The more salient points of these results are pointed out, such as the preeminently small resistance of water and of bodies containing a large proportion of the elements of water (potential water); the possible connexion of this fact with the results of Magnus concerning the conductivity of hydrogen; the increased resistance accompanying increased molecular complexity in the case of isotypic liquids, as exemplified by the alcohols and their derivatives: the great resistance shown by the liquids containing halogens. The results obtained by Tyndall in regard to relative diathermancy are shown to be in accord with the author's results concerning resistance. *A highly diathermanous liquid invariably offers great resistance to conducted heat.* The relation between electrical and thermal resistance in the case of liquids is also briefly discussed.

II. "Results of a preliminary Comparison of certain Curves of the Kew and Stonyhurst Declination Magnetographs." By the Rev. W. Sidgreaves and Balfour Stewart, LL.D., F.R.S. Received October 28, 1868.

The observatories of Kew and Stonyhurst are not far apart, both being in England; the first in the county of Surrey (Lat. 51° 28′ 6″ N., Long. 0° 18′ 47″ W.), and the second in the county of Lancashire (Lat. 53° 50′ 40″ N., Long. 2° 28′ 10″·2 W.).

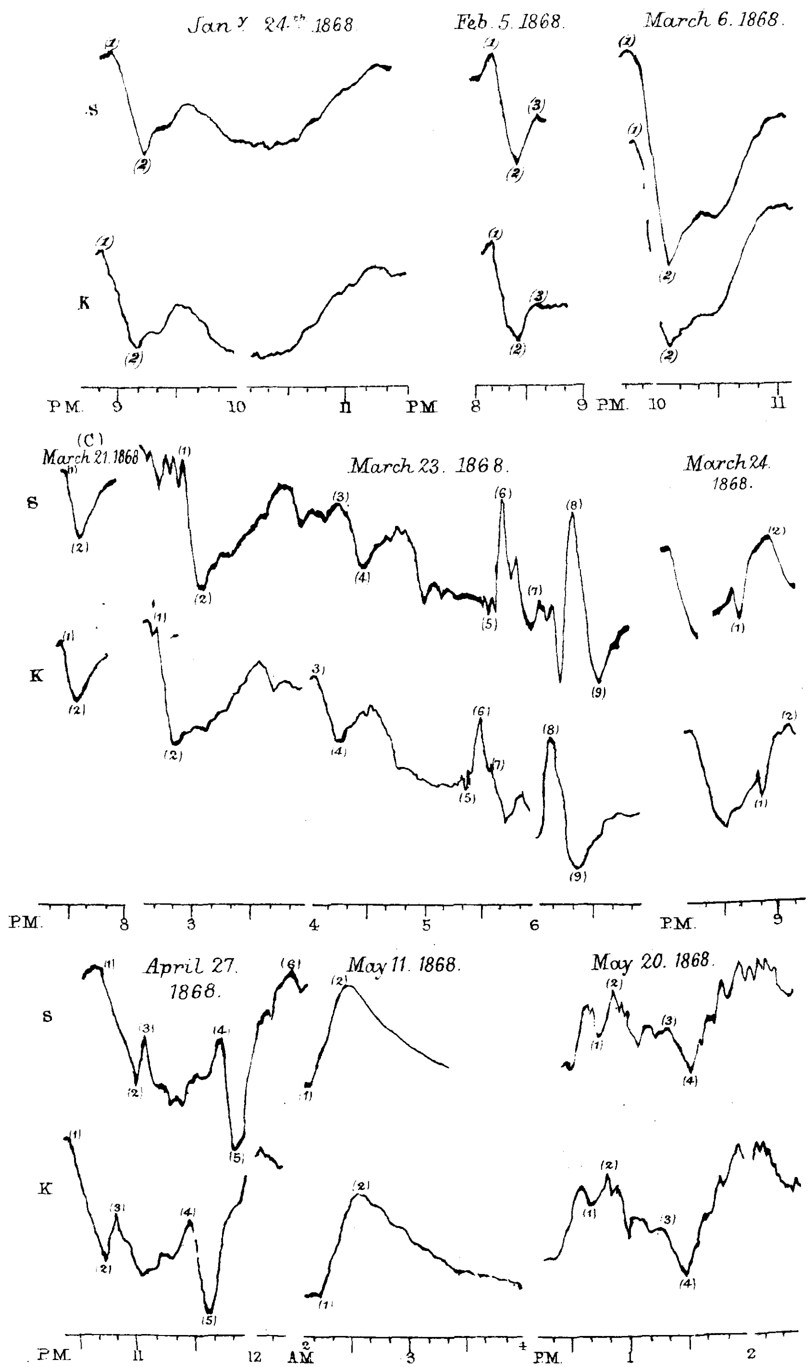
If we bear in mind (as a fact well proved, chiefly by the researches of General Sabine) that magnetic disturbances are of a cosmical nature, we cannot evidently expect any considerable difference between these two stations, and it might be very naturally supposed that the magnetic variations should be precisely the same in each.

