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DR. G. VAN DIJK. — ACTIVITY OF THE EARTH'S
MAGNETISM AND MAGNETIC CHARACTER-
ISATION OF DAYS. — — — — —

I. Activity of the earth's magnetism.

§ 1. In „Ergebnisse der magnetischen Beobachtungen im Jahr 1911“ at Wilhelmshaven BIDLINGMAIER has given a method of expressing in absolute measure the variability of a phenomenon. He has developed this method more in detail for the variations of the earth's magnetism; by introducing the quantity „activity“ BIDLINGMAIER aims at giving a measure of the energy-change, connected with these variations.

The expression for the activity is related to the well-known formula:

$$W = \frac{1}{8\pi} \sum \mu F^2 d\tau,$$

where: W = energy of the field, μ = magnetic permeability, F = field-intensity, $d\tau$ = element of volume; instead of field-intensities in activity there appear variations of field-intensity.

At the end of his treatise BIDLINGMAIER proposed to choose the year 1915 for a study of earthmagnetic activity, some observatories having already promised cooperation.

Also De Bilt decided to participate; the labour, required for the different calculations was very extensive and had to be accomplished in spare time not occupied by regular work; hence it has taken some years before the work was completed.

The computations have chiefly been made according to the method, amply explained by BIDLINGMAIER. The mean activity of a day is derived from the departures from the daily mean and is calculated in two parts, A_h^x and A_d^h , which are respectively deduced from the

departures of the individual values in each hour from the hourly mean and from the departures of the 24 hourly means from the daily mean.

§ 2. A_h^x . The difference of maximum and minimum of the curve (double-amplitude $2a$ in the terminology of BIDLINGMAIER) has been measured for each hour with a millimeterscale to tenths of a millimeter. The relation between amplitude a and hour-integral $\frac{1}{10} \sum (x - M_h)^2$ was computed for the declination and the horizontal intensity for $2a = 2.0, 4.0, 6.0$ mm. and so on; x represents the reading of the curve at 6-minute intervals ($3^m, 9^m, \dots, 57^m$), M_h is the mean of the 10 values x .

For each of the double-amplitudes mentioned above 24 cases have been taken, 2 each month. With a view to the very different values of the hour-integral for curves of the same amplitude but of different form (see: CHREE, Magnetic activity and hourly ranges, Terr. Magn. Vol. XXII, p. 67), the hours, used in computing the hour-integral, were chosen without seeing the curves themselves; from the lists, containing the values of the ranges hours were picked out, belonging to or as nearly as possible to the 10th and the 20th of each month. When the number of values exactly equal to a definite range was inadequate (this appeared to be the case for $2a = 6.0$ mm. and higher), adjacent values were taken (e.g. 5.9 mm., 6.1 mm. etc.), in such a way however, that the average of 24 values approached 6.0 mm., 8.0 mm. etc. as near as possible.

If the trace recorded is a straight inclined line, (a case which presents itself rather frequently and which may be considered approximately to be an average case), with the amplitude a mm. (i. e. distance of the extremities of the line from the horizontal diameter $+a$ and $-a$ mm.), the value of the hour-integral is:

$$\frac{1}{10} a^2 (0.81 + 0.49 + 0.25 + 0.09 + 0.01) \times 2 = 0.33 a^2.$$

Table 1 shows the result of the computations; column 1 gives the amplitude in mm., columns 2, 3 and 4 give for the declination the mean out of 24 values of the hour-integral, the smallest and the largest of the same, columns 5, 6 and 7 give the corresponding values for the

horizontal intensity, columns 8 and 9 contain the average value of the hour-integral, divided by the square of the amplitude.

Table 1. RELATION BETWEEN AMPLITUDE AND HOUR-INTEGRAL, D AND H.

Amplitude. mm.	Hour-integral D, mm ² .			Hour-integral H, mm ² .			Hour-integral: a^2 .	
	mean.	smallest.	largest.	mean.	smallest.	largest.	D.	H.
1.0	0.28	0.13	0.51	0.30	0.10	0.48	0.28	0.30
2.0	1.42	0.58	2.39	1.16	0.64	1.95	0.35	0.29
3.0	2.93	1.03	4.59	2.63	1.16	4.86	0.33	0.29
4.0	5.88	2.06	9.09	5.09	1.49	7.25	0.37	0.32
5.0	8.72	2.46	12.42	7.90	3.24	13.23	0.35	0.32
6.0	14.37	9.15	22.07	13.33	8.67	22.41	0.40	0.37
7.0	16.38	5.82	28.58	17.31	9.66	31.18	0.33	0.35
8.0	25.37	12.69	38.52	21.57	10.12	35.31	0.40	0.34
9.0				27.12	11.86	42.86		0.33
Mean.							0.35	0.32

It is evident from the table that the average values in the last two columns do not differ much from the above computed value 0.33, although, as may be seen from columns 3 and 4, and 6 and 7, in individual cases great departures appear to present themselves. The mean of the average values is 0.35 for D, and 0.32 for H.

Whereas for D and H the value of 1 mm. e on the diagrams was constant or nearly so throughout the whole year (1915), the equivalent of 1 mm. for the vertical intensity varied in the course of the year (see Jaarboek B, Annuaire B, De Bilt 1915; 1 mm. D = 1'.06, corresponding to 5.70 γ , 1 mm. H on an average = 3.34 γ ; in computing the activity the same diagrams have been used as have served in compiling the yearbook). Hence for V the ranges measured on the diagrams have first been reduced to γ 's, and in an analogous manner as for D and H the double-amplitudes 2.0 γ , 4.0 γ and so on were selected and the corresponding hour-integrals computed.

Table 2 gives the values for V, the amplitude is here expressed

in γ , the hour-integral in γ^2 . The average value of hour-integral: (amplitude)² is found to be 0.41.

Table 2. RELATION BETWEEN AMPLITUDE AND HOUR-INTEGRAL, V.

Amplitude. γ .	Hour-integral V, γ^2 .			Hour-integral: a^2 .
	mean.	smallest.	largest.	
1.0	0.39	0.12	0.70	0.39
2.0	1.64	0.75	3.05	0.41
3.0	3.65	1.26	5.77	0.41
4.0	6.53	4.32	8.60	0.41
5.0	9.32	6.26	13.33	0.37
6.0	15.05	8.10	23.28	0.42
7.0	20.58	9.77	29.78	0.42
8.0	28.96	17.91	41.79	0.45
9.0	32.70	12.71	50.48	0.40
Mean.				0.41

In a graphic representation, with amplitude as abscissa and hour-integral as ordinate points have been plotted, representing the relation between these quantities for D, H and V respectively. Between these points curves have been drawn (of a parabolic form, because of the relation hour-integral: (amplitude)² = nearly constant, see the last columns of Tables 1 and 2); on these curves the value of the hour-integral corresponding to each amplitude was read and tabulated.

The values of the hour-integral for double-amplitudes exceeding 15.0 mm. for D, 17.0 mm. in the case of H and 17.0 γ for V have been calculated separately.

Just as in BIDLINGMAIER's paper the values in the monthly tabulations of hourly values of the hour-integral are expressed in mm². for D and H; the resulting daily and hourly means, likewise in mm²., have next been expressed in $\epsilon = 10^{-10}$ erg. cm⁻³. as unit by multiplying by $e^2 : 8\pi$ (e = value of 1 mm. in terms of 1 γ), accordingly with $5.70^2 : 8\pi = 1.29$ for D, and with $3.34^2 : 8\pi = 0.44$ for H. As to V, where the hourly values were expressed in γ^2 , the same had to be

multiplied by $1 : 8\pi = 0.04$. The resulting quantities represent A_h^x , one of the component parts of the activity.

In the observations Wilhelmshaven 1911 the mean values of the ratio hour-integral: (amplitude)² were found to vary from 0.32 to 0.46; those of Cheltenham 1915 (see Terr. Magn. Vol XXII p. 85) lie between 0.48 and 0.35. Seddin 1915 gives on an average 0.35 (see *Ergebnisse der magnetischen Beobachtungen in Potsdam und Seddin*, 1915, p. 30), whilst CHREE, dealing with records of different observatories during the SCOTT Antarctic Expedition of 1911—1912 (see Terr. Magn. Vol XXII), found values, generally between the limits, mentioned above.

The departures between the different values may — since the value of the hour-integral depends greatly on the form of the curve — be explained by the random choice of the hours, used for the evaluation of the hour-integral, although it may seem somewhat astonishing, that such large departures are found to exist between the averages of a great number of values.

§ 3. A_d^h . To compute A_d^h , it is necessary to know the value of the expression $\frac{1}{24} \sum (M_h - M_d)^2$, where M_h = average value of an element for the space of one hour, M_d = daily mean, the mean value of the 24 M_h 's.

Some magnetic observatories in their yearbooks give the values of M_h , the magnetic yearbook of De Bilt contains the momentary values of the elements D, H and V at each hour Greenwich mean time, designating midnight as 0^h (24^h) and noon as 12^h; hence the average hourly values M_h had to be fixed for this purpose separately. The method of this determination agreed in the main with the practice, followed at other observatories.

From the monthly tabulations of hourly values of $M_h - M_d$ (0-1^h, 1-2^h, ..., 23-24^h) for D, H and V, the values of D being expressed in minutes, of H and V in γ 's, the Tables I, II and III for D, H and V respectively, have been derived. They relate to: (1) all days, (2) the five international quiet days of each month. The corresponding tables, based on the momentary values are to be found in *Jaarboek (Annuaire) B*, 1915, De Bilt, pages 26, 27, 29 and 30; a list of the five quiet days on page XV.

From the monthly tabulations of $M_h - M_d$ monthly tables of $(M_h - M_d)^2$ have been derived by squaring the numbers; the daily means and the hourly means of this quantity have next been expressed in terms of 1ϵ by multiplying by $5.38^2 : 8\pi = 1.15$ for D ($1'$ corresponds to 5.38γ), and by $1 : 8\pi = 0.04$ in the case of H and V. The resulting values represent the quantity A_d^h , the other component of the activity. $A_h^x + A_d^h$ is designated by the symbol A_d^x .

§ 4. The Tables IV—VII give hourly mean values of activity, (1) of all days, (2) of the five international quiet days (normal activity according to BIDLINGMAIER) for the months of January, April, July and October.

For the sake of economy not all months are represented. As appears from the mean magnetic character numbers (see *Caractère magnétique de l'année 1915*, Tableau II and the graphic representation: Magnetic character of the year 1915) January and July belong to the least disturbed, April to the moderately and October to the greatly disturbed months of 1915.

The Tables VIII and IX have been obtained by subtracting the corresponding numbers in the Tables IV—VII from one another; they indicate the amount by which the mean activity of all days exceeds the mean of the five quiet days of the month and hence may be indicated as activity of disturbances. The tables contain some negative values, which have no real signification; in these cases the mean hourly value of the quiet days was greater than the corresponding mean value of all days; this results from the regular diurnal oscillation, the range of which on quiet days is sometimes very large.

It is likewise owing to the regular diurnal variation that the greatest values of A_h^x on quiet days are found to occur during the day-hours, the slope in the curves being then strongest. As to A_d^h , the greatest values in the case of D and V occur towards noon, in the case of H in the forenoon; it is about these times that the maxima or minima of the curves occur, and thus $M_h - M_d$, and consequently $(M_h - M_d)^2$ have the greatest values. The maximum values in the tabulations have been printed in fat type, the minimum values small, except for some columns of A_h^x , when a great number of hours, all having the

same minimum or maximum values (mostly 0.0 and 0.1) appeared to occur.

The Tables X and XI contain summaries of activity, monthly means, (1) for all days, (2) for the five quiet days, (3) for disturbances.

The Tables XII—XVII show daily mean values of activity for all months of the year, Table XVIII presents a summary of the values of A_d^x for all days of the year.

§ 5. The tabulations have been mainly arranged in accordance with the tables, given in: Results of observations, made at the... magnetic observatory at Cheltenham, 1915 and 1916.

The annual mean of A_d^x has, accidentally, nearly the same value at both stations, 27.23 at Cheltenham and 27.43 at De Bilt; the monthly means are smaller at Cheltenham in eight months, larger in four months. A_h^x , as a rule, is small with respect to A_d^h and A_d^x ; in the annual mean of all days at De Bilt A_h^x in the case of D is 13 per cent of A_d^x , in the case of H 13 per cent and of V 4 per cent, in the case of the three elements together 12 per cent. The corresponding numbers at Cheltenham are successively 12, 13, 6 and 11 per cent. In the annual mean of the five quiet days the shares of A_h^x in A_d^x are 3 per cent in the case of the three elements D, H and V.

In the annual mean of all days of the total A_d^x the percentage of vertical intensity is 13, of horizontal intensity 33 and of declination 54. The corresponding values at Cheltenham are 18, 35 and 46.

Whereas, with respect to some points, there appears to exist a considerable agreement between the results at Cheltenham and De Bilt, differences between the two stations may be sufficiently explained by the different situation (Cheltenham: 38°44'N, 76°50'W, De Bilt: 52°06'N, 5°11'E) and different values of the magnetic elements.

In comparing the activity values for De Bilt and Seddin, two stations situated rather near each other (Seddin: 52°17'N, 13°1'E, near Potsdam) the following, perhaps somewhat surprising results have been obtained. The annual mean of A_d^x for all days (derived from the north, east and vertical components) is 23.5 at Seddin, the corresponding value at De Bilt is 27.43. Also the monthly means at Seddin are all smaller than at De Bilt. On the other hand the annual mean

for the five quiet days appears to be larger at Seddin (14.5) than at De Bilt (12.88); likewise the monthly means are all larger at Seddin, except in January (2.5 at Seddin, 2.59 at De Bilt).

Owing to the different results obtained at the two stations with respect to the annual means in the case of all days and of the five quiet days, the annual mean of the activity of disturbances at Seddin is rather smaller than at De Bilt, namely 9.0 at Seddin and 14.55 at De Bilt; the monthly means at Seddin all being smaller than those at De Bilt.

§ 6. A_a^d . This quantity, analogous to the preceding ones, may be represented by $\frac{1}{8\pi} (M_d - M_a)^2$, where M_d = daily mean of an element (D, H or V), M_a = the value the element would have, if the secular variation in the course of the year had varied rectilinearly.

In computing M_a the following values of D, H and V have been assumed at 1 January and at 31 December 1915 respectively: $12^\circ 18'.1$ and $12^\circ 8'.3$; 0,18495 and 0,18469; 0,43127 and 0,43107.

Table 3 gives the monthly means of A_a^d for D and H in terms of ϵ .

Table 3. MONTHLY MEAN VALUES
OF A_a^d IN ϵ FOR D AND H, 1915.

	Jan.	Febr.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
D.	0.33	0.24	0.71	0.54	0.54	0.52	0.23	0.61	0.38	0.85	0.47	0.36	0.48
H.	2.85	2.73	4.31	6.32	2.92	13.46	1.44	1.89	3.37	12.69	11.90	3.31	5.60

The values for H are considerably greater than those for D, the annual mean being 0.48 for D and 5.60 for H. The greatest daily values for H ($> 20 \epsilon$) occurred on some highly disturbed days and the subsequent days (postturbation), namely: June 17-20, October 15, 19 and 22-25, November 1, 6, 7, 16 and 17 and December 6; this explains the large monthly means of June, October and November.

In order to get exact values of A_a^d , an exact knowledge of the daily means of the elements, in other terms of the base-lines is necessary. In the case of the vertical intensity A_a^d appeared to have very great values on some days, though these days were not greatly

disturbed. Probably the values of the base-line were not quite accurate; indeed the risk of inaccuracy of the base-value is greatest in the case of vertical intensity.

II. Magnetic characterisation of days.

§ 7. CHREE in his article: „Magnetic activity and hourly ranges” (Terr. Magn., Vol. XXII) has pointed out the remarkably close parallelism between the activity values and the squares of the daily ranges, and hence has suggested to take the square of the absolute range of a day as a measure of the mean activity. Apparently in following up this idea the observatory at Eskdalemuir has from April 1918 as a rule sent, together with the quarterly lists of the magnetic character, the values of $R_N^2 + R_W^2 + R_V^2$ of each day, where R_N , R_W and R_V represent the absolute ranges of the day, north, west and vertical components respectively. In return De Bilt has sent its values to Eskdalemuir (since December 1916 at De Bilt one set of magnetographs has recorded D, H and V, another set the north, west and vertical components).

BAUER, in the last volume of Terrestrial Magnetism, (Vol. XXVI, Sun's activity and earth's activity) has criticised BIDLINGMAIER's choice of an expression for measuring the intensity of magnetic variations; he gave as an expression of the energy-change the quantity:

$$w = dW = 2 \frac{\rho^3}{3} (X dX + Y dY + \frac{1}{2} Z dZ),$$

which, after omitting $\frac{1}{2} Z dZ$, which is small with respect to $X dX + Y dY$, and after substituting $X dX + Y dY$ by $H dH$, he changed into

$$w = 2 \frac{\rho^3}{3} H dH = \epsilon H dH,$$

where ρ = radius of the earth. When H is given in terms of c. g. s. units, dH in γ , the unit in which w is expressed is $\epsilon = 1.72 \times 10^{21}$ ergs.

The annual summary of the magnetic character (Caractère magnétique de l'année...) contains data, representing the sum (Tableau I) and the mean (Tableau II) of the character figures (scale 0, 1 and 2), assigned by the 35 to 40 cooperating magnetic observatories.

§ 8. Table XIX gives the values of $\frac{1}{100} (R_H^2 + R_D^2 + R_V^2)$ for

each day of 1915, De Bilt (instead of $R_H^2 + R_D^2 + R_V^2$ itself, in order to avoid large numbers), Table XX shows the daily values of HdH or HR_H at De Bilt, 1915 (R_H , R_D and R_V are the absolute daily ranges of H , D and V respectively), Table XXI contains the values of the sum of magnetic characters (35 stations) for each day of 1915, while the values of the activity A_d^x for each day of 1915 are to be found in Table XVIII.

The four quantities, just mentioned, all constitute a measure of the amount of magnetic disturbance of a day; they correspond in some respects, differ in others, as may appear below.

The relation between the quantities may be examined by inter-comparing the changes from day to day. The change may be: increase (+), decrease (—) or the values remain the same (=). If, when comparing two quantities, we call the corresponding changes: (1) equal, when both increase, decrease or remain unaltered, (2) unequal, when the changes are contrary to one another (decreasing and increasing, or increasing and decreasing), (3) half equal, when one of the quantities remains unaltered, while the other decreases or increases, then, in comparing A_d^x and $R_H^2 + R_D^2 + R_V^2$, we find 317 equal, 3 half equal and 44 unequal changes, or in 364 cases $317 + \frac{3}{2} = 318.5$ equal changes, giving a relationship, expressed by a proportion of 87.5 per cent.

In Table 4, Nos. 1—6, the comparisons of activity, ΣR^2 , HdH and sum of characters have been summarised. It appears, that the highest relationship, 87.5 per cent, exists between activity A_d^x and ΣR^2 .

This is not astonishing, since in both quantities the squares of the ranges of the three elements D , H and V are represented. The proportion is smallest, where HdH is compared with the other quantities; this is easy to understand, as in HdH only one element plays a part, while in the other quantities all elements cooperate.

If the ranges of H , D and V all of them altered in the same direction from day to day, the relationship between ΣR^2 and HdH would be 100 per cent. By comparing the changes of the absolute ranges of H , D and V from day to day, the results, given in Table 4, Nos. 7—10, were obtained. D changes in the same way with H in 74.0 per cent of the cases, V with H in 62.9 per cent, whilst it happened

in 51.5 per cent of the cases, that the three elements H, D and V varied in the same direction.

§ 9. In comparing the north and the west components for 1919 and 1920 at Eskdalemuir (the data required were kindly communicated by the Eskdalemuir Observatory) and at De Bilt a proportion was found, closely agreeing with the value of 74.0 per cent, deduced above for H and D, De Bilt 1915. This appears from Nos. 11—14 in Table 4, the values obtained are successively 73.2 and 75.8 (Eskdalemuir), 72.9 and 75.1 (De Bilt).

The great accordance, found in No. 7 and in Nos. 11—14, in different years and at different stations, suggests, that the relationship deduced here may be more or less looked upon as a general rule; thus the ranges of the horizontal components (H and D, or X and Y) approximately change in the same direction in about $\frac{3}{4}$ of the cases and in opposite directions in $\frac{1}{4}$ of the cases.

