nominated by universities for appointment as jurors, to receive instructions and commands from legislators who are not professional men as to what they must do in the treatment of purely scientific questions, or as to how they must proceed in a strictly scientific investigation. These specialists will certainly make use of the most exact methods, because this is their usual habit of work; the methods recommended by the bill are not in themselves sufficiently accurate, and can not be made so except by the hands of experts and by making use of necessary modifications.

Furthermore, I am of the opinion that the discovery of the correct physical basis can never be attained by a competition of this kind. This basis will never be discovered by means of experiments in predictions, which are for the most part matters of personal judgment, but only through long continued, rigidly exact, genuine research, with the aid of physical methods, by men equipped with a complete knowledge of physical, meteorological, and mathematical sciences. This is, without doubt, one of the most difficult and complex of all the problems of physics and, therefore, it can only be by means of the devotion of the most profound erudition and many years of research, combined with occasional strokes of genius, that ultimately, if ever, it will be granted to mankind to solve the problem of weather forecasting. Work, hard and thorough work for many, many years, and not a game of chance in experimental predictions, is what is required in this matter.

The method prescribed in the bill is, therefore, already quite hopeless, because it tacitly assumes that some one now living is in possession of the correct physical principles, for it is only in this case that the bill will, by the methods that it proposes, lead to the knowledge of these principles. Ordinarily, I do not like to express myself in an apodistic manner, but in this case I do not hesitate to declare that it is absolutely sure and certain that, at the present time, no human being is in possession of the knowledge of the true physical basis for weather predictions. You will say, "This is true, but if one were only in partial possession of only one of the principles that would already be an advantage." That is true, but certainly one does not need to pay such a high price for this, for all that can be accomplished by a partial knowledge of true physical principles is now being done by the meteorological institutions; and it is certain that no one knows of a single principle of importance more than those known to the experts of these institutions, who, in their predictions, certainly make use of all principles now known, as I have already demonstrated in my lecture. It therefore seems to me certain that competition, as shown by the bill, must remain entirely fruitless.

I would, however, strongly indorse a bill authorizing the devotion of $150,000 to the prosecution of accurate, extensive investigations covering the whole subject of the improvement of weather predictions. There might be some men—let us with the present bill say three men—whom we could secure men of perfect professional education (perhaps *one*, with a sufficient number of assistants, might suffice). They should, if possible, be men of considerable reputation in meteorology, to whom the one sole duty should be assigned of investigating the true principles of weather forecasting; who should, among other things, subject the following relations to the most thorough and detailed investigation: (1.) The connection between the weather and atmospheric pressure, (2) the conditions, manner, and causes of the transition from one style of distribution of atmospheric pressure to another, from day to day, as well as for longer periods; (3) the connection of the solar and other cosmic processes with the terrestrial and especially the meteorological phenomena. The predestinate and, undoubtedly, the most suitable institution for this purpose is the United States Weather Bureau. By this means, the $150,000 will most assuredly be expended in the manner most profitable to weather forecasting and the predictions will, without doubt, make notable progress.

If, on the other hand, we follow the plan proposed by the bill, the $150,000 will certainly be saved to the treasury, since it will never be possible to award the prize to anyone. The three jurors will be uselessly tormented and disturbed, and hindered in their own scientific investigations; and they will have to be paid $10,000 without having discovered a prize winner, if the jurors are honorable, strict specialists.

I have replied to your questions technically, and with a sincere love of the truth, such as is to the scientist the only justification of his activity. Unfortunately, your views concerning this bill do not apparently agree with mine. I hope, however, that mature reflection will lead you to concur in my conclusions.

With the highest regard, I remain, very respectfully,

(Signed) J. M. PERNTER.

RELATION OF PRECIPITATION TO YIELD OF CORN.

By J. WARREN SMITH, Section Director, Weather Bureau, assisted by WILLIAM D. GIBBS, President of the New Hampshire State College.

[Summary of an article prepared for the Year Book of the U. S. Department of Agriculture, for 1903.]