This is no doubt approximately true, but nevertheless there is on certain occasions a residual difference between the indications of the two places, and one which is caught by the eye from the automatic records with very great ease, inasmuch as the instrumental time-scale of these is precisely the same for both places; and not only is the time-scale the same, but *for slow disturbances* the vertical spaces traversed by the traces are the same for both declination magnetographs.

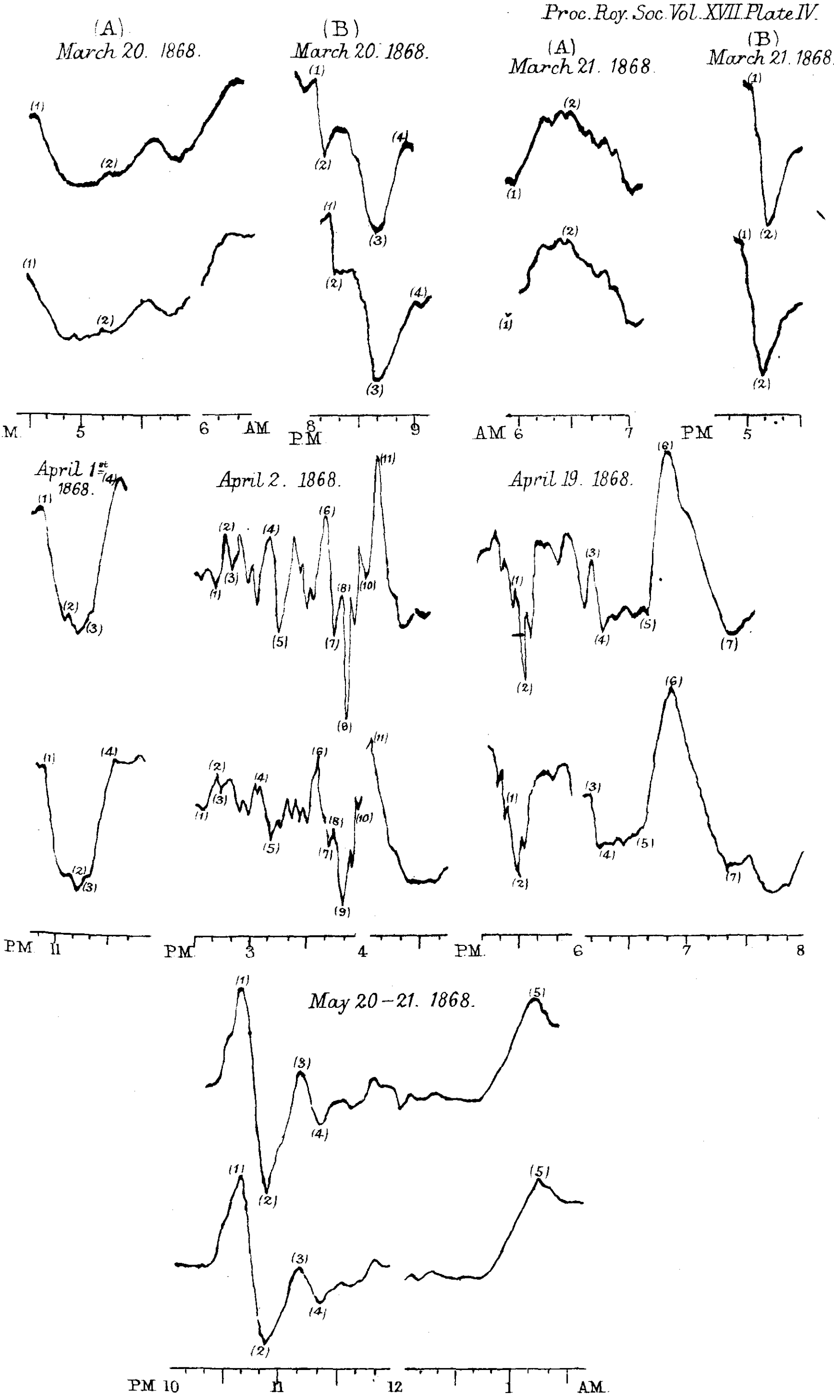
We venture to bring before the Royal Society certain results of an intercomparison of the declination curves of these two observatories, although only of a preliminary nature, because the subject is one of much interest, and because these results appear to exhibit, superposed upon a disturbance which is mainly cosmical, a comparatively small effect, which appears to be more of a local nature, but which is not unworthy of investigation.

