Mr. Smith has certainly shown that accommodation was effected without turgescence, for no blood could enter the processes; but he has not proved that, during life, turgescence of the ciliary processes, which, I conclude, is the mainstay of a lengthened accommodation for near vision, does not take place. In his experiments, I believe that the iris was, by accident, made to effect accommodation to a great extent, whereas in life it effects it only to a small extent.

INFLUENCE OF MEAN TEMPERATURE ON THE PREVALENCE OF SMALL-POX.*

By J. W. MOORE, M.D. Dubl.,

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LONDON.—From the time of the cessation of any epidemic tendency of the disease in the month of August 1868, the average weekly number of deaths from small-pox in London amounted to but five or six—rising a little above these figures in winter, and falling below them in summer. In the *twentieth* week of the year 1870, we meet with the first indication of an increased morbid tendency as regards the disease, the number of deaths being 19. It is interesting to note, that three weeks before there had been a fall of mean temperature of more than 7 deg. Fahr., from 55 to 47.7 deg. With a rising temperature, the weekly number of deaths again declined slightly; and then ensued a conflict between the approaching epidemic and the summer heat, the latter holding the former in check for many weeks. With the fall of mean temperature below 60 deg. in the thirty-third week, the deaths began to increase about the thirty-eighth week; but the first actual epidemic outburst occurred in the forty-fifth week, when 40 deaths were registered, about four weeks after the mean temperature had permanently declined below 50 deg. In the forty-eighth week the deaths rose to 60, three weeks after a fall of temperature below 40 deg. In the last week of the year the number of deaths reached 110, subsequent to the occurrence of very cold weather (mean temperature = 32.5 deg.) The third week of 1871 witnessed a very considerable development of the epidemic, and this appears to be connected with the extreme cold of the closing week of 1870, the mean temperature of which at Greenwich was so low as 25.7 deg. The epidemic now rapidly made way, owing apparently to two causes—the multiplication of the foci of contagion, and the continued low temperature of the season of the year. The maximal number of deaths (288) took place in the eighteenth week; and from this period, with a rise of mean temperature above 50 deg., a decline in the mortality—occasionally more or less interrupted, indeed, but still well marked and persistent—is noticed. In the *Medical Times and Gazette* for May 13th we read:

“The epidemic has now lasted a good six months. It may be regarded as assuming a distinctly epidemic form in November, shortly after the mean temperature of the air had fallen decidedly below 50 deg. In the progress of the seasons we have now arrived at a time when this mean temperature is again reached. The mean temperature of the last three weeks, as recorded at Greenwich, has been 50, 50.7, and 49.7 deg. It is customary about the second week in May for some check in the consecutive weekly rises of temperature to take place; but after this in the ordinary or average progress of events the steady rise towards the summer temperature may be expected to set in, and with it there is at least a hope that the epidemic will begin to fade.”

A glance at the figures given in Table II will show how well founded the writer's anticipations were with regard to the fading of the epidemic; but it was by no means to die out as yet—it was “scotched, not killed”. With the rising temperature of summer the weekly number of deaths gradually fell, until in September the average was about 60; and from this time the mortality remained for several weeks tolerably stationary. In the forty-sixth week, however, a fresh development of small-pox commenced shortly after the advent of the first cold weather. The deaths now ran up to 106 (in the fiftieth week), and continued to be as many as 90 or upwards a week until the beginning of February. From this they declined, the weather during the next two months being mild for the time of year. Indeed, apart from this, it seemed as if the receptivity of the population was at last becoming exhausted; and we may suppose that this was antagonistic to the influence of prolonged winter cold, notwithstanding the evident languishing of the epidemic. The deaths did not fall into the “twenties” until the mean temperature of 50 deg., or thereabouts, became established; or into the “tens” until the thermometer had permanently ranged for some weeks above 60 deg. Once more, at the approach of winter, in the forty-fourth week, we ob-

serve a slight lighting up of the disease; but the unusually mild weather of the “fore-winter”, as Dove calls the season before Christmas, soon reduced the death-rate to its normal height in non-epidemic times.