All cultivators of the soil recognize the important relation between precipitation and crop yield. Johnson said in 1870, How Crops Feed, p. 216 :

> It is a well recognized fact that next to temperature the water supply is the most influential factor in the production of a crop.

Yet we believe that few people have any appreciation of the effect of an abundant water supply upon the ultimate yield of crops. Whitney says, Bulletin No. 22, Bureau of Soils, p. 63:

> On the average farm the great controlling factor in the yield of crops is not the amount of plant food in the soil, but is a physical factor, the exact nature of which is yet to be determined.

Later, on same page, he says :

> The results of these investigations also seem to indicate that the actual quantity of water a soil can furnish the plant, irrespective of the percentage of water actually present in the soil, has probably a very important influence on the yield.

It is self-evident that to have water furnished to the plants in any soil in sufficient quantities there must be an abundant supply available, either through actual rainfall or by irrigation. So that, other things being equal, the results of the investigations of the Bureau of Soils seem to agree with the results of experience, viz : Heavy rainfall, large yields; light rainfall, light yields. Moreover, in a latitude and at an elevation favorable for the production of crops, precipitation is more important than temperature in its effect upon the yield.

It was with something of this thought in mind that the writer of this article began the preparation of the accompanying diagrams. Yet he was not prepared for the remarkable confirmation of the theory, or the close relation between the yield of corn and the precipitation in certain definite short periods during the growth of the crop.

Inasmuch as the greater part of the corn produced in the United States is grown in the central part of the country we have considered only the following States : Ohio, Indiana, Illinois, Iowa, Nebraska, Kansas, Missouri, and Kentucky.

As the area of greatest corn production does not include all of Ohio, Kentucky, Kansas, or Nebraska, we probably should have considered only the western part of Ohio and Kentucky and the eastern parts of Nebraska and Kansas for both yield and rainfall. (Quite likely Kentucky should have been left out of the discussion altogether.) We were anxious, however, to include all the principal corn producing districts, and the data were more readily available by States than by counties.

It is not practicable to reproduce all the original diagrams in this article; hence, the three most important have been selected.

Fig. 1. The solid line shows the average yield of corn in bushels per acre for the States of Ohio, Indiana, Illinois, Iowa, Nebraska, Kansas, Missouri, and Kentucky, for each year from 1888 to 1903, inclusive. The dotted line indicates the average precipitation in inches for the months of June, July, and August over these States and for the respective years. The heavy horizontal line indicates the normal for the sixteen years, for both yield and rainfall. The charts in the Year Book cover only up to and including 1902, but it will be noticed that these include 1903.

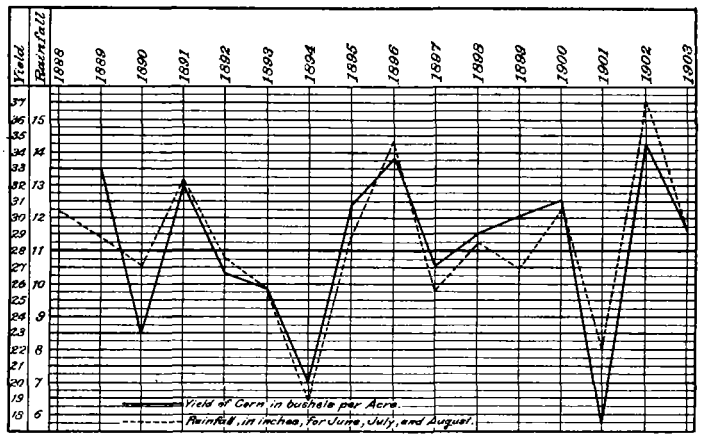

FIG. 1. Rainfall for June, July, and August, and yield of corn per acre.

Fig. 2. The solid line shows the yield of corn per acre as in fig. 1. The dotted line indicates the average precipitation, in inches, over the same States during the month of July.