The records which we have investigated are represented graphically in Plates III. and IV.; and in them the disturbances which have been measured are denoted by figures attached to their extremities.

The following Table exhibits the results of these measurements:—



W. H. Wesley del.


(A) March 20. 1868.
(B) March 20. 1868.
(A) March 21. 1868.
(B) March 21. 1868.
M. 5 6 AM
PM 8 9
AM 6 7
PM 5
April 1st 1868.
April 2. 1868.
April 19. 1868.
PM 11
PM 3 4
PM 6 7 8
May 20–21. 1868.
PM 10 11 12 1 AM.

W. West imp.

Date (see Plate).	Disturbance measured.	Duration, in minutes.	Amount of vertical disturbance in units of scale (hundredths of an inch.)		Abruptness represented by vertical disturbance at Kew in one minute.	Stonyhurst *minus* Kew disturbance.
1868.			Kew.	Stonyhurst.		
Jan. 24.	(1) to (2)	14	52	54	3·7	+ 2
Feb. 5.	(1) to (2)	12	51	57	4·2	+ 6
"	(2) to (3)	17	18	24	2·6	+ 6
Mar. 6.	(1) to (2)	17	107	115	6·3	+ 8
20 (A).	(1) to (2)	long continued.	30	31	slow and curved disturbance.	+ 1
20 (B).	(1) to (2)	4	30	40	7·5	+10
"	(3) to (4)	12	40	45	3·3	+ 5
21 (B).	(1) to (2)	11	71	73	6·4	+ 2
21 (A).	(1) to (2)	long continued.	41	40	slow and curved disturbance.	− 1
21 (C).	(1) to (2)	8	30	35	3·5	+ 5
23.	(1) to (2)	7	61	72	8·7	+11
"	(3) to (4)	....	doubtful.			
"	(5) to (6)	3	32	57	10·7	+25
"	(6) to (7)	2·5	30	40	12·0	+10
"	(8) to (9)	10	70	90	7·0	+20
24.	(1) to (2)	12	40	44	3·3	+ 4
Apr. 1.	(1) to (2)	11	57	60	5·2	+ 3
"	(3) to (4)	10	63	70	6·3	+ 7
2	(1) to (2)	4·5	21	30	4·7	+ 9
"	(2) to (3)	4	11	21	2·8	+10
"	(4) to (5)	4·5	30	51	6·6	+21
"	(6) to (7)	4	45	66	11·2	+21
"	(8) to (9)	4·5	43	65	9·6	+22
"	(10) to (11)	5	39	63	7·8	+24
19.	(1) to (2)	5·5	35	50	6·4	+15
"	(3) to (4)	5·5	27	38	4·9	+11
"	(5) to (6)	10	74	87	7·4	+13
"	(6) to (7)	23	94	99	4·1	+ 5
27.	(1) to (2)	16	63	60	4·0	− 3
"	(2) to (3)	7	22	22	3·1	0
"	(4) to (5)	6	52	60	8·7	+ 8
May 11.	(1) to (2)	17	53	53	3·1	0
20.	(1) to (2)	7	20	24	2·9	+ 4
"	(3) to (4)	12	22	23	1·8	+ 1
20–21.	(1) to (2)	12	90	111	7·5	+21
"	(2) to (3)	14	40	65	2·9	+25
"	(3) to (4)	10	20	30	2·0	+10
"	(4) to (5)	long continued.	65	65	slow and curved disturbance.	0