§ 10. The manuscript of this treatise was for the greater part written, when I saw AD. SCHMIDT's proposal to characterise a day by the daily range in his article: *Über die Bestimmung der erdmagnetischen Aktivität* (Terr. Magn. XXV, 1920). SCHMIDT proposes to take, for the sake of simplifying the calculations, the sum of the ranges of three components (X, Y and Z, or H, D and V) and recommends the application of the ranges of hourly mean values. These ranges will be denoted by A, the absolute ranges by R. Table XXII gives the values of the sum $A_H + A_D + A_V$ at De Bilt for each day of 1915. For different reasons (see §§ 13 and 15), I think it more preferable to take absolute ranges; Table XXIII contains the values of $R_H + R_D + R_V$ for each day of 1915 at De Bilt.

Table 4, No. 15 shows the comparison of $A_H + A_D + A_V$ and $R_H + R_D + R_V$ according to the manner, described in § 8; the relationship is found to be 87.9 per cent.

It is to be expected, that the relationship between $R_H + R_D + R_V$ and $R_H^2 + R_D^2 + R_V^2$ will be great; as may be seen from Table 4, No. 16, it is 96.6 per cent.

The relationship of the other quantities with respect to $R_H + R_D + R_V$

Table 4. COMPARISONS OF DIFFERENT QUANTITIES.

No.		equal.	half-equal.	un-equal.	Sum.	Percentage.
1	Activity A_d^x and $R_H^2 + R_D^2 + R_V^2$,	317	3	44	318.5	87.5
2	Act. A_x^d , De Bilt and sum of characters,	279	12	73	285	78.3
3	Act. A_d^x and H d H,	279	5	80	281.5	77.3
4	$R_H^2 + R_D^2 + R_V^2$, De Bilt and sum of characters,	301	11	52	306.5	84.2
5	$R_H^2 + R_D^2 + R_V^2$ and H d H,	295	9	60	299.5	82.3
6	H d H, De Bilt and sum of characters,	278	13	73	284.5	78.2
7	Absolute ranges H and D,	267	5	92	269.5	74.0
8	" " H and V,	228	2	134	229	62.9
9	" " D and V,	237	5	122	239.5	65.8
10	" " H, D and V,	186	3	175	187.5	51.5
11	Absolute ranges, N- and W-components,	255	11	90	260.5	73.2
12	" " " " " "	265	14	80	272	75.8
13	" " " " " "	263	5	96	264.5	72.9
14	" " " " " "	271	3	89	272.5	75.1
15	$R_H + R_D + R_V$ and $A_H + A_D + A_V$,	316	8	40	320	87.9
16	$R_H + R_D + R_V$ and $R_H^2 + R_D^2 + R_V^2$,	348	7	9	351.5	96.6
17	$R_H + R_D + R_V$ and act. A_d^x ,	312	6	46	315	86.5
18	$R_H + R_D + R_V$, De Bilt and sum of characters,	291	15	58	298.5	82.0
19	$R_H + R_D + R_V$ and H d H,	300	11	53	305.5	83.9
20	$A_H + A_D + A_V$, De Bilt and sum of characters,	277	12	75	283	77.7
21	$A_H + A_D + A_V$ and act. A_d^h ,	332	4	28	334	91.8
22	$A_H + A_D + A_V$ and act. A_d^x ,	330	4	30	332	91.2

Table 4. COMPARISONS OF DIFFERENT QUANTITIES. (Concluded).

No.		equal.	half-equal.	un-equal.	Sum.	Percentage.
23	H d H and X d X + Y d Y + $\frac{1}{4}$ Z d Z,	304	2	44	305	87.1
24	X d X + Y d Y + $\frac{1}{4}$ Z d Z and $R_x^2 + R_y^2 + R_z^2$, De Bilt, 1919	318	2	32	319	90.6
25	X d X + Y d Y + $\frac{1}{4}$ Z d Z, De Bilt and sum of characters, 1919	290	9	53	294.5	83.7
26	$R_x^2 + R_y^2 + R_z^2$, De Bilt and sum of characters, 1919	300	7	45	303.5	86.2
27	$R_x^2 + R_y^2 + R_z^2$ and H d H, De Bilt, 1919	290	0	60	290	82.9
28	H d H, De Bilt and sum of characters, 1919	277	7	66	280.5	80.1
29	H d H, X d X + Y d Y + $\frac{1}{4}$ Z d Z, $R_x^2 + R_y^2 + R_z^2$, De Bilt and sum of characters, 1919	252	9	89	256.5	73.3
30	Absol. ranges and ranges of hourly means, D, De Bilt, 1915	308	3	51	309.5	85.0
31	" " " " " " H, De Bilt, 1915	309	13	42	315.5	86.7
32	Hour-integral A_h^x , Seddin and mean character, 1915	289	54	21	316	86.8
33	" " " De Bilt and mean character, 1915	301	51	12	326.5	89.7
34	" " " De Bilt and sum of characters, 1915	317	25	22	329.5	90.5
35	Hour-integral A_h^x , Seddin and De Bilt, 1915	324	29	11	338.5	93.0
36	A_d^h , Seddin and De Bilt, 1915	320	20	24	330	90.7
37	A_d^x , Seddin and De Bilt, 1915	328	18	18	337	92.6
38	A_d^x , Seddin and sum of characters, 1915	276	26	62	289	79.4
39	Daily ranges, momentary hourly values, N-comp., Eskdalemuir and Greenwich, 1915	275	20	57	285	81.0
40	Daily ranges, hourly mean values, X, Seddin and H, De Bilt, 1915	316	16	32	324	89.0
41	Absolute ranges D, Uccle and De Bilt, 1915	331	10	21	336	92.8
42	" " H, Uccle and De Bilt, 1915	316	12	30	322	89.9
43	" " D, Bochum and De Bilt, 1920	319	8	38	323	88.5

will be about the same as with respect to $R_H^2 + R_D^2 + R_V^2$; whilst according to Table 4, Nos. 1, 4 and 5 the values, relating to activity A_d^x , sum of characters and HdH are: 87.5, 84.2 and 82.3 per cent respectively, the corresponding values with respect to $R_H + R_D + R_V$ are successively: 86.5, 82.0 and 83.9 per cent (see Table 4, Nos. 17, 18 and 19).

In the expression $A_H + A_D + A_V$ disturbances are for the greater part eliminated, since the recorded curve for the space of each hour has been replaced by a straight line, representing the mean value during the hour; accordingly it may be expected, that $A_H + A_D + A_V$ will present a smaller relationship with the sum of characters than $R_H + R_D + R_V$. Nos. 18 and 20 of Table 4 show, that the proportion in the latter case is 82.0, in the former case 77.7.

On the other hand $A_H + A_D + A_V$ will appear to be intimately related to the expression A_d^h , being likewise a function of the hourly mean values (see § 3), and to A_d^x , since A_d^h forms the main part of A_d^x . From Nos. 21 and 22 of Table 4 it may be seen, that the proportions are 91.8 and 91.2 per cent respectively.

§ 11. As to the substitution of $X dX + Y dY + \frac{1}{4} Z dZ$ by HdH in the expression for $w = dW$ (§ 7), we remark that $HdH = X dX + Y dY$ is only correct, when the times, between which the changes dH , dX and dY are measured, are the same for all elements¹⁾; besides, notice has to be taken of the signs of dH , dX and dY , which may be positive or negative. Thus the relation does not hold, when the absolute daily ranges of H , X and Y are taken for dH , dX and dY , since the maxima and minima are generally not simultaneous.

When the declination is not large — and this is the case for most magnetic stations of the globe — the H -and X -curves generally show much conformity and the maxima and minima occur in many cases at the same times; for the Y -curves however the matter is quite different.

1) An analogous remark, mutatis mutandis, may be made about the expression $R_H^2 + R_D^2 + R_V^2$ or $R_N^2 + R_W^2 + R_V^2$, which would only have a physical meaning when the extreme values of the three components were simultaneous.

Since $X = H \cos D$, and $\cos D$ does not differ much from 1 (e. g. for $D = 8^\circ$, $\cos D = 0.99$, $D = 11\frac{1}{2}^\circ$, $\cos D = 0.98$, $D = 14^\circ$, $\cos D = 0.97$) one might expect $H d H$ to be generally somewhat larger than $X d X$; $Y = H \sin D = X \tan D$ is small, as compared with H and X when D is small, and $Y d Y$ generally is small, as compared with $H d H$ and $X d X$.

Table 5. MONTHLY MEAN VALUES OF
 $H d H$, $X d X$ AND SO ON, DE BILT, 1919.

Month.	$H d H$	$X d X$	$Y d Y$	$\frac{1}{4} Z d Z$	$X d X + Y d Y + \frac{1}{4} Z d Z$
January (30)	15.06	15.22	4.10	3.73	23.05
February (28)	15.17	15.91	4.00	3.76	23.67
March (31)	18.48	19.34	4.74	5.74	29.82
April (30)	15.60	16.11	3.98	4.34	24.43
May (24)	16.74	16.95	3.85	5.46	26.26
June (29)	14.08	13.69	3.77	4.03	21.49
July (29)	15.00	14.97	3.62	3.75	22.34
August (30)	15.70	15.71	3.96	3.92	21.59
September (30)	17.74	18.16	4.60	5.48	28.24
October (28)	17.20	18.23	4.19	3.91	26.33
November (29)	10.21	10.65	2.64	2.80	15.09
December (30)	9.99	10.37	2.69	2.52	15.58
Year (348)	15.06	15.43	3.85	4.11	23.39

Table 5 shows the monthly means of $H d H$, $X d X$, $Y d Y$, $\frac{1}{4} Z d Z$ and of $X d X + Y d Y + \frac{1}{4} Z d Z$ for De Bilt, 1919. These mean values have been computed for the days, on which the records of all the elements H , X , Y and Z were complete; the number of these days in each month is given in the table in parenthesis after the name of the month. Especially for H part of the record was missing on days of great disturbance, the spot of light going off the edge of the sheet. When $X d X$, $Y d Y$ and $\frac{1}{4} Z d Z$ are calculated for the days, on which the records of X , Y and Z were complete, i. e. in 362 days, somewhat

larger annual means are obtained, namely $X d X = 16.32$, $Y d Y = 4.05$, $\frac{1}{4} Z d Z = 4.41$, $X d X + Y d Y = 20.4$, $X d X + Y d Y + \frac{1}{4} Z d Z = 24.8$.

The corresponding results for 1920 at De Bilt are: $X d X = 14.36$, $Y d Y = 3.43$, $\frac{1}{4} Z d Z = 3.57$; $X d X + Y d Y = 17.8$, $X d X + Y d Y + \frac{1}{4} Z d Z = 21.4$.

According to the values above, in the expression: $X d X + Y d Y + \frac{1}{4} Z d Z$ at De Bilt $X d X$ represents about $\frac{2}{3}$, $Y d Y$ and $\frac{1}{4} Z d Z$ each form about $\frac{1}{6}$, or, in other terms, the shares of $X d X$, $Y d Y$ and $\frac{1}{4} Z d Z$ are in the ratio of 4 : 1 : 1.

At Eskdalemuir the annual means of $X d X + Y d Y$ for 1919 are: $16.49 + 4.87 = 21.4$; for 1920: $13.93 + 4.05 = 18.0$; the values of $\frac{1}{4} Z d Z$ were not at our disposal. At Eskdalemuir the values are somewhat larger than at De Bilt, possibly owing to its more northerly position; $Y d Y$ as compared with $X d X$ is larger at Eskdalemuir, probably because of the greater values of D and Y there.

From Table 5 results also the fact, which at first sight may seem surprising, that as a rule the monthly means of $H d H$ are smaller than those of $X d X$; one of the causes is that on many days the minimum of H and X (about 11^h) almost coincides with the maximum of Y (about 13^h); hence in the equation $H d H = X d X + Y d Y$ the sign of $Y d Y$ is opposite to that of $X d X$, so that $H d H$ may get smaller than $X d X$. The annual mean of $H d H$ too is somewhat smaller than that of $X d X$.

As an example that $H d H$ sometimes differs very much from $X d X + Y d Y$, when the absolute daily ranges are taken for $d H$, $d X$ and $d Y$, January 4, 1919 may be given. $H R_H$ was found to be $= 35.4$, $X R_X = 43.0$; $Y R_Y = 11.0$ (absolute ranges $R_H = 192\gamma$, $R_X = 239\gamma$, $R_Y = 298\gamma$). The minima and maxima of H and X were nearly simultaneous, the reading of the Y -diagram was at the time of the minimum of $X + 21.0$ mm., at the time of the maximum $- 22.0$ mm., hence: variation $\Delta Y = -43.0$ mm. $= -215\gamma$, $Y \Delta Y = -7.9$; $X R_X + Y \Delta Y = 35.1$, which agrees very well with the value of $H R_H : 35.4$, given above.

When computing ΔH from $\cos D \Delta X + \sin D \Delta Y$, one finds

(D = $11^{\circ}35'$ W) 1917, agreeing with the directly determined value 1927.
 $\frac{1}{4} Z d Z$ on January 4 was = 12.6.

Substitution of $H d H$ for $X d X + Y d Y + \frac{1}{4} Z d Z$, as proposed by BAUER, (instead of $H d H$ fairly correctly $X d X$ might be taken) means, with respect to the annual mean, for stations like De Bilt, abandoning about $\frac{1}{3}$ of the value (for other places the proportion may be different, larger for places nearer to the magnetic poles, smaller for places, nearer to the magnetic aequator); for individual days however great departures of the value " $\frac{1}{3}$ " appear to occur, so that sometimes more than half the value of the expression disappears, causing the value of $H d H$ (or $X d X$) to give an erroneous idea of the change from day to day.

When comparing (for De Bilt, 1919) the change from day to day for the values of $H d H$ and $X d X + Y d Y + \frac{1}{4} Z d Z$, it was found that out of 350 cases 304 changes were in the same direction, 44 in opposite and 2 in half equal directions, or 87.1 per cent in the same, and 12.9 per cent in opposite directions, see Table 4, No. 23.

§ 12. Besides the quantities just mentioned, some other quantities referring to 1919, namely $R_x^2 + R_y^2 + R_z^2$ at De Bilt and the sum of characters have been intercompared; the results are inserted in Table 4, Nos. 24—28. The cases 26, 27 and 28 have been dealt with for 1915 in the Nos. 4, 5 and 6 of Table 4, the results of both years are in close accordance; in 1919 the proportions are somewhat greater than in 1915 (86.2 and 84.2, 82.9 and 82.3, 80.1 and 78.2), but the differences between the two years are small, which proves stability in the relations.

It is clearly to be seen, that $X d X + Y d Y + \frac{1}{4} Z d Z$ shows greater relationship with the other quantities than $H d H$ (90.6 and 82.9 in the case of $R_x^2 + R_y^2 + R_z^2$, 83.7 and 80.1 in the case of the sum of characters); this indicates that $X d X + Y d Y + \frac{1}{4} Z d Z$ is preferable to $H d H$ to denote the amount of disturbance of a day.

It is noteworthy (see Table 4, No. 29) that out of 350 changes of the four quantities: $H d H$, $X d X + Y d Y + \frac{1}{4} Z d Z$, ΣR^2 and the sum of characters 252 occurred in the same direction (i. e. four quantities were all increasing or four were all decreasing), 9 in half equal

directions (i. e. some of the four quantities increased, the other ones remained the same, or some of the four quantities decreased, the other ones remaining the same), and 89 in opposite directions (i. e. one or more of the quantities were increasing, one or more of them were decreasing, the rest, if any, remained the same). Thus, in 73.3 per cent or nearly $\frac{3}{4}$ of the cases the changes from day to day were designated by the four quantities in the same manner.

§ 13 BAUER (Terr. Magn. Vol XXVI, p. 60) has put forward the question, whether instead of the absolute range the range, representing the difference between the largest and the smallest of the hourly means might be taken to express the amount of disturbance. This method of giving the ranges of hourly means may, after the completion of the magnetic yearbooks, be easier at observatories, publishing the hourly mean values of the elements, but for the rest, in our opinion, substitution would not offer any advantage.

In comparing the absolute ranges and the ranges of the hourly means of the horizontal intensity at De Bilt for each day of 1915 it appeared that for some days the ratio is about 1, but there are days also for which the ratio of the ranges is larger than 2, occasionally even larger than 3. Consequently it is impossible to deduce one range from another by multiplying by a constant factor.

The ratios of the monthly mean values of the two ranges are given in Table 6. Besides the values for the horizontal intensity in this table are also included the ratios for declination and for vertical intensity, and for the sum of the ranges of H, D and V (see Tables XXII and XXIII).

These series of values show a minimum in summer and a maximum in winter in all cases, probably for this reason that the range of the regular daily oscillation is larger in summer than in winter, so that the disturbances in summer are superposed upon a broader band than in winter.

For the vertical component the ratios are much smaller than for the horizontal components, the yearly mean for $H + D + V$ is 1.37.

A comparison of the changes from day to day of absolute ranges and ranges of the hourly mean values for D and H, De Bilt 1915,

Table 6. RATIOS OF ABSOLUTE RANGES AND HOURLY-MEAN-VALUE RANGES, MONTHLY MEANS, H, D, V AND $H + D + V$, DE BILT, 1915.

Months.	H.	D.	V.	$H + D + V$.
January	1.51	1.58	1.25	1.50
February	1.54	1.50	1.27	1.47
March	1.48	1.29	1.26	1.35
April	1.45	1.28	1.17	1.31
May	1.43	1.25	1.10	1.28
June	1.35	1.30	1.18	1.30
July	1.28	1.19	1.10	1.20
August	1.34	1.27	1.18	1.28
September	1.40	1.38	1.24	1.36
October	1.52	1.54	1.19	1.46
November	1.73	1.67	1.23	1.60
December	1.70	1.67	1.19	1.60
Year.	1.46	1.38	1.19	1.37

yields the results given in Table 4, Nos. 30 and 31; the proportion is 85.0 per cent in the case of D and 86.7 per cent in the case of H; hence in a great many cases (51 and 42 respectively) the characteristic : absolute range gives a result, which is the opposite of the characteristic : range of the hourly means. When the sums of the ranges $H + D + V$ are compared, the proportion is 87.9, as was stated already in Table 4, No. 15.

The different arguments mentioned point to the conclusion, that replacing absolute ranges by ranges of hourly means is not to be recommended (see further § 15).

§ 14. The annual mean for H d H (HR_H) at De Bilt, 1915, as may appear from Table XX, is found to be 12.5. This value agrees fairly well with the mean of the American observatories, 12.2, given by

BAUER in Terr. Magn. XXVI, Table 2, p. 59, but differs considerably from the value 10.3, given for Potsdam. The values HR for Potsdam, given in this table, agree very well with the mean values of the American stations until 1907, since then they have been smaller (see Table 7).

In inquiring into this matter, I found that for 1905—1907 the values of HR_H are given, R_H representing the absolute range of H. For the following years obviously $XA_X + YA_Y$ has been given, at least, in computing these values for Seddin (see *Ergebnisse der magnetischen Beobachtungen in Potsdam und Seddin*, 1915), I found values, differing not at all or but very little from the values, given in BAUER's table. The ranges A_X and A_Y however are not absolute ranges, as may be seen from *Ergebnisse ... 1915*, p. 24, but ranges of the hourly mean values; if absolute ranges had been applied, the resulting values would have been larger.

According to *Ergebnisse Potsdam und Seddin*, 1915, p. 24, the mean value of: $\sqrt{R_H^2 + R_D^2 + R_V^2} : \sqrt{A_H^2 + A_D^2 + A_V^2}$ for the years

Table 7. VALUES OF HR_H AT POTSDAM, AMERICAN STATIONS (MEAN) AND UCCLE. APPROXIMATION OF VALUES OF HR_H AT POTSDAM-SEDDIN, 1908—1915.

Year.	XA_X	YA_Y	$\frac{1}{2}ZA_Z$	$XA_X + YA_Y$	From T. M. XXVI, p. 59. Table 2.		$1.4 \times XA_X$	HR_H , Uccle.
					Pot.	Mean.		
1905					11.7	11.6		10.9
06					10.6	10.8		9.8
07					12.4	12.2		10.8
08	9.21	1.76	2.85	10.97	10.9	11.8	12.9	11.1
09	8.72	1.69	2.75	10.41	10.4	11.9	12.2	
10	8.63	1.56	2.47	10.19	10.2	11.6	12.1	
11	7.90	1.41	2.19	9.31	9.2	10.6	11.1	
12	6.20	1.21	1.74	7.41	7.4	8.7	8.7	
13	5.92	1.19	1.78	7.11	7.3	8.6	8.3	
14	6.88	1.19	1.93	8.07	8.2	9.4	9.6	
15	8.65	1.54	2.56	10.19	10.3	12.2	12.1	

1905—1907 at Potsdam was found to be $1 : 0.778 = 1.29$ (in the article in *Terr. Magn.* XXV, 1920, p. 132, SCHMIDT gives the value $\frac{3}{2}$ for the ratio of absolute and hourly-mean-value ranges). The annual mean in Table 6, relating to H, De Bilt, 1915, is 1.46; the mean of the two values is about 1.4. HR_H might approximately be calculated by assuming $HA_H = XA_X$ (this will probably hold good rather accurately for Potsdam, where declination is about 8° , $\cos D = 0.99$; cf. the values of HR_H and XR_X at De Bilt, 1915, in Table 5) and multiplying this value by 1.4; see Table 7.