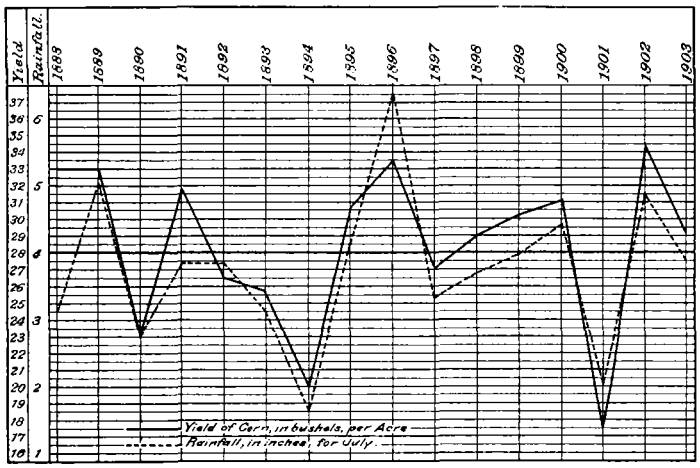

FIG. 2. Rainfall for July and yield of corn per acre.

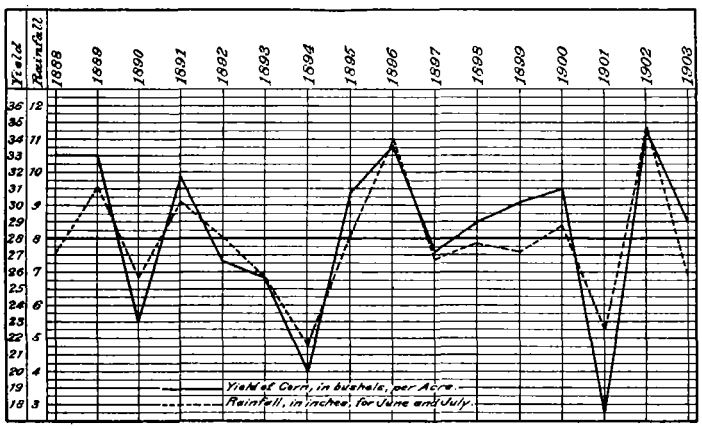

FIG. 3. Rainfall for June and July, and yield of corn per acre.

Fig. 3. The solid line shows the yield of corn per acre as in the two preceding figures. The short dash line indicates the precipitation, in inches, over the district under discussion during June and July.

Fig. 1 shows conclusively that whenever the rainfall for the summer months departs very much from the normal, the yield of corn per acre will also depart from the normal in a marked degree whenever the district considered is so extensive that effects of unusual local conditions are obliterated. Curves for each individual State do not coincide as closely as do these showing the averages for the eight States.

It is true that there are some apparent anomalies. For example, the rainfall in 1902 is much in excess of that for 1896, while the average yield per acre is only slightly in excess. An inspection of fig. 2, however, shows a very much greater rainfall in July, 1896, than in July, 1902. It will be noticed also that while the yield was the lowest on record in 1901, the precipitation for the summer was not so small as in 1894. A study of individual State yields shows that the yield was particularly low in 1894 only in the Western States, and was but little below normal in the central and eastern corn States. In 1901, on the other hand, the yield was low in every State. It was the lowest in the period under discussion in Indiana, Illinois, Kansas, Missouri, and Kentucky. The rainfall during July of 1901 was everywhere below normal, the least rainfall being in Indiana, Illinois, and Missouri, where the yields were the least. In 1890 the yield was very low, while the precipitation for the summer was but little below the normal. This anomaly is partly due to the inclusion in the computation of some areas with only a small acreage in corn. For example, the yield in Ohio was the least in sixteen years, although the rainfall for the State was about normal. The average rainfall for Ohio for the month of July, however, was considerably below the normal, while in the western counties, where the most of the corn is grown, there was a severe drought. Many stations in the western part of the State reported the least rainfall of any July on record. At Dayton, Montgomery County, the total rainfall for July, 1890, was only 0.28 inch; at Waynesville, Warren County, 0.48 inch; at North Lewisburg, Champaign County, 0.30 inch; Wauseon, Fulton County, 0.48 inch; and at Greenville, Darke County, one of the largest corn producing counties in the State, it was only 0.07 inch.