TABLE II.—Showing the Weekly Number of Deaths from Small-pox during the recent Epidemic in certain large British Cities, with the Mean Temperature of Three Weeks before.

Weeks of Year.	LONDON. Population in 1871—3,254,260.						LIVERPOOL. Pop. in 1871, 493,346.						DUBLIN. Pop. in 1871, 310,565.					
	1870.		1871.		1872.		1870.		1871.		1871.		1871.		1872.			
	Deaths from Small-pox.	Mean temp. three weeks before.	Deaths from Small-pox.	Mean temp. three weeks before.	Deaths from Small-pox.	Mean temp. three weeks before.	Deaths from Small-pox.	Mean temp. three weeks before.	Deaths from Small-pox.	Mean temp. three weeks before.	Deaths from Small-pox.	Mean temp. three weeks before.	Deaths from Small-pox.	Mean temp. three weeks before.	Deaths from Small-pox.	Mean temp. three weeks before.	Deaths from Small-pox.	Mean temp. three weeks before.
	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.
1st	8	44.7	79	42.8	91	39.9	..	..	..	..	50	40.8	..	..	36	43.7	..	..
2nd	12	38.2	135	33.0	90	41.6	..	..	..	..	35	32.6	..	..	63	44.2	..	..
3rd	8	34.2	188	25.7	93	43.0	..	..	..	..	65	26.4	..	..	41	44.3	..	..
4th	5	45.2	153	31.1	90	41.5	..	..	..	..	51	32.8	..	..	40	41.4	..	..
5th	11	39.3	106	33.0	52	40.3	..	..	..	..	90	36.5	..	..	45	41.4	..	..
6th	4	36.1	211	37.1	68	39.1	..	..	..	..	86	34.9	..	..	47	40.8	..	..
7th	10	31.6	218	32.4	48	42.0	..	..	..	..	105	30.7	..	..	45	39.2	..	..
8th	11	42.0	227	34.9	53	44.4	..	..	..	..	120	33.5	..	..	33	46.3	..	..
9th	8	32.4	213	41.6	52	46.6	..	..	..	..	89	41.2	..	..	37	45.5	..	..
10th	6	30.7	194	42.7	49	43.8	..	..	..	..	89	45.7	1	47.0	41	45.4	..	..
11th	3	56.9	185	43.8	42	44.9	..	..	..	..	103	44.4	1	46.0	54	44.1	..	..
12th	5	45.8	205	45.7	48	45.6	..	..	..	..	97	45.1	1	46.0	32	47.1	..	..
13th	8	38.4	192	46.3	55	48.7	..	..	..	..	73	46.2	..	..	45.8	67	49.4	..
14th	8	41.0	214	41.7	65	44.6	..	..	..	..	77	41.1	0	42.0	44	46.2	..	..
15th	2	38.1	205	47.1	49	38.9	..	..	..	..	68	48.5	..	..	43.8	83	41.5	..
16th	10	37.2	276	43.8	48	43.5	..	..	..	..	74	42.9	2	43.9	52	41.7	..	..
17th	3	45.5	261	43.1	41	44.7	..	..	..	..	74	42.7	..	..	45.4	60	44.3	..
18th	9	50.1	288	48.3	62	51.4	..	..	..	..	55	47.8	0	49.3	57	51.3	..	..
19th	6	56.0	232	50.0	39	46.2	..	..	..	..	52	48.5	1	50.1	47	44.7	..	..