The values of column 8 agree fairly well with the values of column 7, better than the original values in BAUER's table (see Table 7, column 6); the revised values strengthen BAUER's opinion as to the nearly constant value of HR_H for a great part of the earth.

In order to establish in still another way that in BAUER's table the values given for Potsdam for 1908 and following years are of an other nature than the values for 1905—1907, the values of HR_H of another European station, namely Uccle ($50^\circ 48' N$, $4^\circ 22' E$) for 1905—1908 have been given in the last column of Table 7. These values are derived from: *Annales de l'Observatoire Royal de Belgique, Physique du Globe*, Tome III et IV; from 1907 to 1908 HR_H shows a slight increase at Uccle, whilst the values given for Potsdam in BAUER's table show a great decrease.

§ 15. The character number differs from the other quantities: activity, ΣR^2 , HR_H , ΣR and ΣA in this respect, that it is not a function of the range of the curves, but of the departures from the regular, undisturbed diurnal oscillation. Days, showing a regular, normal course are indicated by the character figure 0 (quiet days); on such days the curves may have a considerable range, especially in summer, so that A_d^x , ΣR^2 , HR_H , ΣR and ΣA may be represented by a great number.

Table 8 gives the values of the quantities, mentioned above, for the five quiet days of July, 1915 (4, 15, 16, 17 and 24).

When the mean values of the last column are compared with the values of the days in January and December of the same year, it is found, that in these months the value of A_d^x is less than 24.28 on 28

Table 8. VALUES OF DIFFERENT QUANTITIES
ON THE FIVE QUIET DAYS OF JULY 1915.

Quiet days, July 1915.	4	15	16	17	24	Mean.
Sum of characters (35 stations)	0	1	0	1	2	0.8
Mean character	0.0	0.0	0.0	0.0	0.1	0.02
Activity A_d^x	13.0	32.0	29.6	24.9	21.9	24.28
$\frac{1}{100} (R_H^2 + R_D^2 + R_V^2)$	46	124	107	82	76	87
HR_H	7.5	13.2	10.6	10.5	8.3	10.02
$R_H + R_D + R_V$	114	179	168	143	133	147.4
$A_H + A_D + A_V$	103	159	153	134	128	135.4

and 29 days respectively, the value of $\frac{1}{100} (R_H^2 + R_D^2 + R_V^2)$ less than 87 on 25 and 22 days, the value of HR_H less than 10.02 on 23 and 24 days, the value of $R_H + R_D + R_V$ less than 147.4 on 25 and 23 days, and the value of $A_H + A_D + A_V$ less than 135.4 on 28 and 28 days. (The largest numbers of days are found in the case of A_d^x and ΣA ; this is another reason for preferring absolute ranges to hourly-mean-value ranges to express the character of a day, cf. §§ 10 and 13). Thus, if the days were characterised by A_d^x , ΣR^2 , HR_H , ΣR or ΣA $\frac{3}{4}$ or more of the days of January and December — among them days with a mean magnetic character of 0.8 and 0.9 — would be denoted by smaller numbers than the mean of the five quiet days of July. This is the influence of the range of the regular diurnal oscillation; in the character number this influence is eliminated.

It is of interest to add, that in winter or summer a quiet day would be expressed in each of the quantities A_d^x , ΣR^2 , HR_H , ΣR or ΣA by a small number or by a rather large number, but stations, situated in the other (southern or northern) hemisphere would indicate a rather large or a small number, so that the same quiet day would be represented by a small value or a rather large value, depending upon the geographical position of the magnetic observatory.

§ 16. The character number appears to have much more relationship with the hour-integral A_h^x than with the quantities just mentioned. The hour-integral is especially a function of the disturbances, namely of the departures in each hour from the hourly mean, whereas the regular diurnal variation is eliminated, at least for the greater part (see e. g. the values of A_h^x on quiet days, Tables IV—VII and X, and § 5).

In *Ergebnisse . . . Potsdam und Seddin, 1915*, the relationship between character number and hour-integral has already been dealt with. The table, given there p. 35 is, in our notation, included in Table 4, No. 32. No. 33 represents the comparison between the mean magnetic character number and the hour-integral according to the observations at De Bilt; the relationship is found to be 86.8 per cent for Seddin, 89.7 per cent for De Bilt.

The comparison may be made more rigorously by taking the sum of characters (in casu for 35 stations) instead of the mean magnetic character; averaging may remove small differences, for instance the sums 2, 3, 4 and 5 after dividing by 35 are all designated by 0.1. For this reason in Table XXI the sums of characters have been inserted and not the mean character numbers, and the sums of characters have been employed to draw the graphic representation of the magnetic character (see the plate). Table 4, No. 34 shows the comparison of A_h^x , De Bilt and the sum of characters, 1915; as compared with No. 33 the number of half equal cases has considerably decreased, more towards equal cases than towards unequal ones, so that the proportion is found to be still somewhat greater than for No. 33, namely 90.5 per cent.

This great relationship may appear somewhat astonishing, since A_h^x relates to the observations of one station, the sum of characters to a great number of stations, each of which assigns to a day one of the character figures 0, 1 or 2 (for quiet, disturbed and highly disturbed days). The fact however, that magnetic disturbances are not a local, but a general phenomenon, and further the circumstance, that the character at different stations is judged from somewhat different points of view (range, frequency, duration and nature of the disturbances, see the annual reviews: *Caractère magnétique de l'année. . .*), so that all kinds of disturbing factors are taken into account and expressed in the sum of characters, cause this sum or the mean of characters to

agree well enough with other quantities, deduced by pure mathematical calculations.

If the same method of classification were applied at all stations, the mean character numbers would not differ much from the numbers 0, 1 and 2; it appears to be of advantage for the magnetic characterisation of a day that the manners of judging are different, so that in the means all values between 0.0 and 2.0 may occur. This is a result, that was not a priori to be predicted, when the resolution of introducing magnetic characterisation of days by the numbers 0, 1 and 2 was taken (Innsbruck 1905); the circumstance, that the cooperating observatories are the same or nearly so each year, secures continuity (see Table 4, Nos. 4 and 26, 6 and 28).

§ 17. Table 4, Nos. 35—43 give the results of some other comparisons between equal or analogous magnetic quantities at different observatories, situated not far apart. Nos. 35—37 compare the activity at Seddin and De Bilt, at both stations Greenwich-days having been taken; No. 38, comparing the activity A_d^x at Seddin and the sum of characters gives about the same result as No. 2. Nos. 39—43 show comparisons of daily ranges, derived (39) from momentary hourly values, (40) from hourly mean values and (41—43) from the extreme values (absolute ranges). It appears from the results that a proportion of 90 per cent has been reached or exceeded only in few cases. A proportion of 100 per cent is never to be expected, among other reasons because of the inevitable errors in measuring the diagrams, so that an amount of 0.1 mm. more or less in the value of a range causes an equal change to turn into an unequal one. Such cases occur several times, since ranges of subsequent days often differ but very little.

The comparison of absolute daily ranges of declination at Langenberg near Bochum, ($51^{\circ} 22' N$, $7^{\circ} 6' E$, see Westfälische Berggewerkschaftskasse zu Bochum, Verwaltungsbericht 1 April 1920—31 März 1921) and De Bilt during the first four months of 1920 gave in 120 cases 115 equal, 1 half equal and 4 unequal changes, or a proportion of 96.2 per cent; the following months however gave much more unequal changes, so that the proportion for the whole year came to 88.5 per cent.

§ 18. From some quarters it has been suggested to replace the character numbers, which have no real physical meaning, by other quantities, for which this is more or less indeed the case. Of the quantities, dealt with in the preceding pages the hour-integral has afforded the greatest relationship with the character numbers; however, both for practical reasons (because of the great amount of labour, its determination involves) and for theoretical reasons introduction of the hour-integral is not to be expected.

In § 15 the difference between the character number and the other quantities A_d^x , ΣR^2 , $H d H$, ΣR and ΣA has been pointed out. Whilst the character number expresses the rate of disturbance of a day, the other quantities, which aim at giving a measure of activity or energy-change, are functions of the daily ranges; in these quantities the regular daily oscillation and the disturbances are not separated from one another, but they appear superimposed. Because of their different nature the character number and one of the other quantities are unfit to wholly replace each other, though there exists a rather close parallelism (large disturbances are generally accompanied by large daily ranges).

The character figures and the mean character of a day are obtained in a rather easy manner by the international cooperation of almost all magnetic observatories on earth; abolishing the character numbers would be a loss, since there is no quantity, easily to be determined, available that might take its place. However, besides the character number another quantity might be given, giving a measure of the energy-change or activity of each day. It is to be expected, that this quantity will be a function of the daily ranges of the components of the earth's magnetism. It is preferable to give absolute ranges; giving hourly-mean-value ranges means flattening the curves, which deprives them more or less of their character.

So long as a common resolution as to the form of the function has not been taken, stations, which are able to do so, might give the absolute daily ranges of the north, west and vertical components or else the ranges of the elements recorded. Giving the values of the elements separately affords an opportunity of further inquiring into the best form of the function, destined to express energy-change or activity. If one should want one number to characterise a day, the easiest

thing would be to begin by giving the sum of the absolute ranges of three components (ΣR); it has been pointed out, that ΣR and ΣR^2 may be considered to be equivalent to indicate the changes from day to day (increase or decrease). This does not involve much trouble; if on the contrary the magnetic observatories would be charged with much more labour, it is to be feared, that the regular cooperation of nearly all magnetic stations on earth in composing the quarterly lists of magnetic character numbers, would be seriously injured.

TABLES.

Table I. DIURNAL VARIATION OF DECLINATION, HOURLY MEAN VALUES, 1915. ALL DAYS.

Months.	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24
January.	-0.76	-0.59	-0.45	-0.47	-0.51	-0.53	-0.46	-0.48	-0.12	0.79	1.42	2.36	2.63	1.78	0.50	0.91	0.90	0.22	-0.31	-1.10	-1.16	-1.45	-1.84	-1.27
Febr.	-1.47	-1.12	-1.28	-1.02	-1.21	-1.13	-0.92	-0.84	0.07	1.26	2.32	3.51	3.65	3.07	2.09	0.96	0.27	-0.46	-0.60	-0.56	-1.70	-2.34	-1.19	-1.37
March.	-1.41	-1.16	-1.34	-0.88	-1.45	-1.48	-1.67	-2.99	-3.38	-1.04	2.05	4.76	6.44	5.81	4.32	2.71	0.36	0.14	-0.99	-0.80	-1.43	-2.33	-2.58	-1.65
April.	-1.92	-1.37	-1.58	-1.57	-1.93	-2.31	-3.04	-3.67	-3.53	-2.05	0.77	4.56	7.00	7.01	5.56	3.80	2.12	0.32	-0.76	-1.08	-1.45	-1.33	-1.45	-1.86
May.	-1.37	-0.87	-1.25	-2.17	-2.80	-3.57	-3.87	-4.00	-3.06	-0.97	1.91	4.76	6.28	5.79	4.48	3.02	1.57	0.62	-0.35	-0.26	-0.80	-0.71	-1.18	-1.07
June.	-1.59	-1.65	-2.01	-2.06	-3.53	-4.85	-5.26	-5.16	-4.05	-1.52	2.00	5.02	6.41	6.89	5.74	4.31	2.57	0.66	0.50	-0.18	-0.01	-0.07	-0.74	-1.45
July.	-1.32	-1.98	-1.79	-2.55	-3.77	-5.04	-5.41	-4.78	-3.75	-1.06	1.98	5.47	7.39	6.98	5.48	3.69	1.79	0.35	0.05	0.08	-0.12	-0.32	-0.54	-0.85
August.	-1.53	-2.21	-1.58	-2.29	-3.12	-3.96	-4.69	-4.63	-3.18	-0.22	2.75	5.78	7.34	6.82	5.09	2.75	1.01	-0.11	-0.23	-0.56	-0.26	-0.64	-0.88	-1.41
Sept.	-1.77	-1.50	-2.08	-1.45	-1.77	-2.13	-2.52	-2.79	-2.01	0.14	2.97	5.81	6.96	5.86	4.25	1.89	-0.20	-0.33	-0.88	-0.72	-1.63	-2.12	-2.16	-1.80
October.	-2.31	-1.90	-0.82	-0.65	0.02	0.39	-0.58	-1.68	-2.21	0.73	2.23	5.06	5.76	5.69	3.88	2.03	0.70	-0.64	-1.82	-1.74	-2.32	-2.90	-3.04	-2.55
November.	-1.82	-1.23	-0.25	-0.57	-0.86	0.15	0.20	0.38	0.66	1.08	2.52	3.89	3.73	2.94	2.33	1.69	0.39	-0.20	-1.20	-2.83	-3.04	-2.55	-3.33	-2.12
Decemb.	-0.97	-0.93	-0.55	-0.42	-0.35	-0.31	-0.13	-0.16	-0.08	0.75	1.47	2.22	2.76	2.18	1.62	1.53	0.60	0.17	-1.06	-1.31	-1.64	-1.82	-1.90	-1.69
Year.	-1.52	-1.39	-1.25	-1.34	-1.77	-2.06	-2.36	-2.57	-2.05	-0.30	2.05	4.43	5.53	5.07	3.78	2.44	1.01	0.06	-0.64	-0.92	-1.30	-1.57	-1.74	-1.59

DIURNAL VARIATION OF DECLINATION, HOURLY MEAN VALUES, 1915. FIVE QUIET DAYS.

Months.	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24
January.	-0.56	0.12	0.02	0.00	-0.18	-0.48	-0.84	-1.06	-0.78	-0.08	0.86	2.12	2.58	1.68	0.74	0.68	0.50	0.20	-0.10	-0.72	-1.08	-1.10	-1.36	-1.20
Febr.	-0.56	-0.38	-0.46	-0.38	-0.54	-0.76	-0.86	-0.80	-0.50	0.60	1.54	2.08	2.14	1.86	1.04	0.38	0.44	0.18	-0.16	-0.62	-0.88	-1.08	-1.14	-1.06
March.	-0.67	-0.17	-0.87	-1.37	-1.73	-1.57	-2.39	-3.71	-3.95	-1.81	1.51	4.29	5.89	5.25	3.59	1.81	0.47	0.17	-0.27	-0.41	-0.87	-1.19	-0.93	-1.09
April.	-0.01	-0.15	-0.79	-1.15	-1.83	-2.19	-3.05	-3.83	-4.03	-2.51	0.15	3.79	5.65	5.79	3.93	2.09	0.83	-0.23	-0.69	-0.69	-0.61	-0.13	-0.07	-0.37
May.	-0.10	-0.66	-1.22	-1.84	-2.96	-3.96	-4.38	-4.78	-3.40	-0.86	1.92	4.62	6.02	5.46	3.96	2.08	0.42	-0.14	-0.12	-0.28	-0.04	0.08	0.12	-0.02
June.	-0.65	-0.43	-0.69	-1.43	-3.01	-3.95	-4.93	-5.23	-4.91	-2.91	0.75	4.15	5.43	5.71	5.11	3.73	2.05	1.17	0.63	-0.37	0.15	0.27	-0.31	-0.23
July.	-1.20	-1.98	-2.02	-2.58	-3.90	-5.36	-5.04	-4.52	-3.16	-0.88	1.96	5.18	6.06	6.08	5.04	3.58	1.88	1.16	0.62	0.20	0.04	0.08	-0.50	-0.68
August.	-1.25	-1.29	-1.45	-2.35	-3.45	-4.01	-4.81	-5.01	-3.45	-0.55	1.83	4.71	6.55	6.69	5.39	3.45	1.33	0.19	-0.17	-0.29	-0.07	-0.27	-0.61	-1.01
Sept.	-1.10	-1.32	-1.46	-1.96	-2.26	-3.20	-4.16	-4.28	-2.56	0.72	3.82	5.78	6.46	4.84	2.42	0.74	-0.08	0.18	0.02	0.20	0.30	-0.32	-0.76	-1.38
October.	-1.10	-0.56	-0.86	-0.92	-1.14	-1.36	-1.80	-3.00	-3.66	-2.42	0.96	3.70	4.66	4.52	2.80	1.68	0.92	0.60	0.24	-0.28	-0.54	-0.64	-0.74	-1.06
November.	-1.01	-1.25	-1.11	-0.97	-0.87	-1.07	-0.85	-0.77	-0.63	0.35	1.69	2.13	2.39	1.93	1.53	0.99	1.05	-0.11	0.13	-0.27	-0.43	-0.69	-1.17	-1.03
Decemb.	-0.65	-0.29	-0.11	-0.11	-0.25	-0.51	-0.67	-0.75	-0.75	0.19	1.17	1.87	2.15	1.41	0.79	0.29	0.35	0.09	-0.29	-0.57	-0.67	-0.81	-0.89	-1.03
Year.	-0.74	-0.70	-0.92	-1.26	-1.84	-2.37	-2.82	-3.14	-2.64	-0.85	1.51	3.70	4.66	4.27	3.03	1.79	0.85	0.29	-0.01	-0.34	-0.45	-0.48	-0.70	-0.85

Table II. DIURNAL VARIATION OF HORIZONTAL INTENSITY, HOURLY MEAN VALUES, 1915. ALL DAYS.

Months.	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24
January.	-1.2	1.1	0.0	2.8	5.2	7.0	7.0	4.6	1.8	-0.9	-4.7	-3.5	-2.9	-2.4	-2.7	-3.7	-4.7	-1.8	0.0	1.2	1.6	1.9	-1.5	-2.3
Febr.	2.8	1.6	1.8	0.8	4.8	4.8	5.0	2.9	0.5	-3.1	-8.1	-7.1	-4.8	-0.4	-0.4	-1.9	-5.8	-2.9	-1.1	0.1	1.9	3.5	1.0	4.1
March.	7.8	4.5	6.1	5.2	7.7	5.5	3.0	0.0	-10.7	-22.7	-4.1	-20.4	-13.8	-6.6	0.5	3.9	2.5	3.0	6.0	7.4	10.0	9.7	7.9	7.6
April.	7.5	3.9	2.4	2.1	4.5	5.6	4.0	-0.3	-6.4	-16.8	-22.7	-21.3	-16.2	-10.0	-2.8	3.1	7.0	8.5	8.1	8.0	7.8	6.9	8.1	
May.	5.7	3.8	3.2	3.3	3.5	3.5	6.4	-11.3	-17.4	-20.6	-18.5	-15.2	-10.0	-5.7	-0.5	5.0	7.0	11.9	13.7	11.4	11.3	9.2	9.6	6.3
June.	8.1	8.9	6.2	6.4	7.8	3.2	-4.9	-15.6	-25.7	-30.9	-31.5	-26.0	-16.8	-9.1	0.2	7.1	12.3	18.1	18.2	16.8	13.9	11.4	10.3	12.0
July.	7.2	5.1	3.5	4.3	5.5	0.9	-7.5	-13.1	-22.1	-27.8	-32.3	-20.7	-11.8	-5.1	3.8	8.1	9.7	13.6	15.0	14.8	14.9	12.0	9.3	8.5
August.	9.6	8.4	6.6	6.0	6.3	2.5	-3.9	-15.6	-24.5	-30.6	-27.1	-21.4	-13.6	-6.7	-1.4	5.7	7.6	10.0	13.5	16.2	16.6	13.8	12.0	9.8
Sept.	9.7	11.4	8.6	8.0	8.5	6.0	-4.0	-12.4	-19.2	-25.7	-24.0	-19.1	-11.5	-5.3	-1.2	-2.0	1.8	5.6	9.8	9.8	11.0	12.9	10.9	9.7
October.	8.5	9.0	6.8	8.1	9.6	9.2	6.8	1.5	-9.7	-19.7	-22.6	-18.3	-11.8	-7.4	-3.5	-3.1	-4.7	0.0	4.4	2.8	6.0	7.6	9.7	10.3
November.	3.7	5.3	5.1	7.2	10.3	9.0	5.3	-0.8	-7.3	-11.7	-13.8	-15.8	-10.9	-9.3	-6.0	-5.3	-0.1	3.3	1.7	5.1	3.8	9.4	8.4	3.7
Decemb.	-0.5	-0.3	0.3	2.3	5.0	6.6	6.3	2.6	-0.8	-4.6	-4.6	-4.1	-3.7	-2.1	-3.0	-4.5	1.3	0.1	-0.9	-0.1	1.3	2.3	1.9	-0.4
Year.	5.7	5.2	4.2	4.7	6.6	5.1	0.9	-4.8	-11.8	-17.9	-19.2	-16.2	-10.6	-5.8	-1.4	1.0	2.8	5.8	7.4	7.9	8.4	8.5	7.2	6.4

DIURNAL VARIATION OF HORIZONTAL INTENSITY, HOURLY MEAN VALUES, 1915. FIVE QUIET DAYS.

