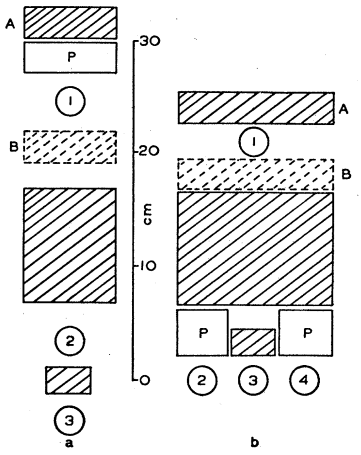

FIG. 2. Arrangements of counters with lead and paraffin absorbers at Macdonald College.

Experiments are being started which will determine how this ratio varies with (i) thickness of paraffin used, (ii) thickness of absorber above lower counter, (iii) thickness of lead scattering block. A more complete study of the apparently high absorption of penetrating cosmic rays by paraffin is also being initiated.

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Neutron Induced Radioactivity in Columbium

The neutron induced activity in columbium is so weak that it has been reported to be almost completely inactive.[1] According to the survey reported by Pool, Cork and Thornton,[2] two weak periods 7.3 minutes and 3.8 days were found. But neither a test for the sign of the β-rays emitted nor any attempt for the assignment were given yet.

A study of the activity produced in columbium has been made with the Tokyo cyclotron which gives a 3-Mev deuteron beam up to 50 microamperes in intensity.

The results obtained so far are given in Table I.

To test the activities due to some impurities, several runs were made on the special samples which had been purified with extreme care by one of the authors (M. I.) from columbium oxide powder of Kahlbaum.

The relative intensities of 7.5*m*, 66*h* and 11*d* were almost the same as those obtained in other samples. As for the 8*h* period, however, only a trace of its activity was noticed. This fact suggests that this period must be due to a tantalum impurity which is very hard to separate from columbium.

TABLE I. *Results on activity of columbium.*

Slow neutrons (Be+D paraffin)	*W* 7.5±0.5*m*	—	*VW* 66±10*h*	—
Fast neutrons (Li+D)	—	*VW* 8±2*h*	*W* 66±3*h*	*W* 11±1*d*
Sign of β-rays	e^-	e^-	e^-	e^-
Chemical test	—	Cb	Y	Cb
Assignment	Cb^{94}	Ta^{180*}	Y^{90}	Cb^{92}
Reaction	(n, γ)	$(n, 2n)$	(n, α)	$(n, 2n)$
Upper limit derived from K–U plot (Mev)	—	—	2.3±0.3	1±0.2

* Impurity (see reference 1).

The 7.5*m* period is in good agreement with Pool, Cork and Thornton. The 66*h* period is undoubtedly identical with the 3.8*d* period found by Pool and others. A correction made for the 11*d* is responsible for the difference. The K–U plot for this activity is in good agreement with that for Y^{90} produced from Y^{89}.

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Raman Effect of Dibromofluoromethane

We have observed nine Raman shifts of dibromofluoromethane using our three prism Steinheil spectrograph (dispersion 8A/mm at 4358A). Eight concentric neon-mercury lamps furnished the radiation. No filters were used. The sample was kept at about 40°C by means of an air blast. The results are shown in Table I.

Three types of photographic plates were used: Two Eastman Ortho-Press Plates (exposure 11.5 hours), one Eastman Spectroscopic Plate Type IG (exposure 41.5 hours) and one Eastman Spectroscopic Plate Type IJ (exposure 47 hours). Only on the type IG plate were the Raman lines excited by 5460A noticed and in this case