20th	19	47.7	267	50.7	54	50.1	..	..	..	..	50	48.8	1	50.0	37	46.8	..	..
21st	11	45.6	257	49.7	54	52.6	..	..	..	..	57	48.5	0	49.5	36	53.3	..	..
22nd	12	49.3	229	47.6	37	47.2	..	..	..	..	35	48.9	0	50.9	23	46.6	..	..
23rd	8	59.8	245	50.1	27	47.5	..	..	..	..	41	48.4	2	51.2	54	47.6	..	..
24th	7	56.5	240	56.7	37	49.8	..	..	..	..	34	55.1	1	55.4	25	46.4	..	..
25th	11	58.1	232	53.9	26	57.7	..	..	..	..	36	44.4	2	55.4	28	53.7	..	..
26th	12	58.0	235	49.9	43	52.6	..	..	..	..	26	51.6	0	55.1	36	51.0	..	..
27th	13	64.6	164	59.5	35	57.9	..	..	..	..	27	57.8	3	58.0	20	55.6	..	..
28th	11	63.8	133	56.2	26	66.5	..	..	..	..	22	53.0	1	55.1	35	61.0	..	..
29th	15	57.7	135	56.6	29	60.3	..	..	..	..	27	56.6	0	56.6	18	57.0	..	..
30th	11	65.0	122	60.5	33	64.5	1	61.1	..	..	20	57.9	0	59.5	7	60.8	..	..
31st	15	65.7	87	61.7	28	65.1	0	59.5	9	59.4	0	59.4	0	60.4	9	58.4	..	..
32nd	11	68.5	96	65.5	15	61.4	1	64.6	6	59.1	3	60.7	3	60.7	19	61.5	..	..
33rd	10	64.8	80	60.4	16	71.1	1	62.9	8	56.2	2	57.2	10	64.2	..	..	..	..
34th	11	65.3	82	60.3	15	61.7	1	66.2	7	58.5	0	59.1	10	58.3	..	..	..	..
35th	..	64.5	..	68.3	8	59.2	2	63.3	4	66.5	1	64.7	7	57.4	..	..	..	..
36th	12	60.9	81	67.1	..	60.6	1	58.0	7	66.7	2	58.9	5	58.1	..	..	..	..
37th	11	57.3	57	63.0	12	64.3	2	56.4	4	58.7	4	59.3	4	62.3	..	..	..	..
38th	15	..	89	..	5	60.1	1	..	5	..	4	60.1	4	59.2	..	..	..	..
39th	14	57.0	51	60.5	9	..	0	55.5	4	57.3	0	58.3	7	58.2	..	..	..	..
40th	27	54.0	72	62.6	10	62.7	1	54.4	4	57.4	5	57.2	4	61.8	..	..	..	..
41st	13	54.5	61	53.6	7	54.3	0	57.2	5	50.3	7	49.7	4	52.3	..	..	..	..
42nd	17	55.7	53	50.2	17	49.0	1	55.9	2	47.3	7	47.7	2	47.8	..	..	..	..
43rd	21	54.1	61	51.9	6	52.4	3	50.7	1	50.1	8	47.8	1	50.2	..	..	..	..
44th	23	47.1	61	45.5	14	47.3	6	47.7	0	46.6	14	50.2	6	46.0	..	..	..	..
45th	40	49.7	54	53.5	15	44.4	4	49.4	2	52.7	9	53.5	3	44.5	..	..	..	..
46th	45	48.2	76	46.9	13	47.4	4	48.5	1	..	7	51.4	3	46.0	..	..	..	..
47th	41	44.1	67	47.3	13	49.7	10	45.4	2	49.5	15	49.7	1	47.3	..	..	..	..
48th	60	39.1	78	39.2	8	50.3	19	39.6	5	41.2	15	41.1	3	49.6	..	..	..	..
49th	61	37.6	104	35.3	8	37.9	16	39.0	0	39.8	12	39.8	3	39.0	..	..	..	..
50th	44	46.8	106	34.3	5	43.9	26	43.5	1	36.8	26	44.1	3	41.5	..	..	..	..
51st	82	38.9	90	36.4	5	48.0	38	49.0	3	36.6	26	40.5	0	43.7	..	..	..	..
52nd	110	32.5	97	29.8	10	41.9	36	36.5	2	33.9	25	34.6	0	41.2	..	..	..	..