Months.	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24
January.	-3.2	-2.6	-1.6	-1.0	1.2	3.8	4.8	4.2	0.4	-5.0	-8.2	-7.0	-3.4	1.8	2.8	0.8	1.4	2.4	2.4	3.4	2.6	1.2	1.2	-1.4
Febr.	0.6	0.8	1.2	2.2	4.2	3.8	4.2	2.8	0.2	-3.8	-7.2	-8.0	-5.4	-1.4	-0.2	-2.8	-3.0	-2.2	1.0	3.4	2.0	2.6	2.4	2.6
March.	3.6	3.6	5.2	5.6	5.8	5.6	4.0	0.4	-9.0	-20.4	-11.6	-18.6	-10.8	-4.6	0.4	2.2	3.2	3.2	5.2	6.6	7.8	7.6	9.0	6.4
April.	3.1	3.9	3.3	2.9	3.7	2.7	2.5	0.1	-5.5	-13.7	-17.7	-16.9	-11.7	-5.1	-1.3	4.1	5.7	4.9	5.7	5.1	5.7	6.5	6.5	6.5
May.	4.6	3.8	3.0	3.4	3.2	0.4	-5.4	-11.2	-16.4	-19.0	-18.4	-13.0	-8.0	-4.6	-0.2	1.0	3.0	6.8	10.8	12.4	11.4	11.2	10.6	10.0
June.	5.5	4.1	3.7	6.3	8.1	5.3	-2.9	-10.9	-21.7	-25.5	-25.9	-20.9	-18.7	-10.5	-0.3	3.1	10.9	16.1	15.9	14.7	13.1	11.3	10.3	9.3
July.	5.1	1.7	1.5	4.5	6.3	1.5	-6.9	-15.7	-22.9	-27.9	-25.5	-18.9	-11.3	-4.7	3.9	9.3	11.7	15.7	13.5	14.9	12.5	11.1	9.5	10.1
August.	7.8	6.0	7.0	6.2	7.0	4.2	-1.6	-12.6	-21.2	-24.8	-21.2	-14.4	-11.8	-5.0	2.2	7.4	10.8	13.8	16.6	14.4	13.2	11.4	9.8	9.8
Sept.	7.2	5.4	5.2	5.2	5.8	5.6	2.0	0.4	-8.0	-19.2	-23.4	-16.6	-8.2	1.4	4.0	4.4	4.0	6.4	11.8	11.8	13.4	12.6	13.8	12.0
October.	4.8	5.2	2.8	3.8	5.8	5.6	2.0	0.4	-8.0	-19.2	-23.4	-16.6	-8.2	1.4	4.0	4.4	4.0	6.4	10.2	10.6	11.0	9.8	10.4	8.6
November.	0.7	-0.7	-0.5	2.3	4.1	3.1	1.5	-0.7	-3.7	-8.9	-11.7	-9.7	-4.1	-1.1	-2.3	0.3	2.9	2.9	4.5	4.5	3.1	4.5	4.9	3.1
Decemb.	-2.4	-2.8	-1.4	0.4	3.4	3.8	3.4	0.6	-5.2	-8.2	-6.4	-5.2	-3.2	-0.4	0.0	1.0	3.2	5.2	5.6	4.6	3.0	2.4	0.2	-1.2
Year.	3.1	2.4	2.4	3.5	4.7	3.2	-0.3	-5.0	-11.3	-16.8	-17.8	-14.7	-9.4	-4.1	-0.4	2.1	4.3	6.5	8.4	8.9	8.4	8.0	7.5	6.3

Table III. DIURNAL VARIATION OF VERTICAL INTENSITY, HOURLY MEAN VALUES, 1915. ALL DAYS.

Months.	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24
January.	0.2	-1.0	-1.6	-2.2	-2.5	-2.8	-2.6	-2.5	-2.8	-1.9	-1.4	-2.3	-1.3	2.0	2.2	2.2	3.1	2.8	2.9	3.0	2.1	1.5	1.5	1.8
Febr.	-2.8	-2.9	-3.2	-3.2	-3.4	-2.6	-2.7	-2.8	-2.3	-2.4	-2.5	-1.9	-0.7	-0.5	0.4	1.8	3.7	5.2	5.8	6.2	4.5	3.4	2.5	0.1
March.	-2.9	-2.7	-3.0	-2.8	-3.8	-2.5	-0.3	2.3	2.2	0.2	-4.4	-7.0	-5.9	-3.9	-0.9	3.3	5.9	6.6	5.8	6.3	3.9	2.9	0.8	0.1
April.	-0.4	-0.6	0.2	0.7	0.7	0.7	2.3	3.5	2.1	-0.3	-4.4	-10.9	-12.5	-8.8	-4.8	-0.7	3.3	6.5	7.1	6.7	5.2	3.2	1.8	-0.1
May.	2.0	1.5	1.2	1.5	2.5	2.8	3.1	2.3	-0.1	-4.1	-10.0	-4.3	-13.4	-9.1	-4.4	-0.4	3.4	5.7	7.4	7.3	5.5	4.3	2.9	2.4
June.	-1.9	-2.3	-2.3	-1.1	-0.2	0.9	3.0	3.5	0.9	-4.5	-9.8	-12.4	-10.6	-5.6	0.1	2.8	8.6	9.2	8.0	6.6	4.9	3.0	1.2	-1.7
July.	0.4	-0.7	-0.3	0.1	1.2	1.3	1.9	1.5	0.9	-2.9	-8.5	-13.0	-13.4	-10.4	-4.7	1.2	6.1	8.4	9.4	8.1	5.7	3.8	2.6	1.1
August.	-2.1	-3.1	-3.2	-3.0	-1.7	0.8	2.8	5.3	3.0	-2.7	-8.6	-13.2	-12.2	-7.6	-1.0	5.7	9.4	9.6	7.7	6.3	4.3	2.7	1.2	-0.4
Sept.	-1.6	-2.3	-2.8	-2.8	-3.3	-1.8	0.6	1.6	0.6	-3.3	-8.2	-9.5	-7.4	-3.1	1.7	6.5	7.9	7.5	5.8	6.0	4.6	2.5	0.7	0.1
October.	-5.3	-7.8	-8.2	-8.1	-6.7	-5.6	-4.5	-1.6	-0.6	-3.4	-5.8	-5.8	-4.1	-0.5	4.9	9.9	11.8	11.6	10.6	9.4	6.9	3.9	1.1	-1.8
November.	-4.8	-5.8	-6.1	-7.2	-7.8	-6.5	-6.4	-5.8	-4.5	-5.5	-5.6	-3.8	-0.7	-2.9	5.9	9.0	10.1	10.2	10.1	9.6	8.4	4.8	0.8	-1.3
Decemb.	-1.8	-2.5	-3.0	-3.6	-3.9	-3.4	-3.2	-3.0	-3.0	-2.2	-1.9	-2.7	-1.5	0.2	1.2	2.8	4.4	5.4	6.8	6.5	5.3	3.5	0.9	-0.6
Year.	-1.8	-2.5	-2.9	-2.6	-2.4	-1.6	-0.5	0.3	-0.3	-2.8	-5.9	-8.1	-7.0	-3.7	0.0	3.7	6.5	7.4	7.3	6.8	5.1	3.3	1.5	0.0

DIURNAL VARIATION OF VERTICAL INTENSITY, HOURLY MEAN VALUES, 1915. FIVE QUIET DAYS.

Months.	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24
January.	0.3	0.3	-0.3	-0.3	-0.9	-1.1	-1.3	-1.3	-1.5	-0.5	-1.1	-2.7	-1.3	0.5	0.9	1.3	1.9	2.5	1.9	1.7	0.5	0.7	-0.1	0.3
Febr.	-2.0	-1.6	-1.8	-1.6	-2.2	-1.4	-2.2	-1.8	-1.8	-1.6	-2.0	-1.2	-0.4	-1.4	-0.4	1.0	2.0	3.6	3.6	3.4	3.2	3.2	2.4	1.0
March.	1.2	1.8	0.4	0.2	0.0	0.6	1.6	4.8	5.0	1.8	2.6	5.8	-4.6	-3.2	-1.2	0.8	0.6	-0.4	0.2	0.8	-0.8	0.4	-1.2	-0.6
April.	2.5	2.3	2.7	2.9	3.5	4.3	6.1	7.5	6.1	3.1	-2.1	-8.9	-13.3	-11.3	-7.1	-4.3	-1.1	1.3	0.3	2.5	1.3	1.1	0.5	0.5
May.	6.6	6.4	7.0	8.0	9.0	9.2	8.6	6.4	1.6	-3.6	-10.8	-15.6	-15.4	-12.2	-7.8	-3.2	-0.2	1.0	1.6	1.0	0.8	0.6	0.4	0.8
June.	0.8	0.6	1.4	2.8	3.8	5.2	6.2	7.2	3.8	-1.0	-6.6	-10.6	-11.0	-8.2	-4.2	-2.8	-0.8	1.2	3.4	3.2	2.4	1.6	0.8	0.6
July.	1.6	1.2	2.0	3.0	4.2	4.6	4.8	4.0	1.0	-3.6	-7.4	-10.4	-10.4	-9.4	-5.6	-0.8	3.2	3.8	4.6	3.4	2.6	1.8	1.2	0.6
August.	2.8	3.4	3.2	3.6	4.2	4.8	6.0	8.2	4.2	-3.4	-11.0	-16.6	-15.8	-11.8	-4.0	3.0	4.6	4.6	2.6	2.6	2.0	1.2	1.0	0.6
Sept.	2.7	3.1	3.1	3.1	4.9	5.9	5.9	4.7	0.7	-5.1	-10.5	-10.9	-8.3	-4.7	-0.9	1.7	1.5	0.1	-0.5	0.7	0.9	1.3	1.1	1.3
October.	1.8	1.2	1.0	1.2	1.0	1.4	1.8	2.6	1.8	-2.6	-5.8	-7.4	-7.4	-5.2	-1.6	1.6	1.4	1.2	1.8	2.0	2.2	2.2	2.2	1.6
November.	0.4	-0.2	-0.8	-1.0	-1.6	-1.4	-1.8	-2.2	-1.6	-2.6	-2.8	-2.4	-1.6	-1.0	0.2	0.8	1.8	2.4	3.0	3.6	3.8	2.2	2.0	1.0
Decemb.	0.0	0.0	-1.0	-1.5	-1.6	-1.6	-0.6	-0.2	-0.2	0.6	0.0	-0.8	-0.2	0.0	-1.0	-1.4	1.6	2.0	1.8	2.2	2.0	1.4	0.2	-0.4
Year.	1.6	1.5	1.4	1.7	1.9	2.5	2.9	3.3	1.6	-1.5	-5.2	-7.8	-7.5	-5.7	-2.7	-0.2	1.4	1.9	2.0	2.3	1.7	1.5	0.9	0.6

Table IV.

HOURLY MEAN VALUES OF ACTIVITY.

January, 1915. ALL DAYS.

January, 1915. FIVE QUIET DAYS. (2, 3, 18, 19, 31).

Hour.	D.			H.			V.			Total.	Hour.	D.			H.			V.			Total.
	G.M.T.	A _h ^x	A _D ^h	A _D ^x	A _h ^x	A _D ^h	A _D ^x	A _h ^x	A _D ^h		G.M.T.	A _h ^x	A _D ^h	A _D ^x	A _h ^x	A _D ^h	A _D ^x	A _h ^x	A _D ^h	A _D ^x	
0-1	1.0	3.0	4.0	0.4	1.4	1.8	0.0	0.0	0.0	6.1	0-1	0.1	0.7	0.8	0.0	0.7	0.0	0.0	0.2	0.2	1.7
1-2	0.7	1.6	2.3	0.5	2.0	2.5	0.0	0.6	0.6	5.4	1-2	0.1	0.3	0.4	0.1	0.5	0.0	0.0	0.3	0.3	1.3
2-3	0.6	2.2	2.8	0.6	1.3	1.9	0.1	0.6	0.7	5.4	2-3	0.1	0.2	0.3	0.0	0.3	0.0	0.1	0.1	0.1	0.7
3-4	0.7	2.3	3.0	0.3	5.3	5.6	0.0	1.1	1.1	9.7	3-4	0.1	0.2	0.3	0.0	0.3	0.0	0.1	0.1	0.1	0.7
4-5	0.4	1.7	2.1	0.5	3.5	4.0	0.0	0.8	0.8	6.9	4-5	0.1	0.3	0.4	0.1	0.3	0.0	0.1	0.1	0.1	0.9
5-6	0.2	1.0	1.2	0.2	4.4	4.6	0.0	0.8	0.8	6.6	5-6	0.1	0.4	0.5	0.1	0.7	0.0	0.1	0.1	0.1	1.4
6-7	0.3	1.2	1.5	0.2	3.3	3.5	0.0	0.6	0.6	5.6	6-7	0.1	1.1	1.2	0.0	1.2	0.0	0.0	0.2	0.2	2.6
7-8	0.3	1.0	1.3	0.3	1.5	1.8	0.0	0.5	0.5	3.6	7-8	0.1	1.3	1.4	0.1	1.4	1.5	0.0	0.3	0.3	3.2
8-9	0.3	1.2	1.5	0.3	1.4	1.7	0.0	0.7	0.7	3.9	8-9	0.1	0.9	1.0	0.1	0.8	0.9	0.0	0.2	0.2	2.1
9-10	0.5	2.0	2.5	0.3	1.6	1.9	0.0	0.5	0.5	4.9	9-10	0.1	0.2	0.3	0.1	1.4	1.5	0.0	0.2	0.2	2.0
10-11	0.5	3.6	4.1	0.2	2.6	2.8	0.0	0.4	0.4	7.3	10-11	0.3	1.2	1.5	0.0	2.8	2.8	0.0	0.3	0.3	4.6
11-12	0.5	7.4	7.9	0.3	3.2	3.5	0.0	0.5	0.5	11.9	11-12	0.2	6.2	6.4	0.1	2.0	2.1	0.0	0.0	0.0	9.1
12-13	0.2	8.6	8.8	0.3	3.1	3.4	0.1	0.1	0.1	12.6	12-13	0.1	8.2	8.3	0.1	0.9	1.0	0.0	0.4	0.4	9.7
13-14	1.0	4.7	5.7	0.6	5.3	5.9	0.0	0.7	0.7	12.3	13-14	0.2	4.1	4.3	0.1	0.7	0.8	0.0	0.2	0.2	5.3
14-15	2.7	3.8	6.5	1.7	4.6	6.3	0.1	0.9	1.0	13.8	14-15	0.1	1.2	1.3	0.0	0.8	0.8	0.0	0.2	0.2	2.3
15-16	0.4	2.3	2.7	0.4	4.1	4.5	0.0	1.1	1.1	8.3	15-16	0.1	0.6	0.7	0.1	0.2	0.3	0.0	0.2	0.2	1.2
16-17	0.9	2.1	3.0	0.6	6.9	7.5	0.1	1.3	1.4	11.9	16-17	0.1	0.4	0.5	0.1	0.2	0.3	0.0	0.3	0.3	1.1
17-18	0.9	2.1	3.0	0.4	2.4	2.8	0.0	1.0	1.0	6.8	17-18	0.1	0.1	0.2	0.0	0.3	0.3	0.0	0.4	0.4	0.9
18-19	1.0	1.9	2.9	0.4	1.3	1.7	0.0	1.0	1.0	5.6	18-19	0.1	0.1	0.2	0.0	0.3	0.3	0.0	0.3	0.3	0.8
19-20	1.4	4.2	5.6	0.9	1.7	2.6	0.1	0.9	1.0	9.2	19-20	0.1	0.8	0.9	0.0	0.5	0.5	0.0	0.2	0.2	1.6
20-21	0.9	3.1	4.0	1.8	4.0	5.8	0.1	0.7	0.8	10.6	20-21	0.1	1.4	1.5	0.0	0.3	0.3	0.0	0.2	0.2	2.0
21-22	0.7	4.6	5.3	0.9	2.5	3.4	0.1	0.4	0.5	9.2	21-22	0.1	1.5	1.6	0.1	0.1	0.1	0.0	0.1	0.1	1.9
22-23	0.9	5.6	6.5	0.5	2.3	2.8	0.0	0.4	0.4	9.7	22-23	0.2	2.3	2.5	0.2	0.2	0.4	0.0	0.1	0.1	3.0
23-24	0.6	2.6	3.2	0.2	2.4	2.6	0.0	0.5	0.5	6.3	23-24	0.1	1.7	1.8	0.1	0.3	0.4	0.0	0.2	0.2	2.4
Mean.	0.74	3.07	3.81	0.53	3.00	3.53	0.04	0.69	0.73	8.07	Mean.	0.10	1.47	1.57	0.07	0.72	0.79	0.01	0.22	0.23	2.59

Table VI.

HOURLY MEAN VALUES OF ACTIVITY.

July, 1915. ALL DAYS.

July, 1915. FIVE QUIET DAYS. (4, 15, 16, 17, 24).

