is formed upon the addition of 6 N HCl to final concentrations of $0.6-1.2$ N (Step II). The thiohydantoins which appear in the ether after acidification of the reaction mixture, show a characteristic maximum at $267-268$ mμ, with molar extinction coefficient close to 16 000. Determination of the number of terminal amino acids is based on this property. Identification is done chromatographically after regenerating the amino acid by baryta hydrolysis according to Edman[1,2].

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On the Use of Rayleigh-Calvet-Philpot Interference Fringes for the Measurement of Diffusion Coefficients According to the Moment Method

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The astigmatic modification of the Rayleigh interferometer, characterized by giving interference fringes which take the form of the refractive index function in the cell, was described by Philpot and Cook[1] in 1948. The author has therefore previously called these fringes Rayleigh-Philpot-Cook fringes. However, the optical arrangement described by Calvet[2-4] earlier contains the essential features of this interferometer. This fact has hitherto escaped the author's attention, largely because it was concealed by Calvet's addition of some nonessential features and of a slit and rotating drum arrangement. Hereby he produced interferograms with the cell coordinate and time on two perpendicular axes, which have quite another appearence than Philpot-Cook's interferograms with the cell coordinate and the refractive index on these axes. Although Calvet's priority is undisputable, Philpot and Cook have no doubt carried out their work independently. It is therefore suggested that the fringes in question be called as in the heading of this article. These fringes are a special kind of *integral interference fringes*, which are produced by bringing to interference one light beam passing through the cell and an other passing through a comparison cell with a constant refractive index, whether the basic interferometer is according to Rayleigh or of some other kind. Hence the observation methods of Labhart and Staub[5] and Antweiler[6] also belong to the integral fringe methods. On the other hand, the Gouy method (Kegeles and Gosting[7]; Longsworth[8]; Coulson, Cox, Ogston and Philpot[9]) and the gradient-recording method described recently by the author[10] might be called *differential interference methods*, and the fringes *differential interference fringes*, since the two interfering light pencils are both passing through the cell.

In a previous article[11], the author described the calculation of diffusion coefficients from integral fringe interferograms according to two methods, the conventional height-area method (this name, of course, refers to the gradient curve), and a method based upon a direct comparison between the position of the fringes and the course of the integral of the error function. In this article, the calculation of the diffusion coefficient according to the moment method will be outlined.

This diffusion coefficient is defined by the equation:

$$D_m = \frac{\int_{-\infty}^{+\infty} x^2 y \, dx}{2t \int_{-\infty}^{+\infty} y \, dx} \qquad (1)$$

where x is the cell coordinate (with $x = 0$ in the centre of the boundary), y the refractive index gradient, dn/dx, and t the time. The above formula is used in the scale method and in other methods which give records of the refractive index gradient. When an integral interference method is used, equation (1) should be given in the form:

$$D_m = \frac{\int_{n_1}^{n_2} x_2 \, dn}{2t(n_2 \text{-} n_1)} \qquad (2)$$

where n_1 and n_2 are the refractive indices of top and bottom solutions in the diffusion cell, respectively. Equation (2) is directly applicable to integral fringe interferograms, since (n_1-n_2) is the total number of fringes and the integral can be computed directly from the comparator readings of the fringes. The refractive index appears in the same power in numerator and denominator, hence its unit is arbitrary. We will use the number of fringes as the most convenient refractive index unit.

In order to show how this calculation is carried out in detail, we will use the same interferogram as that presented in Table 4 of the previous communication. Table 1 below contains in its first column the number of the fringes for which readings have been taken, and the second column gives the thickness of the intervals in the fringe number. In the third column, we find the plate coordinates Gx (G is the optical magnification factor; numerical value: 2.5307), which have been obtained from the comparator readings in the former table by subtraction of 30.179, the reading corresponding to the centre of the boundary ($z = 0$). The fourth column, finally, contains the products of the figures in the second and the squares of those in the third column. The sum of the values in the second column must equal the total number of fringes, and the sum of those in the last column is the numerical value of the integral in equation (2). The individual values in the last column need not be

Table 1.

Fringe number	Thickness of fringe number interval Δ	Distance from centre of boundary Gx	$\Delta \cdot G^2x^2$
0.5	0.75	−13.179	130.2645
1	0.75	−13.224	112.0695
2	1	−10.600	112.3600
3	1	− 9.564	91.4700
4	1.5	− 8.775	115.5015
6	2	− 7.566	114.4880
8	2	− 6.615	87.5160
10	2	− 5.829	67.9540
12	2.5	− 5.151	66.3325
15	3	− 4.241	53.9580
18	3	− 3.428	35.2530
21	3	− 2.690	21.7080
24	3	− 1.989	11.8680
27	3	− 1.326	5.2740
30	4	− 0.666	1.7760
35	5	0.398	0.7900
40	4	1.479	8.7480
43	3	2.146	13.8150
46	2	2.857	16.3240
47	2	3.102	19.2440
50	3	3.875	45.0480
53	2.5	4.725	55.8150
55	2	5.361	57.4800
57	2	6.076	73.8360
59	2	6.897	95.1380
61	2	7.901	124.8520
63	2	9.268	171.7920
65	1.5	11.603	201.9450
66	0.83	14.706	179.5008
Sum	66.33		2092.1208

noted separately; the sum can be computed directly on the calculating machine.

The sum is in this case 20.9212 cm^2, and after division by the square of the magnification factor, one obtains the figure 3.2667 cm^2. This has to be divided by $2t(n_2-n_1) = 2 \times 5220 \times 66.33 = 692\,485$ sec. Consequently the diffusion coefficient is $4.717 \cdot 10^{-6}$ cm^2/sec. After recalculation from the temperature during the experiment, 21.1°, to 25.0°, and to infinite dilution as described by Gosting and Morris [12], one obtains $D_m = 5.254 \cdot 10^{-6}$ cm^2/sec. This figure differs by less than 0.1 per cent from the value obtained in the same experiment by the height-area method, and by 0.45 per cent from the value given by Gosting and Morris.

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On the Presence of a Tuberculostatic Factor in Organ Extracts from Cow *

Preliminary report

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The presence of a thermostabile substance in human urine, which dialyses through cellophane, and has a bacteriostatic and bactericidal effect toward tubercle bacilli has been reported earlier [1]. Furthermore, it could be shown that this substance was not identical with urea, hippuric acid, creatinine, urinary phenols, or salts. Experiments with urine from patients with tuberculosis of the kidney seemed to indicate that this type of urine had a weaker tuberculostatic effect than normal urine.

Because of this observation and because it had proved difficult to purify the tuberculostatic substance from urine, attempts were made to isolate a similar tuberculostatic substance from other sources. Bovine urine appeared to have an inhibitive effect toward tubercle bacteria of about the same order as human urine, and for this reason extracts from several organs from the cow were tested.

It could be shown that water extracts of spleen, lung, liver, kidney and muscle did have a tuberculostatic effect. The active substance from these extracts is similar to the urinary factor in that it is thermostabile and is adsorbed on activated charcoal. Furthermore, it can also be eluted from the charcoal with acetic acid.

* After the completion of this work I became aware a note by R. J. Dubos on the occurence of a tuberculostatic agent in animal tissues [*Am. Rev. Tuberc.* **63** (1951) 119]. The active factor had been extracted by acid alcohol from several organs of cattle, rabbits and guinea pigs.