts. In our last report, we arranged linearly the two cylindrical counters with their common axis (we call them coincidence counters) and connected them to the coincidence circuits. Surrounding the councidence counters with many counters (we call them guard counters), we connected the latters to the anticoincidence circuits to eliminate the natural counts. Thus we could reduce the natural counts to 0.21/min.. In this case, we measured the β rays that came into the counters through the thin mica window at the end of the counter, and found that the solid angle of the back counter to measure the activity.

Therefore, we next devised *a* rectangular coincidence counters which had a common side wall of Al foil. Each of toem had a volume of $2\times5\times1.5$ cm^3, a window of Al foil (5 mg/cm^2 in thickness and 2×5 cm^2 in area) and a plateau of about 300 volts (from 1050 volts to 1350 volts). We also prepared guard counters of rectangular type, each of which was made in dividing the volume of $14\times14\times2$ cm^3 in 7 parts and had a plateau of about 400 volts (from 1100 volts to 1500 volts).

Under this arrangement the natural counts were found to be 10.6/min., while