Hour.	D.			H.			V.			Total.
	A _h ^x	A _h ^h	A _d ^x	A _h ^x	A _h ^h	A _d ^x	A _h ^x	A _h ^h	A _d ^x	
G. M. T.	A _h ^x	A _h ^h	A _d ^x	A _h ^x	A _h ^h	A _d ^x	A _h ^x	A _h ^h	A _d ^x	Total.
0-1	1.0	4.8	5.8	0.6	5.0	5.6	0.1	0.5	0.6	12.0
1-2	1.1	6.0	7.1	0.3	2.4	2.7	0.0	0.7	0.7	10.5
2-3	1.3	7.2	8.5	0.5	1.9	2.4	0.1	0.8	0.9	11.8
3-4	0.9	11.3	12.2	0.6	1.9	2.5	0.1	1.8	1.9	16.6
4-5	0.9	18.7	19.6	0.6	2.8	3.4	0.1	2.3	2.4	25.4
5-6	0.9	32.0	32.9	0.3	2.1	2.4	0.0	2.5	2.5	37.8
6-7	0.9	36.5	37.4	0.6	3.4	4.0	0.1	1.6	1.7	43.1
7-8	0.7	28.5	29.2	0.4	9.6	10.0	0.1	1.2	1.3	40.5
8-9	0.7	17.5	18.2	0.9	24.6	25.5	0.1	0.8	0.9	44.6
9-10	0.9	3.4	4.3	0.5	34.6	35.1	0.2	1.1	1.3	40.7
10-11	1.4	7.4	8.8	0.5	36.0	36.5	0.2	3.8	4.0	49.3
11-12	1.2	37.6	38.8	1.0	21.0	22.0	0.1	7.5	7.6	68.4
12-13	0.5	66.1	66.6	1.0	9.5	10.5	0.1	8.2	8.3	85.4
13-14	0.4	58.3	58.7	1.0	4.0	5.0	0.1	5.9	6.0	69.7
14-15	0.6	36.7	37.3	1.1	2.5	3.6	0.2	2.5	2.7	43.6
15-16	0.7	18.1	18.8	1.0	6.3	7.3	0.2	1.2	1.4	27.5
16-17	0.8	5.5	6.3	1.0	5.4	6.4	0.1	2.7	2.8	15.5
17-18	0.4	1.4	1.8	0.8	9.8	10.6	0.0	4.3	4.3	16.7
18-19	0.4	1.7	2.1	0.6	11.5	12.1	0.0	5.5	5.5	19.7
19-20	0.5	1.6	2.1	0.6	11.0	11.6	0.0	4.3	4.3	18.0
20-21	1.1	5.4	6.5	1.1	11.3	12.4	0.1	2.3	2.4	21.3
21-22	1.0	3.8	4.8	0.7	7.1	7.8	0.1	1.1	1.2	13.8
22-23	0.9	1.8	2.7	0.8	6.2	7.0	0.1	1.2	1.3	11.0
23-24	0.9	3.1	4.0	0.4	5.4	5.8	0.0	0.8	0.8	10.6
Mean.	0.84	17.27	18.11	0.71	9.81	10.52	0.10	2.69	2.79	31.42

Hour.	D.			H.			V.			Total.
	A _h ^x	A _h ^h	A _d ^x	A _h ^x	A _h ^h	A _d ^x	A _h ^x	A _h ^h	A _d ^x	
G. M. T.	A _h ^x	A _h ^h	A _d ^x	A _h ^x	A _h ^h	A _d ^x	A _h ^x	A _h ^h	A _d ^x	Total.
0-1	0.3	2.3	2.6	0.2	1.7	1.9	0.0	0.0	0.8	5.3
1-2	0.2	4.8	5.0	0.1	0.3	0.4	0.0	0.0	0.8	6.2
2-3	0.1	5.3	5.4	0.1	0.2	0.3	0.0	0.0	0.7	6.4
3-4	0.2	8.5	8.7	0.1	1.2	1.3	0.0	0.0	0.8	10.8
4-5	0.5	19.0	19.5	0.1	2.2	2.3	0.0	0.0	1.0	22.8
5-6	0.2	34.1	34.3	0.2	1.3	1.5	0.0	0.0	1.1	36.9
6-7	0.1	30.5	30.6	0.2	3.3	3.5	0.0	0.0	1.6	35.7
7-8	0.3	25.3	25.6	0.4	10.8	11.2	0.0	0.0	1.0	37.8
8-9	0.4	13.1	13.5	0.2	22.2	22.4	0.2	0.3	0.5	36.4
9-10	0.4	4.0	4.4	0.2	34.6	34.8	0.1	1.1	1.2	40.4
10-11	1.5	7.1	8.6	0.2	31.5	31.7	0.1	2.9	3.0	43.3
11-12	0.4	33.0	33.4	0.4	16.5	16.9	0.1	4.6	4.7	55.0
12-13	0.2	44.0	44.2	0.3	5.7	6.0	0.1	5.3	5.4	55.6
13-14	0.2	44.2	44.4	0.4	1.2	1.6	0.1	5.3	5.4	51.4
14-15	0.3	32.9	33.2	0.4	1.6	2.0	0.2	2.6	2.8	38.0
15-16	0.3	19.4	19.7	0.2	5.1	5.3	0.1	0.7	0.8	25.8
16-17	0.3	6.8	7.1	0.1	7.3	7.4	0.1	0.7	0.7	15.2
17-18	0.2	2.3	2.5	0.1	11.1	11.2	0.0	0.8	0.9	14.6
18-19	0.1	0.9	1.0	0.1	7.8	7.9	0.0	1.1	1.1	10.0
19-20	0.2	1.2	1.4	0.1	9.5	9.6	0.0	0.7	0.7	11.7
20-21	0.1	0.8	0.9	0.1	6.4	6.5	0.0	0.4	0.5	7.9
21-22	0.1	0.3	0.4	0.1	5.2	5.3	0.0	0.2	0.2	5.9
22-23	0.1	0.7	0.8	0.1	4.0	4.1	0.0	0.1	0.1	5.0
23-24	0.2	0.7	0.9	0.1	4.9	5.0	0.0	0.1	0.1	6.0
Mean.	0.28	14.21	14.49	0.19	8.15	8.34	0.05	1.45	1.50	24.33

Table VII.

HOURLY MEAN VALUES OF ACTIVITY.

October, 1915. ALL DAYS.

October, 1915. FIVE QUIET DAYS. (2, 5, 9, 18, 29).

Hour.	D.			H.			V.			Total.	Hour.	D.			H.			V.			Total.
	G.M.T.	A _h ^x	A _h ^h	A _d ^x	A _h ^x	A _d ^h	A _h ^x	A _d ^h	A _d ^x		G.M.T.	A _h ^x	A _h ^h	A _d ^x	A _h ^x	A _d ^h	A _d ^x	A _h ^x	A _d ^h	A _d ^x	
0-1	7.2	19.3	26.5	1.4	9.8	11.2	0.4	6.2	6.6	44.3	0-1	0.4	1.7	2.1	0.2	2.2	2.4	0.0	0.2	0.2	4.7
1-2	2.2	12.0	14.2	1.5	9.5	11.0	0.3	10.1	10.4	35.6	1-2	0.7	1.9	2.6	0.3	1.2	1.5	0.0	0.2	0.2	4.3
2-3	3.6	10.4	14.0	1.9	7.4	9.3	0.2	12.4	12.6	35.9	2-3	0.2	1.0	1.2	0.1	0.8	0.9	0.0	0.2	0.2	2.3
3-4	2.7	4.6	7.3	0.7	9.2	9.9	0.3	11.3	11.6	28.8	3-4	0.1	1.1	1.2	0.1	0.7	0.8	0.0	0.2	0.2	2.2
4-5	2.5	7.1	9.6	1.1	6.7	7.8	0.2	8.3	8.5	25.9	4-5	0.1	1.7	1.8	0.0	1.4	1.4	0.0	0.2	0.2	3.4
5-6	2.7	14.7	17.4	1.6	13.5	15.1	0.2	5.6	5.8	38.3	5-6	0.1	2.3	2.4	0.1	1.6	1.7	0.0	0.2	0.2	4.3
6-7	1.8	8.3	10.1	0.7	5.4	6.1	0.1	4.8	4.9	21.1	6-7	0.2	4.2	4.4	0.1	0.3	0.4	0.0	0.4	0.4	5.2
7-8	0.9	8.6	9.5	0.7	2.0	2.7	0.1	2.5	2.6	14.8	7-8	0.2	11.4	11.6	0.2	0.9	1.1	0.0	0.7	0.7	13.4
8-9	0.5	10.1	10.6	0.6	6.3	6.9	0.1	1.2	1.3	18.8	8-9	0.1	15.3	15.4	0.3	2.9	3.2	0.0	0.4	0.4	19.0
9-10	1.1	4.3	5.4	1.0	22.3	23.3	0.1	1.5	1.6	30.3	9-10	0.6	7.0	7.6	0.3	15.6	15.9	0.1	0.4	0.4	23.9
10-11	2.2	8.6	10.8	1.6	25.5	27.1	0.1	2.3	2.4	40.3	10-11	1.7	1.9	3.6	0.1	20.6	20.7	0.0	1.5	1.5	25.8
11-12	1.4	32.8	34.2	1.1	17.5	18.6	0.1	2.9	3.0	55.8	11-12	0.5	16.5	17.0	0.2	17.2	17.4	0.0	2.2	2.3	36.7
12-13	0.9	40.7	41.6	0.7	7.5	8.2	0.1	2.9	3.0	52.8	12-13	0.2	25.6	25.8	0.2	8.4	8.6	0.0	2.3	2.3	36.7
13-14	1.8	41.2	43.0	2.1	4.7	6.8	0.3	3.9	4.2	54.0	13-14	0.2	23.7	23.9	0.1	3.4	3.5	0.1	1.2	1.3	28.7
14-15	2.8	23.5	26.3	2.7	4.1	6.8	0.2	8.0	8.2	41.3	14-15	0.6	10.2	10.8	0.2	3.4	3.6	0.1	0.6	0.7	15.1
15-16	3.3	13.2	16.5	1.4	4.2	5.6	0.2	12.4	12.6	34.7	15-16	0.2	3.9	4.1	0.1	0.6	0.7	0.0	0.6	0.6	5.4
16-17	2.9	6.3	9.2	1.9	7.7	9.6	0.1	17.5	17.6	36.4	16-17	0.1	1.4	1.5	0.1	0.5	0.6	0.0	0.4	0.4	2.5
17-18	6.0	13.9	19.9	5.6	5.2	10.8	0.3	15.1	15.4	46.1	17-18	0.1	0.6	0.7	0.1	1.5	1.6	0.0	0.5	0.5	2.8
18-19	15.4	23.7	39.1	7.1	12.0	19.1	0.4	10.8	11.2	69.4	18-19	0.1	0.2	0.3	0.1	4.6	4.7	0.0	0.3	0.3	5.3
19-20	3.0	18.1	21.1	1.7	7.3	9.0	0.2	7.2	7.4	37.5	19-20	0.1	0.3	0.4	0.1	4.6	4.7	0.0	0.3	0.3	5.4
20-21	4.4	16.4	20.8	2.4	10.7	13.1	0.3	3.4	3.7	37.6	20-21	0.1	0.6	0.7	0.1	5.0	5.1	0.0	0.3	0.3	6.1
21-22	5.8	23.2	29.0	3.4	4.2	7.6	0.9	2.2	3.1	39.7	21-22	0.1	0.7	0.8	0.1	4.0	4.1	0.0	0.3	0.3	5.2
22-23	4.9	20.1	25.0	2.3	8.6	10.9	0.3	3.0	3.3	39.2	22-23	0.1	1.0	1.1	0.1	4.4	4.5	0.0	0.3	0.3	5.9
23-24	5.6	20.5	26.1	2.6	9.4	12.0	0.3	3.5	3.8	41.9	23-24	0.1	1.7	1.8	0.1	3.0	3.1	0.0	0.1	0.1	5.0
Mean.	3.57	16.74	20.31	1.98	9.20	11.18	0.24	6.62	6.86	38.35	Mean.	0.30	5.66	5.96	0.14	4.52	4.66	0.02	0.58	0.60	11.22

Table VIII.

HOURLY MEAN VALUES OF ACTIVITY.

January, 1915. DISTURBANCES.

April, 1915. DISTURBANCES.

Hour.	D.			H.			V.			Total.
	G.M.T.	A _h ^x	A _d ^x	A _h ^x	A _d ^x	A _h ^x	A _d ^x	A _h ^x	A _d ^x	
G.M.T.	A _h ^x	A _d ^x	A _h ^x	A _d ^x	A _h ^x	A _d ^x	A _h ^x	A _d ^x	A _h ^x	A _d ^x
0-1	0.9	2.3	3.2	0.4	0.7	1.1	0.0	0.2	0.2	4.5
1-2	0.6	1.3	1.9	0.4	1.5	1.9	0.0	0.3	0.4	4.2
2-3	0.5	2.0	2.5	0.6	1.0	1.6	0.1	0.4	0.5	4.6
3-4	0.6	2.1	2.7	0.3	5.0	5.3	0.0	1.0	1.0	9.0
4-5	0.3	1.4	1.7	0.4	3.2	3.6	0.0	0.7	0.7	6.0
5-6	0.1	0.6	0.7	0.1	3.7	3.8	0.0	0.7	0.7	5.2
6-7	0.2	0.1	0.3	0.2	2.1	2.3	0.0	0.4	0.4	3.0
7-8	0.2	-0.3	-0.1	0.2	0.1	0.3	0.0	0.3	0.3	0.5
8-9	0.2	0.3	0.5	0.2	0.6	0.8	0.0	0.5	0.5	1.8
9-10	0.4	1.8	2.2	0.2	0.2	0.4	0.0	0.3	0.3	2.9
10-11	0.2	2.4	2.6	0.2	-0.2	0.0	0.0	0.1	0.1	2.7
11-12	0.3	1.2	1.5	0.2	1.2	1.4	0.0	-0.1	-0.1	2.8
12-13	0.1	0.4	0.5	0.2	2.2	2.4	0.0	0.0	0.0	2.9
13-14	0.8	0.6	1.4	0.5	4.6	5.1	0.0	0.5	0.5	7.0
14-15	2.6	2.6	5.2	1.7	3.8	5.5	0.1	0.7	0.8	11.5
15-16	0.3	1.6	1.9	0.3	3.9	4.2	0.0	0.9	0.9	7.0
16-17	0.8	1.7	2.5	0.5	6.7	7.2	0.0	1.1	1.1	10.8
17-18	0.8	2.0	2.8	0.4	2.1	2.5	0.0	0.6	0.6	5.9
18-19	0.9	1.8	2.7	0.4	1.0	1.4	0.0	0.7	0.7	4.8
19-20	1.3	3.4	4.7	0.9	1.2	2.1	0.1	0.7	0.7	7.5
20-21	0.8	1.7	2.5	1.8	3.7	5.5	0.1	0.5	0.6	8.6
21-22	0.6	3.1	3.7	0.8	2.4	3.2	0.0	0.3	0.3	7.2
22-23	0.7	3.3	4.0	0.3	2.1	2.4	0.0	0.3	0.3	6.7
23-24	0.5	0.9	1.4	0.1	2.1	2.2	0.0	0.4	0.4	4.0
Mean.	0.61	1.60	2.21	0.47	2.29	2.76	0.03	0.47	0.50	5.47

Hour.	D.			H.			V.			Total.
	G.M.T.	A _h ^x	A _d ^x	A _h ^x	A _d ^x	A _h ^x	A _d ^x	A _h ^x	A _d ^x	
G.M.T.	A _h ^x	A _d ^x	A _h ^x	A _d ^x	A _h ^x	A _d ^x	A _h ^x	A _d ^x	A _h ^x	A _d ^x
0-1	1.9	15.2	17.1	0.6	8.6	9.2	0.1	1.1	1.2	27.5
1-2	1.7	8.4	10.1	1.1	1.7	2.8	0.1	0.9	1.0	13.9
2-3	0.8	5.6	6.4	0.3	0.4	0.7	0.0	0.6	0.6	7.7
3-4	3.2	2.4	3.2	0.3	0.9	1.2	0.0	0.4	0.4	4.8
4-5	0.5	1.3	1.8	0.4	3.0	3.4	0.0	0.6	0.7	5.9
5-6	0.4	1.8	2.2	0.2	3.3	3.5	0.0	0.6	0.6	6.3
6-7	0.4	1.6	2.0	0.3	1.8	2.1	0.0	-0.1	-0.1	4.0
7-8	0.7	0.7	1.4	0.5	0.8	1.3	0.0	-0.8	-0.8	1.9
8-9	0.4	-1.9	-1.5	0.5	1.0	1.5	0.0	-0.4	-0.4	-0.4
9-10	0.6	0.1	0.7	0.4	4.9	5.3	0.0	-0.4	-0.4	5.6
10-11	0.1	2.5	2.6	0.2	12.1	12.3	0.0	0.7	0.7	15.6
11-12	0.3	8.2	8.5	0.3	9.6	9.9	0.0	2.1	2.1	20.5
12-13	0.6	20.0	20.6	0.4	7.3	7.7	0.0	0.7	0.7	29.0
13-14	0.6	19.5	20.1	0.8	5.2	6.0	0.0	-0.7	-0.7	25.4
14-15	0.3	19.9	20.2	1.3	1.6	2.9	0.1	-0.6	-0.5	22.6
15-16	0.6	13.7	14.3	1.0	0.7	1.7	0.1	-0.2	-0.1	15.9
16-17	1.2	6.3	7.5	1.2	1.9	3.1	0.1	1.8	1.9	12.5
17-18	1.6	1.8	3.4	1.8	4.8	6.6	0.1	4.2	4.3	14.3
18-19	2.5	3.5	6.0	1.3	3.9	5.2	0.1	5.6	5.7	16.9
19-20	2.3	5.6	7.9	2.0	4.8	6.8	0.1	3.8	3.8	18.5
20-21	2.3	9.2	11.5	1.6	5.3	6.9	0.1	2.2	2.3	20.7
21-22	2.2	7.0	9.2	1.4	4.1	5.5	0.3	1.1	1.4	16.1
22-23	2.7	7.4	10.1	1.2	2.1	3.3	0.0	0.6	0.6	14.0
23-24	2.1	11.0	13.1	1.2	3.2	4.4	0.1	1.0	1.1	18.6
Mean.	1.15	7.12	8.27	0.85	3.88	4.73	0.06	1.04	1.10	14.10

Table IX.

HOURLY MEAN VALUES OF ACTIVITY.

July, 1915. DISTURBANCES.

October, 1915. DISTURBANCES.

Hour.	D.			H.			V.			Total.		
	A_h^x	A_h^h	A_d^x	A_h^x	A_h^h	A_d^x	A_h^x	A_h^h	A_d^x	A_h^x	A_h^h	A_d^x
G. M. T.	Hour.			Hour.			G. M. T.			Total.		
	A_h^x	A_h^h	A_d^x	A_h^x	A_h^h	A_d^x	A_h^x	A_h^h	A_d^x	A_h^x	A_h^h	A_d^x
0-1	0.7	2.5	3.2	0.4	3.3	3.7	0.1	0.0	0.1	6.7	0.2	0.2
1-2	0.9	1.2	2.1	0.2	2.1	2.3	0.0	0.0	0.0	4.4	0.0	0.0
2-3	1.2	1.9	3.1	0.4	1.7	2.1	0.1	0.1	0.1	5.4	0.2	0.2
3-4	0.7	2.8	3.5	0.5	0.7	1.2	0.0	0.0	0.0	5.7	1.0	1.0
4-5	0.4	-0.3	0.1	0.5	0.6	1.1	0.1	1.3	1.4	2.6	1.4	1.4
5-6	0.7	-2.1	-1.4	0.1	0.8	0.9	0.0	1.4	1.5	1.0	1.5	1.5
6-7	0.8	6.0	6.8	0.4	0.1	0.5	0.0	0.1	0.1	7.4	0.1	0.1
7-8	0.4	3.2	3.6	0.0	-1.2	-1.2	0.0	0.2	0.2	2.6	0.2	0.2
8-9	0.3	4.4	4.7	0.7	2.4	3.1	0.0	0.4	0.4	8.2	0.4	0.4
9-10	0.5	-0.6	-0.1	0.3	0.0	0.3	0.0	0.0	0.1	0.3	0.0	0.0
10-11	-0.2	0.3	0.2	0.3	4.5	4.8	0.1	0.9	1.0	6.0	1.0	1.0
11-12	0.8	4.6	5.4	0.6	4.5	5.1	0.1	2.9	3.0	13.5	3.0	3.0
12-13	0.3	22.1	22.4	0.7	3.8	4.5	0.0	2.9	2.9	29.8	2.9	2.9
13-14	0.2	14.1	14.3	0.6	2.8	3.4	0.1	0.5	0.6	18.3	0.6	0.6
14-15	0.3	3.8	4.1	0.7	0.9	1.6	0.0	-0.2	-0.1	5.6	-0.2	-0.1
15-16	0.4	-1.3	-0.9	0.8	1.2	2.0	0.1	0.5	0.7	1.8	0.7	0.7
16-17	0.5	-1.3	-0.8	0.9	-1.9	-1.0	0.0	2.1	2.1	0.3	2.1	2.1
17-18	0.2	-0.9	-0.7	0.7	-1.3	-0.6	0.0	3.5	3.5	2.2	3.5	3.5
18-19	0.3	0.8	1.1	0.5	3.7	4.2	0.0	4.3	4.4	9.7	4.4	4.4
19-20	0.3	0.4	0.7	0.5	1.5	2.0	0.0	3.6	3.6	6.3	3.6	3.6
20-21	1.0	4.6	5.6	1.0	4.9	5.9	0.1	1.8	1.9	13.4	1.9	1.9
21-22	0.9	3.5	4.4	0.6	1.9	2.5	0.1	0.9	1.0	7.9	1.0	1.0
22-23	0.8	1.1	1.9	0.7	2.2	2.9	0.0	1.1	1.1	5.9	1.1	1.1
23-24	0.7	2.4	3.1	0.3	0.5	0.8	0.0	0.7	0.8	4.7	0.8	0.8
Mean.	0.55	3.05	3.60	0.52	1.65	2.17	0.04	1.24	1.28	7.05	1.28	1.28

27.12

6.36

6.05

0.21

4.66

1.85

14.35

11.07

3.28

Mean.

23-24

22-23

21-22

20-21

19-20

18-19

17-18

16-17

15-16

14-15

13-14

12-13

11-12

10-11

9-10

8-9

7-8

6-7

5-6

4-5

3-4

2-3

1-2

0-1

Total.

 A_d^x A_h^h A_h^x A_d^h A_h^x A_h^h A_d^x A_h^h A_h^x A_h^h

Table X. ACTIVITY, MONTHLY MEANS, 1915.

ALL DAYS.