In this rather hasty sketch of the epidemic of small-pox in London, I have not gone at length into the weekly variations of the number of deaths, but the Table shows these well, as also their relation to variations in temperature; and I would, therefore, merely call the attention of my hearers to that Table, in the hope that they will follow up this interesting inquiry for themselves.

LIVERPOOL.—Dr. Trench, in his admirable Report on the Health of Liverpool during the year 1871, observes: “During the first seven months of 1870 (from January 1st to July 30th) there had not been a single death from small-pox recorded in the Borough; but on the 30th July, and 8th August, there died in the Netherfield Road Hospital, from a severe and confluent form of the disease, two Spanish sailors. These men were natives of Galicia, where the small-pox was raging at the time of their leaving.” He adds, further on: “These two deaths were apparently the commencement of an epidemic which, during its course, numbered 2,093 fatal cases—174 in 1870, and 1,919 in 1871.”

For thirteen weeks after the first deaths, the mean weekly number of

* Concluded from p. 718 of last number.

deaths was only one. "Yes," an objector to the 'temperature theory' will say, "but the disease required fully three months to obtain a footing in the city after its importation from abroad." As a matter of fact, however, Liverpool had been exposed to contagion through the navigation for many months before the first death occurred; for of nine non-fatal cases of small-pox admitted to the Netherfield Road Hospital in the first six months, three were foreign emigrants and three were seamen: the remaining three were attacked while in Liverpool (two work-house tramps and a little girl resident in the town). In the forty-third week the deaths rose 3, three weeks subsequent to a fall of temperature amounting to 5 deg.—namely, from 55.9 to 50.7 deg. When the weather became ten degrees colder the deaths rapidly increased, until in the third week of 1871 they suddenly ran up to 65. This was just three weeks after the severe frost of the last ten days of 1870. The next period of intense cold, in the fourth week of the year, was followed, at an interval of between three and four weeks, by the acme of the epidemic—234 deaths being caused by small-pox in the seventh and eighth weeks. The disease now declined, the most remarkable diminutions in the number of deaths occurring in the eighteenth week, subsequently to a rise of temperature from 42.7 to 47.8 deg.; in the twenty-fourth week, after a rise of temperature from 48.4 to 55.1 deg.; and in the thirtieth week, after a rise of temperature from 57.9 to 59.4 deg. The check to the disappearance of the disease given by the winter cold is well shown by an analysis of the quarterly returns of deaths in 1872. In the last quarter (thirteen weeks) of 1871, small-pox caused 28 deaths in the borough of Liverpool; the number of deaths in each quarter of 1872 was 24, 16, 4, and 6 respectively. Here the very gradual fall from 28 to 24, and again to 16 (in the winter and spring), contrasts strongly with the more rapid fall from 16 to 4 in the summer; while in the autumn even a slight rise, from 4 to 6, is noticed. Is it not evident from these figures that the winter cold acted as a drag on the decline of the epidemic in the early months of 1872? that the summer heat then encouraged that decline, which was once more checked to some extent by the returning winter of 1872-73?

DUBLIN.—The first point which strikes the inquirer into the statistics of the late epidemic, as it affected the Irish metropolis, is the postponement of the outbreak in that city to a full year after it had commenced to rage in a place even so near as Liverpool, separated by only a "streak of silver sea". Indeed, the acme of the epidemic had already been reached and passed in Liverpool before a single death from small-pox had been registered in Dublin.