It may be inferred from this Table that where the disturbances are slow and long continued, that is to say, where there is scarcely any abruptness, the amount of disturbance as represented by the traces is the same for both places; and this is quite confirmed by placing the curves the one over the other, when they will be found to coincide even in their most minute features.

Let us now take the excesses of Stonyhurst over Kew for the various disturbances, and endeavour to see if this element is in any way connected with the abruptness of the disturbance.

We may for convenience sake divide these excesses into four groups.

Group I. Excesses not exceeding 4 scale-units.
II. Excesses exceeding 4 and not exceeding 9 scale-units.
III. Excesses exceeding 9 and not exceeding 19 scale-units.
IV. Excesses above 19 scale-units.

Group I.		Group II.		Group III.		Group IV.	
Excess (under 5).	Abruptness.	Excess (under 10).	Abruptness.	Excess (under 20).	Abruptness.	Excess (above 20).	Abruptness.
2	3·7	6	4·2	10	7·5	21	7·5
2	6·4	6	2·6	10	2·0	25	2·9
−3	4·0	8	6·3	11	8·7	25	10·7
0	3·1	5	3·3	10	12·0	20	7·0
0	3·1	8	8·7	10	2·8	21	6·6
4	2·9	5	3·5	15	6·4	21	11·2
1	1·8	7	6.3	11	4·9	22	9·6
4	3·3	9	4·7	13	7·4	24	7·8
3	5·2	5	4·1				
Means 1·5	3·7	6·6	4·9	11	6·5	22	7·9

It would appear from these groups that generally, and on an average, the excess of Stonyhurst over Kew in declination disturbances varies with the abruptness of the disturbance, being great when the disturbance is very abrupt.

It is hoped that on some future occasion further results, derived from an intercomparison of these curves, may be presented to the Society.

III. "On the reappearance of some periods of Declination Disturbance at Lisbon during two, three, or several days." By Senhor Capello, of the Lisbon Observatory. Communicated by Balfour Stewart, LL.D. Received October 28, 1868.

Any one who carefully examines the magnetograph curves must often notice that there are, during periods of disturbance, synchronous movements of the needle during corresponding hours for two, three, or more days.

In some cases the repetition is only in two or three parallel movements, in others there are true periods of some hours in duration.

The repeated periods are not entirely similar, their phases being in general so modified that in some cases their identity can only be recognized by a very minute investigation.

The same periods, when repeated, have not always the same total duration; nor do they recommence at the same precise hour, but sometimes earlier, and sometimes later, the differences varying from a few minutes to two or three hours.

There is also to be remarked in the repeated disturbances a tendency to modify in form, or to level their *peaks* and *hollows*, or, on the contrary, to augment the angular forms.