Months.	D.			H.			V.			Total.
	A_h^x	A_d^h	A_d^x	A_h^x	A_d^h	A_d^x	A_h^x	A_d^h	A_d^x	A_d^x
January.	0.74	3.07	3.81	0.53	3.00	3.53	0.04	0.69	0.73	8.07
February.	1.43	6.90	8.33	0.69	3.02	3.71	0.07	1.52	1.59	13.63
March.	1.59	12.57	14.16	0.99	6.64	7.63	0.11	2.74	2.85	24.64
April.	1.41	15.24	16.65	0.99	6.57	7.56	0.08	2.54	2.62	26.83
May.	0.98	12.68	13.66	0.77	6.16	6.93	0.06	2.46	2.52	23.11
June.	3.30	20.11	23.41	2.58	18.49	21.07	0.37	8.95	9.32	53.80
July.	0.84	17.27	18.11	0.71	9.81	10.52	0.10	2.69	2.79	31.42
August.	1.47	15.94	17.41	0.88	10.57	11.45	0.15	3.43	3.58	32.44
September.	2.15	15.03	17.18	1.30	8.63	9.93	0.14	2.53	2.67	29.78
October.	3.57	16.74	20.31	1.98	9.20	11.18	0.24	6.62	6.86	38.35
November.	4.31	13.08	17.39	2.22	8.11	10.33	0.16	4.72	4.88	32.60
December.	1.18	5.70	6.88	0.94	4.16	5.10	0.10	2.44	2.54	14.52
Mean.	1.91	12.86	14.77	1.22	7.86	9.08	0.14	3.44	3.58	27.43

FIVE QUIET DAYS.

Months.	D.			H.			V.			Total.
	A_h^x	A_d^h	A_d^x	A_h^x	A_d^h	A_d^x	A_h^x	A_d^h	A_d^x	A_d^x
January.	0.10	1.47	1.57	0.07	0.72	0.79	0.01	0.22	0.23	2.59
February.	0.14	1.48	1.62	0.09	1.22	1.31	0.01	0.53	0.54	3.47
March.	0.30	7.95	8.25	0.14	4.11	4.25	0.02	0.37	0.39	12.89
April.	0.26	8.10	8.36	0.14	2.67	2.81	0.03	1.50	1.53	12.70
May.	0.27	10.10	10.37	0.14	4.27	4.41	0.04	2.37	2.41	17.19
June.	0.32	12.38	12.70	0.17	8.11	8.28	0.05	1.36	1.41	22.39
July.	0.28	14.21	14.49	0.19	8.15	8.34	0.05	1.45	1.50	24.33
August.	0.30	13.40	13.70	0.16	7.50	7.66	0.07	2.16	2.23	23.59
September.	0.31	9.74	10.05	0.16	6.62	6.78	0.04	0.96	1.00	17.83
October.	0.30	5.66	5.96	0.14	4.52	4.66	0.02	0.58	0.60	11.22
November.	0.23	2.10	2.33	0.15	1.22	1.37	0.01	0.27	0.28	3.98
December.	0.13	1.21	1.34	0.08	0.80	0.88	0.01	0.13	0.14	2.36
Mean.	0.24	7.32	7.56	0.14	4.16	4.30	0.03	0.99	1.02	12.88

Table XI. ACTIVITY, MONTHLY MEANS, 1915.
DISTURBANCES.

Months.	D.			H.			V.			Total.
	A_h^x	A_d^h	A_d^x	A_h^x	A_d^h	A_d^x	A_h^x	A_d^h	A_d^x	A_d^x
January.	0.64	1.60	2.24	0.46	2.28	2.74	0.03	0.47	0.50	5.48
February.	1.29	5.42	6.71	0.60	1.80	2.40	0.06	0.99	1.05	10.16
March.	1.29	4.62	5.91	0.85	2.53	3.38	0.09	2.37	2.46	11.75
April.	1.15	7.14	8.29	0.85	3.90	4.75	0.05	1.04	1.09	14.13
May.	0.71	2.58	3.29	0.63	1.89	2.52	0.02	0.09	0.11	5.92
June.	2.98	7.73	10.71	2.41	10.38	12.79	0.32	7.59	7.91	31.41
July.	0.56	3.06	3.62	0.52	1.66	2.18	0.05	1.24	1.29	7.09
August.	1.17	2.54	3.71	0.72	3.07	3.79	0.08	1.27	1.35	8.85
September.	1.84	5.29	7.13	1.14	2.01	3.15	0.10	1.57	1.67	11.95
October.	3.27	11.08	14.35	1.84	4.68	6.52	0.22	6.04	6.26	27.13
November.	4.08	10.98	15.06	2.07	6.89	8.96	0.15	4.45	4.60	28.62
December.	1.05	4.49	5.54	0.86	3.36	4.22	0.09	2.31	2.40	12.16
Mean.	1.67	5.54	7.21	1.08	3.70	4.78	0.11	2.45	2.56	14.55

Table XII.

DAILY MEAN VALUES OF ACTIVITY.

January, 1915.

February, 1915.

Date.	D.			H.			V.			Total.
	Δ_h^x	Δ_d^h	Δ_d^x	Δ_h^x	Δ_d^h	Δ_d^x	Δ_h^x	Δ_d^h	Δ_d^x	
1	1.9	5.0	6.9	1.4	30.4	21.8	0.1	4.5	4.6	33.3
2	0.1	1.2	1.3	0.1	0.3	0.4	0.0	0.2	0.2	1.9
3	0.1	1.4	1.5	0.1	0.9	1.0	0.0	0.1	0.1	2.6
4	0.2	1.6	1.8	0.2	1.0	1.2	0.0	0.2	0.2	3.2
5	4.5	9.4	13.9	3.0	11.1	14.1	0.2	3.1	3.3	31.3
6	1.1	3.8	4.9	0.2	1.0	1.2	0.0	0.3	0.3	6.4
7	0.9	4.2	5.1	0.7	2.5	3.2	0.1	0.8	0.9	9.2
8	0.7	2.7	3.4	0.4	2.8	3.2	0.0	0.8	0.8	7.4
9	0.3	0.7	1.0	0.2	1.7	1.9	0.0	0.2	0.2	3.1
10	0.2	0.8	1.0	0.1	1.3	1.9	0.0	0.2	0.2	3.1
11	0.1	0.7	0.8	0.1	0.5	0.6	0.0	0.1	0.1	1.5
12	0.7	6.1	6.8	0.4	5.2	5.6	0.0	0.5	0.5	12.9
13	0.6	3.0	3.6	0.7	1.8	2.5	0.1	0.3	0.4	6.5
14	0.9	5.7	6.6	0.4	2.1	2.5	0.0	0.5	0.5	9.6
15	0.3	1.9	2.2	0.1	0.8	0.9	0.0	0.4	0.4	3.5
16	0.2	1.1	1.3	0.1	0.6	0.7	0.0	0.2	0.2	2.2
17	0.5	2.0	2.5	0.3	0.6	0.9	0.0	0.3	0.3	3.7
18	0.1	1.2	1.3	0.1	0.8	0.9	0.0	0.2	0.2	2.4
19	0.1	0.5	0.6	0.1	0.6	0.7	0.0	0.1	0.1	1.4
20	0.2	1.2	1.4	0.2	1.2	1.4	0.0	0.6	0.6	3.4
21	0.1	0.9	1.0	0.1	0.3	0.4	0.0	0.1	0.1	1.5
22	0.3	2.7	3.0	0.2	2.0	2.2	0.0	0.1	0.1	5.3
23	0.1	0.9	1.0	0.2	0.2	0.4	0.0	0.1	0.1	1.5
24	0.2	2.5	2.7	0.2	2.7	2.9	0.0	0.4	0.4	6.0
25	3.8	8.1	11.9	3.9	20.3	24.2	0.3	3.3	3.6	39.7
26	1.6	5.8	7.4	1.1	2.4	3.5	0.1	0.8	0.9	11.8
27	1.1	8.1	9.2	1.2	2.7	3.9	0.1	1.2	1.3	14.4
28	0.9	4.2	5.1	0.2	0.8	1.0	0.0	0.7	0.7	6.8
29	0.3	1.8	2.1	0.3	1.9	2.2	0.0	0.3	0.3	4.6
30	0.7	2.5	3.2	0.3	1.0	1.3	0.0	0.2	0.2	4.7
31	0.1	3.0	3.1	0.1	1.0	1.1	0.0	0.6	0.6	4.8
Mean.	0.74	3.07	3.81	0.53	3.00	3.53	0.04	0.69	0.73	8.07

Date.	D.			H.			V.			Total.
	Δ_h^x	Δ_d^h	Δ_d^x	Δ_h^x	Δ_d^h	Δ_d^x	Δ_h^x	Δ_d^h	Δ_d^x	
1	1.8	5.5	7.3	0.4	2.8	3.2	0.1	0.9	1.0	11.5
2	0.4	2.6	3.0	0.4	6.1	6.5	0.1	1.4	1.5	11.0
3	0.1	0.8	0.9	0.1	0.3	0.4	0.0	0.4	0.4	1.7
4	0.2	2.4	2.6	0.2	1.4	1.6	0.0	0.4	0.4	4.6
5	0.9	6.6	7.5	0.5	3.2	3.7	0.1	1.2	1.3	12.5
6	0.6	5.7	6.3	0.2	1.0	1.2	0.0	1.1	1.1	8.6
7	0.1	1.5	1.6	0.1	1.0	1.1	0.0	0.1	0.1	2.8
8	2.8	10.4	13.2	0.9	6.0	6.9	0.2	3.9	4.1	24.2
9	1.9	15.0	16.9	0.8	1.8	2.6	0.1	5.8	5.9	25.4
10	0.2	1.7	1.9	0.2	1.1	1.3	0.0	0.2	0.2	3.4
11	0.1	1.2	1.3	0.1	1.5	1.6	0.0	0.1	0.1	3.0
12	0.3	2.7	3.0	0.2	1.2	1.4	0.0	0.4	0.4	4.8
13	0.3	1.0	1.3	0.2	1.0	1.2	0.0	0.2	0.2	2.7
14	0.1	1.3	1.4	0.1	0.5	0.6	0.0	0.1	0.1	2.1
15	0.2	2.1	2.3	0.1	1.5	1.6	0.0	1.0	1.0	4.9
16	0.1	0.7	0.8	0.1	1.1	1.2	0.0	0.1	0.1	2.1
17	0.3	2.8	3.1	0.2	2.0	2.2	0.0	2.3	2.3	7.6
18	0.4	2.3	2.7	0.2	1.2	1.4	0.0	0.3	0.3	4.4
19	8.6	17.2	25.8	2.4	12.8	15.2	0.3	9.3	9.6	50.6
20	1.6	29.1	30.7	1.8	3.8	5.6	0.1	1.0	1.1	37.4
21	2.2	9.6	11.8	0.9	2.1	3.0	0.1	1.3	1.4	16.2
22	2.5	19.5	22.0	2.6	4.7	7.3	0.2	2.5	2.7	32.0
23	4.0	9.1	13.1	2.3	3.6	5.9	0.2	2.7	2.9	21.9
24	2.6	12.9	15.5	1.7	10.0	11.7	0.1	1.0	1.1	28.3
25	1.4	7.1	8.5	1.1	4.5	5.6	0.1	1.6	1.7	15.8
26	5.0	12.6	17.6	1.2	6.3	7.5	0.1	1.3	1.4	26.5
27	0.6	6.0	6.6	0.2	1.4	1.6	0.0	1.3	1.3	9.5
28	0.6	4.3	4.9	0.2	0.6	0.8	0.0	0.6	0.6	6.3
Mean.	1.43	6.90	8.33	0.69	3.02	3.71	0.07	1.52	1.59	13.63

Table XIII.

DAILY MEAN VALUES OF ACTIVITY.

April, 1915.

March, 1915.

Date.	D.			H.			V.			Total.
	A_h^N	A_d^h	A_d^N	A_h^N	A_d^h	A_d^N	A_h^N	A_d^h	A_d^N	
1	0.3	3.3	3.6	0.1	0.9	1.0	0.0	0.5	0.5	5.1
2	0.2	6.4	6.6	0.1	0.9	1.0	0.0	0.4	0.4	8.0
3	0.1	4.0	4.1	0.1	1.9	2.0	0.0	0.3	0.3	6.4
4	0.2	9.8	10.0	0.1	1.4	1.5	0.0	1.8	1.8	13.3
5	0.4	5.9	6.3	0.2	2.7	2.9	0.0	0.5	0.5	9.7
6	0.4	4.4	4.8	0.4	3.5	3.9	0.0	0.8	0.8	9.5
7	2.1	21.8	23.9	1.5	9.8	11.3	0.1	2.2	2.3	37.5
8	4.0	26.2	30.2	2.9	17.7	20.6	0.3	10.8	11.1	61.9
9	1.8	18.7	20.5	0.6	13.3	13.9	0.1	1.4	1.5	35.9
10	1.5	7.9	9.4	1.1	7.2	8.3	0.1	0.7	0.8	18.5
11	0.4	6.5	6.9	0.4	7.5	7.9	0.0	0.1	0.1	14.9
12	0.5	5.8	6.3	0.2	3.1	3.3	0.0	0.3	0.3	9.0
13	0.4	6.0	6.4	0.3	3.9	4.2	0.0	0.2	0.2	10.8
14	0.2	7.5	7.7	0.2	7.9	8.1	0.0	0.3	0.3	16.1
15	0.4	8.6	9.0	0.1	3.9	4.0	0.0	0.6	0.6	13.6
16	1.5	14.7	16.2	1.6	6.8	8.4	0.2	0.3	0.3	25.1
17	1.5	14.7	16.2	1.7	5.8	7.5	0.1	5.9	6.0	29.7
18	0.7	10.2	10.9	0.9	3.5	4.4	0.1	5.3	5.4	20.7
19	2.1	18.4	20.5	1.1	11.2	12.3	0.2	5.7	5.9	38.7
20	6.1	24.4	30.5	3.3	7.5	10.8	0.3	4.0	4.3	45.6
21	6.7	26.7	33.4	3.2	8.7	11.9	0.5	8.3	8.8	54.1
22	7.0	16.3	23.3	2.7	8.7	11.4	0.3	5.4	5.7	40.4
23	1.4	11.7	13.1	2.0	12.9	14.9	0.1	3.5	3.6	31.6
24	1.1	12.6	13.7	0.5	4.9	5.4	0.1	0.9	1.0	20.1
25	2.3	14.0	16.3	1.9	6.0	7.9	0.2	14.1	14.3	38.5
26	1.1	12.5	13.6	1.4	9.1	10.5	0.3	4.4	4.7	28.8
27	0.7	8.9	9.6	0.3	3.1	3.4	0.0	1.3	1.3	14.3
28	0.5	13.1	13.6	0.3	5.8	6.1	0.0	0.3	0.3	20.0
29	1.2	12.4	13.6	0.6	9.3	9.9	0.1	1.3	1.4	24.9
30	1.8	23.7	25.5	0.7	11.8	12.5	0.1	1.8	1.9	39.9
31	0.5	12.2	12.7	0.2	5.3	5.5	0.0	1.4	1.4	19.6
Mean.	1.59	12.57	14.16	0.99	6.64	7.63	0.11	2.74	2.85	24.64

Date.	D.			H.			V.			Total.
	A_h^N	A_d^h	A_d^N	A_h^N	A_d^h	A_d^N	A_h^N	A_d^h	A_d^N	
1	0.7	14.3	15.0	0.4	5.0	5.4	0.1	2.4	2.5	22.9
2	1.5	20.5	22.0	1.4	10.0	11.4	0.2	3.7	3.9	37.3
3	2.3	17.2	19.5	1.0	8.2	9.2	0.1	1.8	1.9	30.6
4	0.8	13.7	14.5	0.3	5.5	5.8	0.1	3.0	3.1	23.4
5	0.6	13.7	14.3	0.3	8.2	8.5	0.1	1.8	1.9	24.7
6	0.5	9.0	9.5	0.4	9.3	9.7	0.0	0.9	0.9	20.1
7	3.1	10.8	13.9	2.6	11.8	14.4	0.2	2.2	2.4	30.7
8	2.7	29.0	31.7	4.0	14.9	18.9	0.2	1.5	1.7	52.3
9	0.4	7.0	7.4	0.2	2.2	2.4	0.0	1.2	1.2	11.0
10	0.2	7.4	7.6	0.1	2.5	2.6	0.0	2.0	2.0	12.2
11	0.2	5.2	5.4	0.2	2.6	2.8	0.0	1.9	1.9	10.1
12	0.3	9.4	9.7	0.1	1.9	2.0	0.0	1.5	1.5	13.2
13	0.2	6.0	6.2	0.1	2.1	2.2	0.0	1.4	1.4	9.8
14	0.5	12.8	13.3	0.5	4.2	4.7	0.0	0.9	0.9	18.9
15	3.2	27.3	30.5	2.0	4.2	6.2	0.1	1.8	1.9	38.6
16	2.1	22.3	24.4	2.0	6.9	8.9	0.9	4.3	5.2	38.5
17	0.5	9.9	10.4	0.4	11.5	11.9	0.0	0.4	0.4	22.7
18	2.3	11.6	13.9	1.0	14.9	15.9	0.0	0.7	0.7	30.5
19	1.8	17.6	19.4	1.7	11.1	12.8	0.1	1.8	1.9	34.1
20	0.9	17.1	18.0	0.8	3.3	4.1	0.1	5.7	5.8	27.9
21	3.6	17.9	21.5	1.4	3.4	4.8	0.0	1.7	1.7	28.0
22	6.6	33.1	39.7	3.3	8.8	12.1	0.1	1.5	1.6	53.4
23	1.9	21.8	23.7	1.2	8.3	9.5	0.1	1.7	1.8	35.0
24	0.4	8.6	9.0	0.3	3.3	3.6	0.0	0.6	0.6	13.2
25	0.5	10.4	10.9	0.3	1.9	2.2	0.0	1.5	1.5	14.6
26	2.9	23.6	26.5	2.6	19.9	22.5	0.3	20.1	20.4	69.4
27	0.3	9.7	10.0	0.2	2.4	2.6	0.0	2.6	2.6	15.2
28	0.4	12.5	12.9	0.2	4.2	4.4	0.0	0.7	0.7	18.0
29	0.6	19.2	19.8	0.2	3.0	3.2	0.0	1.2	1.2	24.2
30	0.5	18.7	19.2	0.4	2.3	2.7	0.1	3.7	3.8	25.7
Mean.	1.41	15.24	16.65	0.99	6.57	7.56	0.10	2.54	2.64	26.85

Table XIV.

DAILY MEAN VALUES OF ACTIVITY.

May, 1915.

June, 1915.