In the Registrar-General's (for Ireland) *Weekly Return of Births and Deaths* in Dublin for February 18th, 1871, the Deputy-Registrar of No. 3 North City District reported that small-pox had broken out in a family living in Temple Street West. A week later, he reported a fresh focus of the disease at Constitution Hill. On March 11th, a girl, aged 16, who had come from Wales ill, died of small pox in Cork Street Fever Hospital. This was the beginning of the epidemic, which made no head, however, for nearly seven months, notwithstanding that deaths of cases imported from England were registered on April 22nd, June 3rd, June 10th, and August 19th. In the thirty-seventh week of the year, the period of abeyance of the epidemic drew to a close while the temperature was still high; but the first pronounced outburst of the disease occurred ten weeks later, three weeks after the mean temperature had finally fallen below 50 deg. But before this, a rise in the number of deaths to 14, consequent on a three weeks' depression of temperature below 50 deg., was followed by a decline in the mortality after a rise of mean temperature to 53 deg. in the third week of October. The second great development of the epidemic begins at the end of December, three weeks after a period of severe cold, the temperature of the forty-ninth week having been only 34.6 deg. It is necessary to remark that very serious delays in registration occasionally occurred during the epidemic period, and these have rendered the task of analysis of the statistics of mortality one of no inconsiderable difficulty. To give one example of this: the large number of deaths from small-pox registered in the second week of 1872 (63) includes 36 deaths which had only then been registered, although they had occurred in the South Dublin Union Workhouse at intervals since December 17th, 1871.

In a lecture on "Meteorology in its bearing upon Health and Disease", which I recently had the honour of delivering before the Royal Dublin Society, I illustrated an analysis of the late epidemic in Dublin by means of a diagram, giving the weekly death-curve from small-pox, and the meteorological curves for the epidemic period. In that lecture I described the subsequent course of the epidemic after January 1872 in the following words:

"Towards the end of February, a slight decrease in the deaths appears to be connected with the mild temperature of that month. The peaks and depressions which follow are largely accounted for by irregular registration; but the greatest severity of the epidemic was experienced in the first half of April, a short time after a period of cold, which was very intense for the time of year, snow and hail having fallen in large quantities (with keen north-easterly winds) on every day from the 21st to the 27th of March. The mean temperature of this period was scarcely 37 deg., or nearly eight degrees below the average. The number of deaths now began to decline, the mean temperature in two weeks (April 13th and May 4th) rising above 50 deg. The depression in the death-curve in the week ending June 1st, and the great rise in the following week, depend on irregular registration. With the rise of mean temperature to between 55 and 60 deg. in the middle of June, the weekly number of deaths falls permanently below 30 early in July.

"It is interesting to note that abundant rainfalls seemed to be followed by remissions in the severity of the epidemic. A reference to the diagram will show this very clearly; and the converse also, for the acme of the epidemic closely followed a period of comparatively dry weather and lower humidity."

So far, I have followed the weekly returns of deaths in Dublin, published by the Registrar-General; but, recognising the possibly fallacious character of conclusions drawn from an analysis of "bills of mortality," the value of which was detracted from by irregularities in registration, I have thought it desirable to fall back upon a more reliable gauge of the intensity of an epidemic, namely, the rate of admissions to a special hospital of cases of the epidemic disease.

In Table III, statistics of this kind have been compiled. I may mention that, when the approach of an epidemic of small-pox to Dublin became more than a matter of contingency, the committee of Cork Street Hospital resolved to perform their duty to the city and to those stricken by this loathsome disease, to the best of their ability. Accordingly, they at once set apart an isolated building, known as the old Fever Hospital, for the reception of small-pox patients. In this building, accommodation was provided for between fifty and sixty patients, each ward containing three beds. By referring to column 2 in Table III,

TABLE III.—*Showing the Admissions of Small-pox Patients per month into Cork Street Hospital during the Years 1871-72-73, compared with the Meteorological conditions during the same period.*

