continued for 0·5 min., 1 min., 2 min., followed by observation, with a Geiger-Müller counter, of the activity and of its variation with time ; (b) irradiation of the same sheet for the same periods, but with 4 cm. paraffin interposed between the source and the silver.

For the interpretation of the results, we followed the method suggested by McLennan, Grimmet and Read[2]. Repeated experiments gave for the period in case (a) 47 ± 3 sec. ; in case (b) 30 ± 4 sec. It seems thus that without paraffin, the swift neutrons form a radio-element different from those formed by slow neutrons. After irradiation for 15 min., one finds a curve which shows a period of 2·5 min. and another period which, in the case of interposition of paraffin, is about 30 sec. and reaches about 50 sec. when no paraffin is interposed.

It seems thus that the action of neutrons on silver determines the formation of three radio-elements : the first one is produced by the swift neutrons, period about 50 sec. ; the second is produced only by the slow neutrons, period about 30 sec. ; the third with a period of 2·5 min. is produced by the swift and by the slow neutrons, but with an intensity enhanced by interposing a hydrogenated substance between the source of neutrons and the silver.

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A Simplified Procedure for Determining Normal Boiling Points by the Comparative Method*

ŚWIĘTOSŁAWSKI'S method[1] for determining the normal boiling point of a substance by comparing its boiling point with that of water at three or more pressures, and applying his equation involving the ratio of the dt/dp coefficients of the two liquids, can be simplified by working as nearly as possible at a pressure of one normal atmosphere. If the manostat, which equalizes the pressures in the two ebulliometers, can be adjusted previously to one normal atmosphere (as determined by the temperature of boiling of water in the barometric ebulliometer) the normal boiling point of the substance in the second ebulliometer can be measured directly.

If, as is likely to be the case, the pressure cannot be adjusted to one atmosphere within the required precision of ± 0·02 mm. of mercury, it is only necessary to make a second pair of observations at a pressure which differs so little from the first pressure that the variation of boiling point with respect to pressure can be assumed to be linear (over the small interval), both for water and for the substance under investigation. If the first pressure is below normal, the second preferably should be above normal, and vice versa. The normal boiling point can then be calculated from the observed boiling points by the use of simple proportion between the observed changes in boiling points and the correction to 760 mm. of mercury, corresponding to 100° as the defined normal boiling point of water. One form in which the equation may be written is

$$t_s = t_{s_1} + \frac{\Delta t_s}{\Delta t_w}\,(100 - t_{w_1}),$$

in which t_{s_1} and t_{w_1} represent either pair of observed boiling points of the substance and of water, respectively, and Δt_s, Δt_w are the changes in the boiling points occurring between the first and second pairs of observations.

Determination of the boiling point of carbon tetrachloride and of trimethylcarbinol.

Substance	Boiling point of water (°C.)	Boiling point of substance (°C.)	Normal boiling point of substance determined by Świętosławski's procedure (°C.)
Carbon tetrachloride	99·527 99·934 100·000	76·130 76·608 76·685 (calc.)	76·685
Trimethylcarbinol	99·885 99·980 100·000	82·240 82·327 82·345 (calc.)	82·347

To illustrate the applicability of this simplified procedure, the normal boiling points of carbon tetrachloride and trimethylcarbinol were determined and compared with those obtained by Świętosławski's procedure, using the dt_s/dt_w ratio for reducing to normal pressure the boiling point actually measured. The carbon tetrachloride used for the measurements was of the fifth degree of purity on Świętosławski's scale[2], having a difference of 0·002° C. between the boiling point and temperature of condensation in a standard differential ebulliometer. The trimethylcarbinol was of the fourth degree of purity, having a corresponding difference of 0·007° C. The data are given in the accompanying table.

The agreement of the data obtained by the use of the two methods demonstrates the validity and high precision of the new method. Details will be published elsewhere.

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Vibrations of the Ethylene Molecule

BONNER[1] has recently recorded seven frequencies (1619, 3009, 1341, 3069, 950, 2880 and 1654) in the Raman spectrum of liquid ethylene. In the earlier work of Dickinson, Dillon and Rasetti[2] on the Raman spectrum of ethylene gas, 1623·3, 3019·3, 1342·4, 3240, 3272 and 2880 were recorded. I have recently obtained an intense Raman spectrum of ethylene gas at a pressure of 40 atmospheres using λ4358 radiation, and have measured lines at 1626, 3020, 1343, 2880 and 1656. Thus, both Bonner and I have failed to record the lines at 3240 and 3272, and these are probably spurious.

Vibrations of the ethylene molecule and the deduction of the force constants therefrom have been the subject of recent investigations by several workers[1,3,4,5]. Six of the twelve fundamental frequencies of this molecule are active in the Raman effect, and these have been identified (see refs. 5