Date.	D.			H.			V.			Total.
	A _h ^x	A _d ^h	A _d ^x	A _h ^x	A _d ^h	A _d ^x	A _h ^x	A _d ^h	A _d ^x	
1	4.9	30.6	35.5	1.2	8.8	10.0	0.1	2.5	2.6	48.1
2	2.9	33.1	36.0	3.0	6.6	9.6	0.1	3.4	3.5	49.1
3	1.0	9.2	10.2	0.7	10.8	11.5	0.0	0.7	0.7	22.4
4	0.8	10.8	11.6	0.7	7.9	8.6	0.0	0.8	0.8	21.0
5	0.6	8.6	9.2	0.6	5.1	5.7	0.0	1.1	1.1	16.0
6	0.3	6.3	6.6	0.2	4.8	5.0	0.0	1.1	1.1	12.7
7	0.2	7.5	7.7	0.1	4.6	4.7	0.0	1.3	1.3	13.7
8	0.2	10.9	11.1	0.1	2.1	2.2	0.0	2.0	2.0	15.3
9	0.4	11.4	11.8	0.2	2.1	2.3	0.0	0.3	0.3	14.4
10	0.4	8.6	9.0	0.2	4.0	4.2	0.0	0.3	0.3	13.5
11	0.3	5.3	5.6	0.2	3.5	3.7	0.0	2.2	2.2	11.5
12	0.7	5.6	6.3	0.5	5.6	6.1	0.1	1.5	1.6	14.0
13	0.6	17.8	18.4	0.5	5.6	6.1	0.1	5.8	5.9	30.4
14	1.3	14.7	16.0	0.7	7.1	7.8	0.1	2.6	2.7	26.5
15	0.8	18.1	18.9	0.6	10.4	11.0	0.1	1.6	1.7	31.6
16	1.8	24.0	25.8	1.4	7.8	9.2	0.1	2.8	2.9	37.9
17	2.3	12.6	14.9	2.5	22.1	24.6	0.1	3.0	3.1	42.6
18	0.3	9.1	9.4	0.2	3.8	4.0	0.0	1.2	1.2	14.6
19	0.9	12.8	13.7	0.5	7.7	8.2	0.0	1.0	1.0	22.9
20	1.5	10.0	11.5	1.0	9.2	10.2	0.1	3.0	3.1	24.8
21	1.0	11.8	12.8	1.3	5.6	6.9	0.1	1.8	1.9	21.6
22	0.9	10.9	11.8	0.5	5.6	6.1	0.1	3.2	3.3	21.2
23	0.3	7.7	8.0	0.3	2.3	2.6	0.1	1.5	1.6	12.2
24	1.1	9.7	10.8	0.7	3.6	4.3	0.1	1.9	2.0	17.1
25	0.5	13.2	13.7	0.5	4.1	4.6	0.1	3.0	3.1	21.4
26	0.5	14.0	14.5	0.3	3.8	4.1	0.1	4.1	4.2	22.8
27	2.0	6.7	8.7	3.5	9.7	13.2	0.2	9.5	9.7	31.6
28	0.3	12.4	12.7	0.1	5.8	5.9	0.0	3.2	3.2	21.8
29	0.3	14.5	14.8	0.2	5.4	5.6	0.1	3.0	3.1	23.5
30	0.6	9.2	9.8	0.6	2.4	3.0	0.1	5.1	5.2	18.0
31	0.9	15.9	16.8	0.5	3.1	3.6	0.1	1.6	1.7	22.1
Mean.	0.98	12.68	13.66	0.77	6.16	6.93	0.06	2.46	2.52	23.11

Date.	D.			H.			V.			Total.
	A _h ^x	A _d ^h	A _d ^x	A _h ^x	A _d ^h	A _d ^x	A _h ^x	A _d ^h	A _d ^x	
1	0.2	6.0	6.2	0.2	4.8	5.0	0.1	2.5	2.6	13.8
2	0.3	6.0	6.3	0.2	6.6	6.8	0.1	2.3	2.4	15.5
3	0.3	11.3	11.6	0.1	8.2	8.3	0.0	3.8	3.8	22.7
4	0.2	8.0	8.2	0.1	4.2	4.3	0.0	0.5	0.5	13.0
5	0.2	7.7	7.9	0.1	2.9	3.0	0.0	1.5	1.5	12.4
6	0.3	9.7	10.0	0.1	4.9	5.0	0.0	1.0	1.0	16.0
7	0.3	12.4	12.7	0.4	7.6	8.0	0.0	1.2	1.2	21.9
8	0.6	12.9	13.5	1.3	12.6	13.9	0.1	2.1	2.2	29.6
9	0.4	10.7	11.1	0.3	8.1	8.4	0.0	1.1	1.1	20.6
10	0.3	10.7	11.0	0.1	5.5	5.6	0.0	1.5	1.5	18.1
11	0.3	13.6	13.9	0.4	4.9	5.3	0.0	1.3	1.3	20.5
12	1.3	35.2	36.5	1.4	9.4	10.8	0.3	5.0	5.3	52.6
13	2.6	41.2	43.8	2.1	23.2	25.3	0.2	6.1	6.3	75.4
14	0.9	8.1	9.0	0.9	10.9	11.8	0.1	1.4	1.5	22.3
15	0.3	16.4	16.7	0.2	11.1	11.3	0.1	2.5	2.6	30.6
16	0.6	24.5	25.1	1.1	9.0	10.1	0.1	3.6	3.7	38.9
17	76.5	131.6	208.1	56.6	240.7	297.3	8.5	194.7	203.2	708.6
18	3.3	30.0	39.3	2.4	22.0	24.4	0.4	12.4	12.8	76.5
19	0.3	11.0	11.3	0.1	8.4	8.5	0.1	1.7	1.8	21.6
20	0.5	17.4	17.9	0.2	11.2	11.4	0.1	1.1	1.2	30.5
21	1.1	25.8	26.9	1.6	27.1	28.7	0.1	2.7	2.8	58.4
22	2.7	24.8	27.5	2.4	11.7	14.1	0.2	3.4	3.6	45.2
23	0.5	13.5	14.0	0.4	9.2	9.6	0.1	1.5	1.6	25.2
24	0.4	19.3	19.7	0.5	32.1	32.6	0.1	3.0	3.1	55.4
25	0.9	12.2	13.1	0.9	12.4	13.3	0.1	1.0	1.1	27.5
26	0.9	17.1	18.0	0.7	11.9	12.6	0.1	3.3	3.4	34.0
27	0.8	10.4	11.2	0.4	7.6	8.0	0.1	1.9	2.0	21.2
28	0.6	16.9	17.5	0.5	12.6	13.1	0.1	1.7	1.8	32.4
29	1.1	17.8	18.9	0.9	19.4	20.3	0.1	2.6	2.7	41.9
30	0.4	14.8	15.2	0.2	11.5	11.7	0.1	1.0	1.1	28.0
Mean.	3.30	20.11	23.41	2.58	18.49	21.07	0.37	8.95	9.32	53.80

Table XV.

DAILY MEAN VALUES OF ACTIVITY.

July, 1915.

August, 1915.

Date.	D.				H.				V.				Total.				
	Δ_h^x	Δ_d^h	Δ_d^x	Δ_h^h	Δ_h^x	Δ_d^h	Δ_d^x	Δ_h^h	Δ_h^x	Δ_d^h	Δ_d^x	Δ_h^h					
1	0.3	11.8	12.1	0.4	8.8	9.2	1.0	1.0	22.2	23.2	0.8	8.7	9.5	0.2	2.9	3.1	35.8
2	2.7	9.3	12.0	2.3	16.5	18.8	3.4	3.4	14.4	17.8	3.0	22.5	25.5	0.5	8.7	9.2	52.5
3	0.5	13.5	14.0	0.6	9.5	10.1	0.1	3.3	27.5	3.4	1.9	18.5	20.0	0.2	4.0	4.2	44.1
4	0.2	7.1	7.3	0.1	3.7	3.8	0.0	1.9	13.0	0.6	0.7	12.5	13.2	0.1	1.6	1.7	27.0
5	0.3	12.5	12.8	0.3	8.3	8.6	0.0	1.5	22.9	0.3	1.7	10.0	10.2	0.1	1.4	1.5	29.1
6	0.7	15.1	15.8	1.3	8.3	9.6	0.1	1.8	27.3	2.2	1.9	16.6	17.7	0.3	2.2	2.5	36.3
7	0.3	10.5	10.8	0.2	3.1	3.3	0.0	0.7	14.8	6.8	32.3	39.1	1.9	23.7	25.6	0.3	76.6
8	0.8	14.0	14.8	0.7	5.8	6.5	0.1	0.7	22.1	1.0	14.6	15.6	1.1	11.7	12.8	0.1	30.7
9	2.8	25.5	28.3	2.0	5.0	7.0	0.3	4.4	40.0	0.5	16.3	16.8	0.2	6.6	6.8	0.0	24.6
10	1.1	18.3	19.4	1.0	11.8	12.8	0.1	3.5	35.8	1.3	20.9	22.2	0.8	11.4	12.2	0.1	38.1
11	1.6	21.3	22.9	1.7	17.0	18.7	0.2	2.5	44.3	0.5	21.6	22.1	0.4	10.2	10.6	0.2	38.6
12	1.1	18.7	19.8	1.3	18.3	19.6	0.1	3.1	42.6	0.4	12.6	13.0	0.3	8.5	8.8	0.2	35.5
13	0.6	23.1	23.7	0.4	11.3	11.7	0.1	2.1	37.6	0.2	11.3	11.5	0.1	7.0	7.1	0.1	20.5
14	0.6	21.0	21.6	0.3	14.6	14.9	0.1	3.0	39.6	0.3	13.5	13.8	0.2	6.9	7.1	0.1	23.8
15	0.3	16.7	17.0	0.3	13.0	13.3	0.1	1.6	32.0	0.3	15.3	15.6	0.1	5.1	5.2	0.1	23.9
16	0.3	18.7	19.0	0.2	7.9	8.1	0.1	2.4	29.6	0.4	14.6	15.0	0.2	9.9	10.1	0.1	27.1
17	0.3	14.4	14.7	0.2	9.3	9.5	0.0	0.7	24.9	1.1	11.6	12.7	1.3	12.6	13.9	0.2	29.5
18	0.5	22.4	22.9	0.2	7.4	7.6	0.1	2.4	33.0	0.9	20.1	21.0	0.4	5.4	5.8	0.1	28.6
19	0.4	14.6	15.0	0.3	9.8	10.1	0.1	4.1	29.3	1.4	15.2	16.6	0.8	8.1	8.9	0.1	26.1
20	0.3	15.9	16.2	0.2	6.6	6.8	0.1	2.8	25.9	0.6	12.1	12.7	0.7	7.3	8.0	0.1	22.9
21	0.4	17.2	17.6	0.2	7.9	8.1	0.0	2.8	28.5	0.7	16.8	17.5	0.7	8.2	8.9	0.1	29.9
22	1.0	21.4	22.4	0.8	7.7	8.5	0.1	3.7	34.7	0.7	14.6	15.3	0.4	3.3	3.7	0.1	20.2
23	0.5	11.0	11.5	0.8	6.5	7.3	0.1	1.8	20.7	0.8	21.3	22.1	0.3	8.6	8.9	0.1	32.0
24	0.3	14.0	14.3	0.1	6.9	7.0	0.0	0.6	21.9	0.3	9.9	10.2	0.2	8.4	8.6	0.1	20.7
25	0.7	14.5	15.2	0.5	5.7	6.2	0.1	3.4	24.9	1.3	16.0	17.3	1.1	4.9	6.0	0.1	24.5
26	1.3	25.9	27.2	1.0	10.5	11.5	0.1	2.0	40.8	8.5	16.6	25.1	3.0	18.4	21.4	0.6	66.7
27	2.5	23.5	26.0	2.3	12.1	14.4	0.2	5.4	46.0	1.8	17.6	19.4	1.9	16.6	18.5	0.2	40.6
28	0.7	21.0	21.7	0.3	13.0	13.3	0.1	1.7	36.8	1.1	7.7	8.8	0.7	9.2	9.9	0.1	20.4
29	1.7	30.1	31.8	1.5	24.0	25.5	0.1	0.9	58.3	3.4	21.5	24.9	1.6	15.9	17.5	0.3	48.5
30	1.1	18.3	19.4	0.9	9.3	10.2	0.1	1.4	31.1	1.0	14.3	15.3	1.2	6.3	7.5	0.1	25.1
31	0.3	13.9	14.2	0.2	4.7	4.9	0.0	1.6	20.7	0.7	9.4	10.1	0.2	4.7	4.9	0.1	16.4
Mean.	0.84	17.27	18.11	0.71	9.81	10.52	0.10	2.69	31.42	1.47	15.94	17.41	0.88	10.57	11.45	0.15	32.44

Table XVI.

DAILY MEAN VALUES OF ACTIVITY.

October, 1915.

September, 1915.

Date.	D.			H.			V.			Total.
	A _h ^x	A _d ^h	A _d ^x	A _h ^x	A _d ^h	A _d ^x	A _h ^x	A _d ^h	A _d ^x	
1	0.3	12.9	13.2	0.1	4.8	4.9	0.1	1.5	1.6	19.7
2	0.4	11.6	12.0	0.2	5.0	5.2	0.1	3.0	3.1	20.3
3	0.3	9.1	9.4	0.2	5.5	5.7	0.0	1.2	1.2	16.3
4	0.3	12.6	12.9	0.1	7.0	7.1	0.0	0.8	0.8	20.8
5	0.7	17.7	18.4	0.3	5.6	5.9	0.1	1.4	1.5	25.8
6	0.4	9.2	9.6	0.2	7.5	7.7	0.1	1.3	1.4	18.7
7	0.3	13.9	14.2	0.1	7.6	7.7	0.1	1.9	2.0	23.9
8	0.3	12.2	12.5	0.2	9.3	9.5	0.0	1.0	1.0	23.0
9	0.3	10.4	10.7	0.3	9.5	9.8	0.0	0.6	0.6	21.1
10	0.7	11.5	12.2	0.4	5.8	6.2	0.1	1.0	1.1	19.5
11	0.5	8.7	9.2	0.3	6.4	6.7	0.1	0.9	1.0	16.9
12	0.6	15.1	15.7	0.3	4.1	4.4	0.1	0.7	0.8	20.9
13	1.1	22.8	23.9	0.9	3.9	4.8	0.1	3.3	3.4	32.1
14	0.3	8.5	8.8	0.2	6.7	6.9	0.0	0.6	0.6	16.3
15	0.6	12.5	13.1	0.3	7.0	7.3	0.0	0.5	0.5	20.9
16	1.7	21.3	23.0	0.9	4.9	5.8	0.1	1.9	2.0	30.8
17	1.7	27.5	29.2	1.9	10.9	12.8	0.2	3.1	3.3	45.3
18	0.3	7.0	7.3	0.1	4.9	5.0	0.0	0.6	0.6	12.9
19	0.3	7.2	7.5	0.2	3.9	4.1	0.0	0.8	0.8	12.4
20	0.3	8.4	8.7	0.2	7.4	7.6	0.0	0.5	0.5	16.8
21	0.5	10.0	10.5	0.3	3.7	4.0	0.0	0.6	0.6	15.1
22	13.8	25.6	39.4	4.1	7.8	11.9	0.6	9.1	9.7	61.0
23	12.5	26.7	39.2	8.1	21.3	29.4	0.6	8.4	9.0	77.6
24	5.2	9.3	14.5	4.3	12.9	17.2	0.3	3.1	3.4	35.1
25	2.1	11.4	13.5	2.0	7.1	9.1	0.2	1.3	1.5	24.1
26	3.9	24.5	28.4	3.1	9.3	12.4	0.3	3.1	3.4	44.2
27	2.5	12.2	14.7	1.0	14.0	15.0	0.1	1.7	1.8	31.5
28	3.7	29.6	33.3	1.8	20.7	22.5	0.2	3.7	3.9	59.7
29	8.1	17.4	25.5	4.7	16.7	21.4	0.4	12.6	13.0	59.9
30	2.9	23.9	26.8	2.3	17.5	19.8	0.2	5.8	6.0	52.6
Mean.	2.15	15.03	17.18	1.30	8.63	9.93	0.14	2.53	2.67	29.78

Date.	D.			H.			V.			Total.
	A _h ^x	A _d ^h	A _d ^x	A _h ^x	A _d ^h	A _d ^x	A _h ^x	A _d ^h	A _d ^x	
1	0.8	8.2	9.0	0.6	10.6	11.2	0.0	0.3	0.3	20.5
2	0.2	4.5	4.7	0.1	3.9	4.0	0.0	0.5	0.5	9.2
3	0.6	11.6	12.2	0.4	4.4	4.8	0.0	0.2	0.2	17.2
4	0.5	9.3	9.8	0.2	2.1	2.3	0.0	0.4	0.4	12.5
5	0.2	6.0	6.2	0.1	3.3	3.4	0.0	0.6	0.6	10.2
6	0.4	7.5	7.9	0.1	1.7	1.8	0.0	0.8	0.8	10.5
7	0.8	11.2	12.0	0.4	2.6	3.0	0.1	0.6	0.7	15.7
8	0.4	8.6	9.0	0.2	2.1	2.3	0.0	1.1	1.1	12.4
9	0.3	7.7	8.0	0.1	4.4	4.5	0.0	0.7	0.7	13.2
10	5.3	29.6	34.9	1.5	3.4	4.9	0.1	1.2	1.3	41.1
11	0.6	10.8	11.4	0.4	5.8	6.2	0.0	1.0	1.0	18.6
12	0.4	8.0	8.4	0.3	4.2	4.5	0.0	0.6	0.6	13.5
13	0.2	7.5	7.7	0.2	5.4	5.6	0.0	0.5	0.5	13.8
14	4.1	35.3	39.4	2.4	20.3	22.7	0.4	16.3	16.7	78.8
15	10.6	60.0	70.6	8.6	47.4	56.0	1.6	39.6	41.2	167.8
16	8.1	14.4	22.5	2.3	5.9	8.2	0.4	11.5	11.9	42.6
17	2.1	6.8	8.9	0.5	6.1	6.6	0.1	0.8	0.9	16.4
18	0.3	5.5	5.8	0.2	6.1	6.3	0.0	0.3	0.3	12.4
19	5.9	32.3	38.2	2.6	20.1	22.7	0.3	9.8	10.1	71.0
20	4.7	12.8	17.5	2.6	29.2	31.8	0.1	1.7	1.8	51.1
21	2.8	11.0	13.8	3.1	11.5	14.6	0.3	4.1	4.4	32.8
22	6.2	34.0	40.2	2.5	10.0	12.5	0.4	6.8	7.2	59.9
23	25.2	51.8	77.0	13.7	13.9	27.6	1.0	30.2	31.2	135.8
24	8.3	34.6	42.9	8.5	10.1	18.6	1.1	34.6	35.7	97.2
25	10.2	35.5	45.7	5.4	21.8	27.2	0.5	28.8	29.3	102.2
26	5.0	12.0	17.0	2.0	12.0	14.0	0.3	9.5	9.8	40.8
27	1.7	13.2	14.9	0.5	5.2	5.7	0.1	0.4	0.5	21.1
28	0.8	6.7	7.5	0.3	1.8	2.1	0.0	0.4	0.4	10.0
29	0.4	4.7	5.1	0.2	4.9	5.1	0.0	0.7	0.7	10.9
30	0.6	4.8	5.4	1.0	2.4	3.4	0.1	0.4	0.5	9.3
31	2.7	12.9	15.6	0.5	2.6	3.1	0.1	0.7	0.8	19.5
Mean.	3.57	16.74	20.31	1.98	9.20	11.18	0.24	6.62	6.86	38.35

DAILY MEAN VALUES OF ACTIVITY.

December, 1915.