—	Admissions.	METEOROLOGICAL CONDITIONS.						
		Mean Bar.	Mean Temp.	Mean Dry B.	Mean Wet B.	Mean Humid.	Rain-fall.	Rainy Days.
I	2	3	4	5	6	7	8	9
1871.		Inches.	Deg.	Deg.	Deg.	Per cent	Inches.	
February ..	1	29.847	45.3	47.0	44.7	83.3	1.648	16
March ..	1	29.908	45.6	47.5	44.4	78.8	0.815	12
April ..	7	29.795	48.7	50.5	47.6	81.2	3.162	20
May ..	5	30.065	52.6	55.8	51.4	73.5	0.378	9
June ..	7	29.924	56.0	58.3	54.4	77.0	2.265	16
July ..	1	29.734	59.2	61.1	57.2	77.8	4.291	28
August ..	4	29.951	60.8	63.1	59.2	78.0	10.05	12
September ..	8	29.887	53.6	55.2	52.2	81.0	4.048	13
October ..	41	29.129	50.7	52.3	49.9	83.5	2.917	16
November ..	59	29.986	42.6	43.7	41.5	83.3	1.258	13
December ..	78	30.603	41.4	42.2	39.9	82.1	0.797	15
1872.								
January ..	81	29.405	41.6	42.4	40.4	84.5	2.864	23
February ..	90	29.610	45.2	46.0	43.9	84.2	2.557	20
March ..	97	29.698	45.1	46.3	43.7	80.7	2.419	21
April ..	65	29.914	47.3	49.2	45.3	74.0	2.655	12
May ..	59	29.919	49.3	51.1	47.1	74.0	2.164	22
June ..	64	29.825	55.2	57.5	53.5	76.0	3.276	19
July ..	34	29.926	61.2	63.4	58.4	72.1	1.098	12
August ..	16	29.967	58.9	60.7	56.7	76.8	4.302	17
September ..	7	29.801	54.8	56.2	53.2	80.7	2.464	22
October ..	7	29.560	46.5	47.9	45.4	81.8	3.421	22
November ..	3	29.578	43.6	44.9	42.5	82.1	3.414	24
December ..	8	29.464	41.4	42.5	40.8	86.5	4.932	24
1873.								
January ..	2	29.550	42.2	42.9	40.7	83.0	2.650	21
February ..	1	30.160	37.1	38.4	36.0	79.8	0.925	8
March ..	—	29.792	42.0	43.4	40.9	80.7	2.391	22
Total ..	746							

The meteorological data given in columns 3, 5, 6, and 7, are the results of observations taken daily at 9 A.M., 3 P.M., and 9 P.M. The mean temperature given in column 5 is deduced from the daily maximal and minimal temperatures in the shade. The rainfall is the monthly total of daily readings taken at 9 A.M., and a "rainy day" is one on which at least 0.1 of an inch of rain is collected within twenty-four hours. The barometer readings are corrected and reduced to 32 deg. at mean sea level.

The number of admissions per month to this special and isolated hospital will be seen. The decided epidemic tendency observable in the months of April, May, and June, 1871, gave way before the increasing summer heat; but, with the rapidly falling temperature of September, the number of admissions once more commenced to rise. In October, the mean temperature fell below 50 degs., and the admissions rose to 41

from 8 in September. This increase went on until the month of March, 1872, when the maximum (97 admissions) was reached. March was, indeed, a little colder than February; and I have already mentioned the intense cold (for the time of year) which characterised the latter portion of the former month. In April, the admissions rapidly declined; in May they remained almost stationary, and in June even a slight increase in this number is noticed. This anomaly, I cannot but think, was connected with the persistently low mean temperature, coupled with the diminished humidity of the three weeks dating from the 5th of May. The mean temperature of the week ending the 5th of May, 1872, was 53.4 degs.; of the following three weeks it was 46.6 degs., 47.6 degs., and 46.4 degs. respectively. The temperature then increased to 53.7 degs. in the week ending June 1st; but, in the next week, it again fell to 51 degs. From June, the admissions fell uninterruptedly to 7 in September. A check in their fall is now observable, and, from November to December, even a slight increase in their number occurred. The epidemic was now virtually at an end, and, in March, 1873, not one small-pox patient was admitted to the wards, which were soon afterwards closed.

