

of the combined cystine may owe its inertness to neighbouring proline residues, a suggestion which accords well with the previous hypothesis of the mode of linkage of this portion of the cystine.<sup>16</sup>

An attempt to isolate cystine peptides from the (C + D) fraction of the combined cystine of wool is now in progress, and together with full details of the work referred to will be published elsewhere.

*Note added in proof.* Preliminary qualitative examination of cystine peptides from the (C + D) fraction of whole wool has confirmed the suggestion that proline is associated with this fraction. Glycine, alanine, serine and threonine seem also to be present in substantial amounts.

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<sup>1</sup> Mercer and Rees, *Austral. J. Exp. Biol.*, **24**, 147 (1946).

<sup>2</sup> Mercer and Rees, *Austral. J. Exp. Biol.*, **24**, 175 (1946).

<sup>3</sup> Farrant, Mercer and Rees, *Nature*, **159**, 535 (1947).

<sup>4</sup> Geiger, *J. Res. Nat. Bur. Stand.*, **32**, 127 (1944).

<sup>5</sup> Steinhardt and Fugitt, *J. Res. Nat. Bur. Stand.*, **29**, 315 (1942).

<sup>6</sup> Butler, (through) *Nature*, **159**, 581 (1947).

<sup>7</sup> Jones and Gersdorff, *J. Biol. Chem.*, **106**, 707 (1934).

<sup>8</sup> Gordon, Martin and Syngé, *Biochem. J.*, **37**, 92 (1943).

<sup>9</sup> Consden, Gordon and Martin, *Biochem. J.*, in the press.

<sup>10</sup> Fischer and Abderhalden, *Z. physiol. Chem.*, **39**, 81 (1903).

<sup>11</sup> Mercer, personal communication.

<sup>12</sup> Astbury, *J. Chem. Soc.*, 337 (1942).

<sup>13</sup> Pauling, *J. Amer. Chem. Soc.*, **62**, 2643 (1943).

<sup>14</sup> Coleman and Howitt, *Nature*, **155**, 78 (1945).

<sup>15</sup> Middlebrook and Phillips, *Biochem. J.*, **36**, 428 (1942).

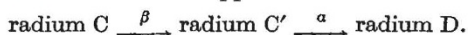
<sup>16</sup> Lindley and Phillips, *Biochem. J.*, **39**, 17 (1945).

## Application of the Cathode Ray Oscillograph to Measurements of Short Life-Periods of Radioactive Sources

THE most accurate determinations of the life-periods of short-lived radioactive nuclei have been made using either coincidence circuits with variable resolving times<sup>1</sup>, or the method of delayed coincidences<sup>2</sup>.

Recent developments in cathode ray oscillographs have enabled measurements of this sort to be made in a more direct manner and with standard equipment. In this method, a pulse from one Geiger-Müller counter starts the single sweep on the oscillograph, and the output from a second counter is applied to the vertical plates. If these pulses are due to the radiations from a single radioactive source of short life, then observations on the distribution of the pulses seen on the screen enable an estimate of the half-life of the source to be made.

The method has been applied to the transformation



The  $\beta$ -ray from radium C is followed, after a short time-interval, by the emission of an  $\alpha$ -ray from the daughter nucleus, radium C'. Observations on these time intervals enable the half-life of radium C' to be estimated.

A thin-walled vessel containing radon gas was placed between two Geiger-Müller counters. One counter had a window of thickness sufficient to prevent  $\alpha$ -particles and most of the  $\beta$ -particles from radium B being recorded. The other counter was operated in the proportional region so that it responded to  $\alpha$ -particles only. The stopping power of the window of this counter was such that only radium C'  $\alpha$ -rays could penetrate.

The pulses from the counters were fed through suitable circuits to the oscilloscope, the  $\beta$ -counter initiating the sweep and the  $\alpha$ -pulses being applied to the vertical deflexion plates. The instrument used was an Ultrascopes, Mark 6, with three speed-ranges, namely, 25, 50 and 500 microsec. Incorporated in the time-base is a calibrating device consisting of an oscillatory circuit 'ringing' at a known frequency. The output of this causes the trace to be intersected by dark gaps representing known time-intervals. Hence visual observation of the pulses enabled their distribution in time to be recorded. Many of the pulses, of course, appear on the screen by chance, and it is necessary to perform control experiments in which the counters are irradiated by separate sources to allow for this.

The corrected distribution in time of the  $\alpha$ -pulses shows an exponential fall giving a half-value period for radium C' of 140 microsec. This result is not so accurate as that claimed for coincidence methods<sup>1,3</sup>, but it is thought that the method is capable of being developed for the measurements of much shorter periods, in particular the life-time of metastable states which are of considerable interest theoretically.

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<sup>1</sup> Rotblat, *Proc. Roy. Soc., A*, **177**, 260 (1941).

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## Constitution of Alkali Halide-Borate Glasses

Majumdar, Banerjee and Banerjee claim to have demonstrated<sup>1</sup> that sodium chloride dissolved in borax glass was present in the form of crystallites, and also that sodium chloride-boric oxide glasses gave the X-ray diffraction pattern of sodium chloride (together with some unidentified lines). The experimental work and deductions therefrom demand some comment and criticism.

There can be no objection to the experimental results obtained with the halide-borax glasses, since it has been shown that, in such systems as Na<sub>2</sub>O—SiO<sub>2</sub><sup>2</sup>, Na<sub>2</sub>O—B<sub>2</sub>O<sub>3</sub><sup>3</sup>, there is an upper limit to the amount of alkali metal oxide which can exist in the vitreous phase. I have found the same type of phenomenon to occur with the systems CaO—B<sub>2</sub>O<sub>3</sub>, Na<sub>2</sub>O—CaO—B<sub>2</sub>O<sub>3</sub>, RX—B<sub>2</sub>O<sub>3</sub> (where R is Li, Na or K, and X is F, Cl, Br or I) and Na<sub>2</sub>O—RX—B<sub>2</sub>O<sub>3</sub>. Thus a molten mixture of sodium carbonate and silica, in proportions to yield an Na<sub>2</sub>O : SiO<sub>2</sub> ratio greater than that approximating to the metasilicate, Na<sub>2</sub>O.SiO<sub>2</sub>, separates into two phases on cooling. The crystalline phase, in a vitreous matrix, consists of impure sodium carbonate, probably a double salt of the carbonato-silicate type.

In binary borate systems, the limiting proportions for glass formation approximate to the compositions, for example, Na<sub>2</sub>O.2B<sub>2</sub>O<sub>3</sub> (that is, anhydrous borax), NaF.2B<sub>2</sub>O<sub>3</sub> and NaCl.3B<sub>2</sub>O<sub>3</sub>. The precipitation of excess alkali compound is particularly well marked in the KF—B<sub>2</sub>O<sub>3</sub> system, where a melt containing potassium fluoride, in excess of the limiting theoretical composition 3KF.2B<sub>2</sub>O<sub>3</sub>, on cooling can produce very well-developed crystals of the halide up to 3 mm. in size.

The fact, therefore, that melts of borax and sodium chloride yield products which give the X-ray diffraction pattern of the alkali halide is not unexpected.