Date.	D.			H.			V.			Total.	Date.	D.			H.			V.			Total.
	A _h ^x	A _d ^h	A _d ^x	A _h ^x	A _d ^h	A _d ^x	A _h ^x	A _d ^h	A _d ^x			A _h ^x	A _d ^h	A _d ^x	A _h ^x	A _d ^h	A _d ^x	A _h ^x	A _d ^h	A _d ^x	
1	157	575	732	8.5	247	33.2	0.1	21.2	21.3	127.7	1	0.1	1.6	1.7	0.1	0.6	0.7	0.1	0.1	0.1	2.5
2	1.5	8.2	9.7	0.8	28	3.6	0.1	0.7	0.8	14.1	2	0.1	2.3	2.4	0.2	1.3	1.5	0.0	0.1	0.1	4.0
3	0.6	3.8	4.4	0.2	1.2	1.4	0.0	0.4	0.4	6.2	3	0.6	2.8	3.4	0.2	0.9	1.1	0.0	0.2	0.2	4.7
4	4	3.4	3.7	0.3	1.0	1.3	0.0	0.5	0.5	5.5	4	0.1	1.5	1.6	0.1	1.1	1.2	0.0	0.1	0.1	2.9
5	12.9	15.2	28.1	3.8	11.2	15.0	0.4	4.6	5.0	48.1	5	0.1	1.8	1.9	0.1	0.7	0.8	0.0	0.0	0.0	2.7
6	34.0	71.9	105.9	14.6	50.6	65.2	0.6	37.8	38.4	209.5	6	11.3	72.6	83.9	13.7	56.1	69.8	2.0	55.8	57.8	211.5
7	0.9	11.5	12.4	0.8	3.0	3.8	0.0	1.3	1.3	17.5	7	2.2	6.9	9.1	1.7	4.1	5.8	0.1	0.7	0.8	15.7
8	4.5	9.8	14.3	2.1	6.4	8.5	0.2	1.7	1.9	24.7	8	0.6	4.0	4.6	0.4	2.4	2.8	0.0	0.3	0.3	7.7
9	1.8	6.6	8.4	1.0	2.6	3.6	0.1	1.6	1.7	13.7	9	2.7	3.2	5.9	0.4	0.9	1.3	0.0	0.2	0.2	7.4
10	0.7	5.6	6.3	0.5	7.6	8.1	0.0	1.4	1.4	15.8	10	0.3	1.0	1.3	0.3	1.6	1.9	0.0	1.1	1.1	4.3
11	0.9	7.4	8.3	0.7	5.8	6.5	0.1	3.1	3.2	18.0	11	0.9	3.5	4.4	0.7	1.6	2.3	0.0	0.3	0.3	7.0
12	0.9	4.1	5.0	0.9	6.7	7.6	0.1	0.1	0.2	12.8	12	0.9	6.8	7.7	0.3	1.8	2.1	0.0	0.1	0.1	9.9
13	0.4	3.1	3.5	0.4	2.1	2.5	0.1	1.3	1.4	7.4	13	0.2	1.4	1.6	0.1	0.6	0.7	0.0	0.1	0.1	2.4
14	0.1	0.8	0.9	0.0	1.6	1.6	0.0	0.1	0.1	2.6	14	0.7	7.1	7.8	0.5	7.8	8.3	0.0	2.4	2.4	18.5
15	6.0	31.4	37.4	4.9	6.3	11.2	0.2	1.4	1.6	50.2	15	4.6	18.9	23.5	4.7	17.7	22.4	0.4	6.9	7.3	53.2
16	9.7	37.0	46.7	6.2	21.7	27.9	0.7	21.6	22.3	96.9	16	0.8	1.4	2.2	0.6	4.2	4.8	0.0	0.9	0.9	7.9
17	5.8	20.8	26.6	2.6	28.7	31.3	0.3	17.3	17.6	75.5	17	0.8	0.8	1.6	0.2	2.2	2.4	0.0	0.5	0.5	4.5
18	13.0	35.5	48.5	6.0	15.8	21.8	0.5	10.6	11.1	81.4	18	0.1	0.7	0.8	0.1	0.9	1.0	0.0	0.1	0.1	1.9
19	2.5	6.7	9.2	1.6	6.8	8.4	0.1	3.2	3.3	20.9	19	0.5	2.8	3.3	0.3	1.2	1.5	0.0	0.5	0.5	5.3
20	6.6	13.6	20.2	1.8	10.6	12.4	0.1	2.4	2.5	35.1	20	0.2	1.1	1.3	0.1	0.8	0.9	0.0	0.1	0.1	2.3
21	3.2	6.6	9.8	2.1	5.9	8.0	0.2	1.8	2.0	19.8	21	0.1	0.6	0.7	0.1	0.9	1.0	0.0	0.3	0.3	2.0
22	3.5	8.2	11.7	1.9	3.9	5.8	0.1	2.5	2.6	20.1	22	0.2	1.4	1.6	0.1	0.8	0.9	0.0	0.1	0.1	2.6
23	0.3	1.6	1.9	0.2	1.0	1.2	0.0	0.5	0.5	3.6	23	1.4	4.1	5.5	0.7	1.7	2.4	0.0	1.2	1.2	9.1
24	0.2	1.7	1.9	0.2	1.8	2.0	0.0	0.5	0.5	4.4	24	0.9	1.4	2.4	0.4	0.9	1.3	0.0	0.1	0.1	3.8
25	0.3	2.6	2.9	0.3	2.9	3.2	0.0	0.2	0.2	6.3	25	1.4	2.8	4.2	0.8	1.4	2.2	0.0	0.7	0.7	7.1
26	0.5	1.4	1.9	0.5	1.0	1.5	0.0	0.2	0.2	3.6	26	1.7	7.0	8.7	0.9	7.6	8.5	0.0	1.3	1.3	18.5
27	1.5	6.1	7.6	2.8	1.9	4.7	0.2	0.5	0.7	13.0	27	1.5	6.9	8.4	0.7	2.1	2.8	0.1	0.2	0.3	11.5
28	0.9	7.9	8.8	0.6	5.2	5.8	0.4	2.6	3.0	17.6	28	0.2	1.3	1.5	0.1	1.5	1.6	0.0	0.1	0.1	3.2
29	0.1	0.9	1.0	0.1	1.2	1.3	0.0	0.3	0.3	2.6	29	1.0	3.3	4.3	0.2	1.2	1.4	0.0	0.3	0.3	6.0
30	0.2	1.4	1.6	0.1	1.0	1.1	0.0	0.1	0.1	2.8	30	0.3	3.3	3.3	0.2	1.0	1.2	0.0	0.5	0.5	5.3
Mean.	4.31	13.08	17.39	2.22	8.11	10.33	0.16	4.72	4.88	32.60	Mean.	1.18	5.70	6.88	0.94	4.16	5.10	0.10	2.44	2.54	14.52

Table XVIII.

SUMMARY OF DAILY MEAN VALUES OF ACTIVITY, A_d^x , 1915.

Date.	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	33.3	11.5	5.1	22.9	48.1	13.8	22.3	35.8	19.7	20.5	127.7	2.5
2	1.9	11.0	8.0	37.3	49.1	15.5	45.6	52.5	20.3	9.2	14.1	4.0
3	2.6	1.7	6.4	30.6	22.4	22.7	27.5	44.1	16.3	17.2	6.2	4.7
4	3.2	4.6	13.3	23.4	21.0	13.0	13.0	27.0	20.8	12.5	5.5	2.9
5	31.3	12.5	9.7	24.7	16.0	12.4	22.9	29.1	25.8	10.2	48.1	2.7
6	6.4	8.6	9.5	20.1	12.7	16.0	27.3	36.3	18.7	10.5	209.5	211.5
7	9.2	2.8	37.5	30.7	13.7	21.9	14.8	76.6	23.9	15.7	17.5	15.7
8	7.4	24.2	61.9	52.3	15.3	29.6	22.1	30.7	23.0	12.4	24.7	7.7
9	3.1	25.4	35.9	11.0	14.4	20.6	40.0	24.6	21.1	13.2	13.7	7.4
10	3.1	3.4	18.5	12.2	13.5	18.1	35.8	38.1	19.5	41.1	15.8	7.3
11	1.5	3.0	14.9	10.1	11.5	20.5	44.3	38.6	16.9	18.6	18.0	7.0
12	12.9	4.8	9.9	13.2	14.0	52.6	42.6	25.5	20.9	13.5	12.8	9.9
13	6.5	2.7	10.8	9.8	30.4	75.4	37.6	20.5	32.1	13.8	7.4	2.4
14	9.6	2.1	16.1	18.9	26.5	22.3	39.6	23.8	16.3	78.8	2.6	18.5
15	3.5	4.9	13.6	38.6	31.6	30.6	32.0	23.9	20.9	167.8	50.2	53.2
16	2.2	2.1	25.1	38.5	37.9	38.9	29.6	27.1	30.8	42.6	96.9	7.9
17	3.7	7.6	29.7	22.7	42.6	708.6	24.9	29.5	45.3	16.4	75.5	4.5
18	2.4	4.4	20.7	30.5	14.6	76.5	33.0	28.6	12.9	12.4	81.4	1.9
19	1.4	50.6	38.7	34.1	22.9	21.6	29.3	26.1	12.4	71.0	20.9	5.3
20	3.4	37.4	45.6	27.9	24.8	30.5	25.9	22.9	16.8	51.1	35.1	2.3
21	1.5	16.2	54.1	28.0	21.6	58.4	28.5	29.9	15.1	32.8	19.8	2.0
22	5.3	32.0	40.4	53.4	21.2	45.2	34.7	20.2	61.0	59.9	20.1	2.6
23	1.5	21.9	31.6	35.0	12.2	25.2	20.7	32.0	77.6	135.8	3.6	9.1
24	6.0	28.3	20.1	13.2	17.1	55.4	21.9	20.7	35.1	97.2	4.4	3.8
25	39.7	15.8	38.5	14.6	21.4	27.5	24.9	24.5	24.1	102.2	6.3	7.1
26	11.8	26.5	28.8	69.4	22.6	34.0	40.8	66.7	44.2	40.8	3.6	18.5
27	14.4	9.5	14.3	15.2	31.6	21.2	46.0	40.6	31.5	21.1	13.0	11.5
28	6.8	6.3	20.0	18.0	21.8	32.4	36.8	20.4	59.7	10.0	17.6	3.2
29	4.6		24.9	24.2	23.5	41.9	58.3	48.5	59.9	10.9	2.6	6.0
30	4.7		39.9	25.7	18.0	28.0	31.1	25.1	52.6	9.3	2.8	5.3
31	4.8		19.6		22.1		20.7	16.4		19.5		4.6
Mean.	8.07	13.63	24.64	26.85	23.11	53.80	31.42	32.44	29.78	38.35	32.60	14.52

Table XIX.

SUMMARY OF DAILY VALUES OF 0.01 ($R_H^2 + R_D^2 + R_V^2$), 1915.

Date.	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	217	146	26	101	410	64	94	206	84	80	1149	9
2	8	67	29	185	316	62	256	292	94	40	155	29
3	14	12	29	200	135	79	129	207	68	110	33	45
4	22	26	36	113	107	45	46	199	84	77	28	12
5	292	90	50	128	88	44	92	116	126	41	719	10
6	82	62	58	97	54	61	152	182	84	48	1973	1655
7	57	13	268	349	54	113	59	417	91	142	90	277
8	92	128	295	375	60	158	124	175	86	58	238	53
9	26	132	236	67	71	83	213	100	84	57	103	140
10	16	21	130	50	70	67	219	191	90	356	87	33
11	7	17	76	46	47	82	238	130	70	123	89	52
12	92	32	48	54	64	354	218	114	95	73	111	67
13	64	28	71	47	142	423	144	71	132	69	56	9
14	62	11	80	101	233	103	157	89	65	550	12	105
15	19	19	72	254	158	96	124	85	85	739	711	342
16	13	9	200	227	184	155	107	129	163	442	999	48
17	52	33	353	106	239	6698	82	197	282	117	455	44
18	16	27	104	123	70	321	132	125	53	52	559	11
19	8	398	255	220	131	88	108	172	55	627	144	54
20	24	250	509	177	103	106	96	108	75	477	393	14
21	7	185	440	207	113	265	114	120	80	444	169	12
22	29	309	326	386	92	231	191	88	610	320	272	17
23	12	206	291	244	59	107	106	128	800	1640	28	103
24	34	190	111	60	133	166	76	87	394	800	33	54
25	402	157	183	73	90	175	102	172	231	642	35	91
26	146	231	167	348	103	177	160	559	322	283	45	175
27	78	68	70	65	194	114	229	229	170	130	113	155
28	55	41	84	75	82	126	154	102	335	51	111	24
29	36		167	86	85	165	440	308	424	50	11	61
30	45		194	115	78	91	152	135	374	108	12	27
31	19		87		91		79	74		169		45
Mean.	66.0	96.7	162.7	156.0	124.4	360.6	148.2	158.3	190.2	287.6	297.8	121.1

Table XX.

SUMMARY OF DAILY VALUES OF HR_H , 1915.

Date.	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	20.1	8.1	4.3	10.5	14.1	9.3	12.6	14.7	8.0	12.4	39.2	2.6
2	2.2	11.7	4.1	12.5	18.6	9.0	20.3	20.0	9.5	7.3	13.0	5.5
3	3.7	3.9	5.7	15.5	14.2	9.3	14.9	19.3	8.7	13.1	6.1	6.5
4	6.3	5.7	5.1	9.5	13.8	6.6	7.5	21.0	8.0	6.6	5.9	3.8
5	21.0	10.3	7.1	11.3	11.8	6.2	12.6	11.0	10.1	6.0	35.1	3.3
6	4.9	5.6	9.9	12.1	7.5	8.2	15.9	17.1	11.6	7.0	51.5	44.9
7	9.3	4.1	13.7	28.4	7.3	15.1	6.8	18.5	9.3	10.5	9.9	19.3
8	10.8	10.2	20.3	23.8	5.1	15.7	13.0	15.5	10.2	6.6	16.4	9.2
9	5.7	9.9	16.5	6.0	7.0	10.9	11.5	10.9	11.6	7.3	8.7	8.4
10	5.7	5.0	15.9	5.8	9.3	8.0	16.7	14.2	9.2	12.9	12.3	7.3
11	2.9	6.2	11.8	7.4	7.1	9.7	18.0	11.1	9.2	10.3	9.3	9.1
12	10.8	4.9	7.2	5.5	9.8	16.6	20.1	10.7	9.3	10.3	13.3	7.4
13	10.3	5.5	10.7	5.2	11.5	26.4	12.6	8.9	9.6	11.1	9.7	3.1
14	6.0	3.0	11.8	10.0	14.4	14.0	13.4	9.4	8.9	21.9	5.1	14.0
15	4.3	5.2	6.6	13.5	14.5	11.3	13.2	8.2	10.4	27.4	25.0	23.4
16	3.4	4.3	17.4	16.4	15.3	13.9	10.6	9.8	10.8	22.9	35.4	10.0
17	6.2	5.5	21.5	12.7	23.4	99.7	10.5	17.7	15.8	13.1	27.7	8.4
18	3.6	4.3	9.8	14.1	8.3	21.2	10.1	10.0	7.7	9.6	21.4	4.2
19	3.5	17.5	17.0	18.4	13.6	10.0	10.9	13.1	7.7	19.9	14.8	8.9
20	7.1	17.3	25.3	8.1	11.8	12.5	9.0	11.6	11.1	30.9	23.2	3.2
21	2.4	13.7	23.5	14.7	13.2	21.5	10.5	10.6	7.7	28.9	16.8	3.8
22	5.5	19.5	17.8	16.3	10.1	18.6	13.0	8.5	19.4	11.6	20.7	3.4
23	3.7	11.8	24.8	16.8	7.5	11.9	11.2	10.8	33.5	33.9	6.2	8.7
24	7.1	17.8	9.3	7.5	12.3	17.2	8.3	10.7	22.8	23.0	7.8	8.4
25	30.1	17.4	13.6	7.9	8.6	13.9	9.5	9.2	17.3	26.2	7.7	10.4
26	12.1	13.0	15.8	21.8	8.5	16.2	14.5	24.0	21.1	16.5	7.7	16.3
27	11.2	6.5	8.4	6.3	19.6	10.9	16.4	21.0	13.4	10.4	13.5	12.6
28	5.1	4.7	9.2	7.6	8.1	13.0	12.2	11.3	19.5	5.3	11.5	6.1
29	8.7		16.6	7.5	8.1	15.7	23.7	20.7	21.1	9.4	4.3	5.6
30	7.3		15.7	9.4	8.3	10.7	14.0	13.8	21.5	13.0	4.1	4.4
31	4.7		9.8		9.5		8.9	10.3		8.1		8.3
Mean.	7.93	9.02	13.10	12.08	11.36	16.11	12.98	13.66	13.13	14.63	16.11	9.37

Table XXI.

SUMMARY OF DAILY VALUES
OF SUM OF CHARACTERS, (35 Stations), 1915.

Date.	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	44	20	4	18	41	2	10	26	0	26	56	1
2	1	26	2	38	45	2	42	42	5	2	29	5
3	2	4	2	33	31	0	26	36	4	11	10	10
4	21	14	6	12	29	1	0	25	1	7	7	2
5	52	31	14	7	17	1	6	1	19	1	56	2
6	29	18	25	14	3	2	37	27	4	3	69	67
7	28	2	43	40	1	20	1	42	2	13	32	38
8	25	44	50	54	0	32	26	29	1	5	31	19
9	12	39	37	14	9	18	39	2	4	1	19	21
10	5	14	26	2	4	2	33	8	21	37	32	16
11	2	3	20	7	3	17	38	7	8	23	27	27
12	27	21	18	3	23	48	36	2	10	5	30	24
13	29	12	12	0	21	49	7	0	25	5	10	1
14	27	1	4	9	26	31	4	1	5	53	1	32
15	12	13	3	38	25	8	1	0	6	67	41	48
16	2	1	26	34	38	30	0	8	33	48	59	33
17	12	8	31	18	45	70	1	32	37	31	51	14
18	1	5	32	34	8	58	3	20	3	7	54	2
19	1	52	32	36	27	5	1	32	3	57	37	10
20	20	44	51	30	33	7	3	16	1	48	37	12
21	10	38	55	28	30	36	4	23	14	41	35	1
22	15	40	52	45	25	43	28	15	56	43	34	4
23	3	44	34	36	10	23	9	9	62	66	9	30
24	17	41	23	5	22	13	2	4	45	53	4	21
25	50	36	40	8	22	33	21	27	37	56	11	32
26	37	35	29	46	12	26	27	56	42	40	20	40
27	32	13	10	11	46	22	41	35	37	19	32	32
28	25	10	6	2	1	14	6	30	47	10	30	8
29	14		15	5	1	26	32	43	44	9	1	12
30	20		29	16	16	4	24	27	41	23	2	10
31	2		7		20		3	9		28		12
Mean.	18.6	22.5	23.8	21.4	20.5	21.4	16.5	21.1	20.6	27.0	28.9	18.9

Table XXII.

SUMMARY OF DAILY VALUES OF $A_H + A_D + A_V$, 1915.

Date.	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	162	114	65	142	188	117	135	189	136	117	300	42
2	36	99	73	172	200	119	207	187	139	86	114	61
3	45	43	75	153	133	137	163	178	119	122	64	58
4	49	61	98	144	128	96	103	144	122	102	61	44
5	142	109	78	161	113	100	129	148	140	85	205	41
6	74	84	89	129	98	114	148	170	128	88	461	414
7	86	45	192	152	108	131	107	242	137	122	118	133
8	85	128	233	203	117	154	129	166	134	101	133	77
9	56	141	179	97	97	122	162	137	126	109	103	69
10	52	49	126	104	106	120	184	187	121	179	116	69
11	36	47	98	96	101	129	192	171	110	132	125	80
12	112	67	91	103	102	238	177	158	117	112	106	75
13	69	52	96	96	172	267	169	126	148	112	78	36
14	85	37	123	129	168	127	173	139	110	276	45	122
15	57	60	106	160	165	155	159	132	128	352	209	203
16	42	39	139	178	167	177	153	147	140	198	330	68
17	61	74	201	120	175	774	134	157	200	122	260	60
18	46	62	135	134	109	227	166	146	101	98	269	41
19	34	191	190	162	139	134	156	141	96	266	132	74
20	60	162	186	159	130	149	142	140	111	215	163	47
21	33	127	253	141	123	201	162	158	107	182	133	40
22	61	195	179	199	134	186	182	123	204	206	136	46
23	38	127	194	203	105	134	143	153	246	322	60	92
24	75	164	127	92	111	167	128	139	183	288	64	51
25	202	130	166	108	135	148	138	147	149	273	71	65
26	112	147	166	259	143	161	173	264	188	181	53	139
27	92	87	109	111	148	139	193	194	138	120	78	93
28	79	66	122	118	139	158	178	122	236	83	127	49
29	66		159	129	131	171	224	201	228	94	47	64
30	63		192	151	129	138	154	142	216	82	44	57
31	61		130		125		128	118		112		66
Mean.	73.3	96.7	141.0	143.5	133.5	173.0	157.8	160.2	148.6	159.3	140.2	83.1

Table XXIII.

SUMMARY OF DAILY VALUES OF $R_H + R_D + R_V$, 1915.

Date.	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	239	176	81	168	292	137	155	232	149	138	542	44
2	46	134	84	222	283	132	272	283	161	101	189	85
3	58	60	85	224	182	148	188	238	135	158	91	101
4	77	79	98	174	164	108	114	222	145	129	87	52
5	272	151	109	183	152	111	154	172	175	105	438	49
6	124	119	123	155	119	127	199	219	153	113	717	667
7	122	57	253	291	120	168	119	337	158	182	155	254
8	150	185	290	300	120	204	174	210	147	121	241	112
9	80	190	238	126	125	150	232	159	146	121	159	169
10	65	72	178	118	130	135	238	223	150	266	154	98
11	42	64	134	114	114	144	245	193	136	167	156	114
12	149	91	109	120	132	294	237	180	153	133	160	118
13	125	85	132	112	199	326	193	139	186	129	124	46
14	118	51	139	160	238	163	205	155	130	381	53	168
15	71	74	130	246	197	161	179	149	144	465	394	299
16	57	46	231	246	213	205	168	181	200	351	526	110
17	112	97	312	159	241	1376	143	228	261	171	357	106
18	64	81	171	171	132	305	181	175	117	109	381	51
19	46	318	262	232	179	156	171	197	123	383	199	114
20	82	241	357	217	167	164	160	171	141	336	310	58
21	43	210	346	222	172	259	172	181	137	333	208	59
22	83	289	290	297	157	245	220	148	393	279	262	60
23	57	225	276	243	128	163	169	177	450	635	88	156
24	91	219	165	119	182	208	133	154	316	468	95	109
25	317	198	231	138	157	206	168	203	242	426	95	147
26	186	230	218	320	168	216	205	398	287	279	104	205
27	146	132	137	130	233	173	249	239	207	170	169	185
28	115	101	137	134	149	180	195	163	288	110	172	75
29	96		208	145	150	209	314	290	339	115	54	112
30	105		220	173	152	153	191	193	313	164	52	79
31	72		153		155		144	140		183		105
Mean.	110.0	142.0	190.2	188.6	171.0	224.2	189.7	204.8	202.7	232.9	224.4	132.5

MAGNETIC CHARACTER OF THE YEAR 1915.