It now remains merely to inquire into the probable causes of this seasonal prevalence of small-pox. It is to be regretted that but little can be said upon this subject in the present state of our knowledge. One cause I have already mentioned, namely, the overcrowding of the poor in winter. Another is the lowering of the vital powers of the population in the cold season, and the consequently increased receptivity of and liability to infectious disease. But there must be something beyond all this, for these causes operate in the case of other infectious diseases also which do not attain their maximal degree of prevalence in winter. Thus, measles is most prevalent in early summer, scarlatina in autumn, and so on. A possible cause of the diminution of small-pox in early summer may be sought for in the influence of the leafing and flowering season upon the atmosphere. But this explanation has its shortcomings also, and is inadequate in its application to the disease we are considering. Theory, no doubt, is useful when kept within proper bounds; but to theorise on such a subject would be unprofitable, and we must wait, trusting that, with the advance of our knowledge of disease, further light will ultimately be shed upon this interesting question.

NOTES ON A NEW PERIMETER.*

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THE introduction of a new instrument to the profession, like that of a new work, seems always to demand an apology from the author. I trust, however, that my readers may find such points of merit and novelty in the description I am going to lay before them, as will redeem me from the feeling of having uselessly trespassed upon their time and the valuable columns of this JOURNAL.

Many, like myself, must have felt the difficulty and want of taking an accurate chart of the field of vision with rapidity; and this want has led to the development of many instruments and devices. No one of these performs, to my mind, what is required of them rapidly and efficiently; and, for clinical purposes, it is highly essential that these two qualities should be combined. Thus, in hospital practice, most surgeons continue the old custom of making the patient fix his eye upon their own, and then rapidly moving the fingers in the different parts of the field of vision. No doubt this practice (which cannot be registered, and must leave but a doubtful impression on the mind of the surgeon) is continued on account of the facility and rapidity with which it is carried out, and also because, up to the present time, no instrument has been devised the use of which does not take up more time than can well be spared, except under special circumstances.

The instrument which I have devised, and which is represented in Fig. 1, enables the operator to map out the field of vision with as great rapidity as, perhaps greater than, it could be done according to the old method described above, and which is in general vogue. With its help, the greatest accuracy can be obtained; and, if necessary, the limits of the field can be immediately transferred to a chart, and kept for future reference. But it not only fulfils the duties of a perimeter in an ordinary sense; it will also test the field of vision for colours, transmitted or spectral; and, by a very simple addition, it can be made to indicate the presence of astigmatism, and show the meridian in which this exists, if present. Some other indications it can fulfil, which I shall speak of by and by, as they will be more readily understood when the instrument has been fully described.

* Called a Photo-perimeter.

The perimeter is a hollow hemisphere of light metal (zinc or copper), hammered out with great accuracy, its diameter being twenty-four inches. The concavity of the hemisphere is painted white, and divided into degrees of latitude and longitude. The meridians of longitude commence at the pole, and between each is a space equal to

Fig. 1 represents a front view of the Perimeter, with the chin-rest and mirror *in situ*.

Fig. 2.—a. The Diaphragm, containing various sized apertures. b. The Colour-Discs: these are attached behind the Perimeter, and are drawn in Fig. 1 with dotted lines.

15 deg. The parallels of latitude encircle the pole; the first being at 10 deg. from it, and each successive one placed at an interval of 10 deg. The pole itself is occupied by a circular opening about three-quarters of an inch in diameter, the purpose of which will be shortly explained, as will also some further markings on the surface of the perimeter.

In order to measure the field of vision, it is necessary, whatever the instrument employed, to have a fixation-point, and an object which can be made to travel over the parts of the retina which do not occupy the fixation-point. In the instrument which I am describing, these two indications are fulfilled in the following manner. A gas-lamp upon a movable upright stand is so adjusted behind the perimeter, that the rays from it pass through the aperture which occupies the pole of the

Fig. 3 shows the patient in position for taking the field. The position of the mirror is not quite exact: it should be nearer and more to the side of the eye.

hemisphere in a diverging beam. These rays fall upon the mirror, which is (as seen in Fig. 3) attached by a rod to the chin-rest; and this mirror, being ground to a focus of a little less than twelve inches, will form a small and bright dispersion-circle upon the surface of the peri-