Fig. 2 shows a most striking result. It indicates that if one knows the precipitation for the month of July alone over the great corn growing district of the United States, the yield can be estimated very closely. There are anomalies to be sure, but practically all of them can be explained by knowing the June weather conditions and the distribution of the July rainfall. As to 1888, we are not sure that the statistics of yield were collected with the accuracy that has been exercised since. In 1891, when the yield for the district was considerably above the normal with the precipitation slightly below, there was a large June rainfall. There was a large yield in Nebraska and a moderately large yield in Kansas, Kentucky, and Iowa, which would increase the average yield for the district. The precipitation during July, 1896, was the largest during the period, though the yield was not so great as in 1902. An examination of the meteorological records for July, 1896, shows that excessive showers, which injured rather than benefited corn, fell in Ohio, across the northern part of the district, while damage was done by drought in southern Missouri; the yield was slightly below the normal in Missouri, and was only slightly above in Indiana and Kentucky. In 1902 the yield was the highest during the period, while the rainfall for July was less than in 1889 or 1896. The rainfall in June, 1902, however, was far above that of any other June, and with the abundant and well distributed rainfall of July produced the heavy yield.

Fig. 3 shows that if we combine the precipitation for June and July, as has been done in this chart, we have a curve of rainfall that follows the curve of yield even more closely than the July rainfall alone, as might be expected, particularly in 1891 and 1896. It will be noticed that the lowest yield occurred in 1901, when the rainfall for June and July was 2.50 inches below the normal, whereas the next lowest yield was in 1894, when the rainfall for June and July was 3.25 inches below the normal. A study of individual States shows that the yield in 1894 was particularly low only in the Western States, while it was but slightly below the normal in the Eastern States. The meteorological records show a severe drought during both summers, but in 1894 it extended later into August, while in 1901 it began somewhat earlier in June. Higher temperatures accompanied the drought in 1901, intensifying its influence and helping to force the yield lower than in 1894.

We are of the opinion that a more detailed study of the yield of corn by counties, and the distribution of the rainfall, both geographically and daily, will show an even closer relation between the yield of corn and the rainfall for a comparatively short period during the summer.

We believe also that a more complete study of this whole subject will show that there are comparatively short periods during the growth of practically every crop when favorable weather will insure a large crop and unfavorable weather will cause a small crop.

INVARIABILITY OF OUR WINTER CLIMATE.

By WM. B. STOCKMAN, District Forecaster, in charge of Division of Meteorological Records, dated June 24, 1904.

In order to comply with the request of a correspondent asking whether the winters are becoming less rigorous than formerly, it was recently necessary to compile temperature data covering a considerable period of years at a number of selected stations, so distributed as to show the general conditions obtaining over the country generally east of the Mississippi Valley. In this section only could records of the necessary length be obtained.

TABLE 1.

Station.	Average of 50 winters, 1854-55 to 1903-4.	Mean of first 25 winters, 1854-55 to 1878-79.	Departure from average of 50 winters.	Mean of second 25 winters, 1879-80 to 1903-4.	Departure from average of 50 winters.
Fort Snelling, Minn.	13.4	12.9	— 0.5	13.8	+ 0.4
Fort Leavenworth, Kans.	29.3	29.1	— 0.2	29.6	+ 0.3
New Orleans, La.	55.4	55.2	— 0.2	55.5	+ 0.1
St. Louis, Mo.	33.5	33.5	0.0	33.5	0.0
Chicago, Ill.	25.2	25.0	— 0.2	25.5	+ 0.3
Cincinnati, Ohio	34.4	34.8	+ 0.4	34.0	— 0.4
Cleveland, Ohio	28.2	28.2	0.0	28.2	0.0
New Bedford, Mass	29.3	29.1	— 0.2	29.5	+ 0.2
Washington, D. C.	34.5	34.2	— 0.3	34.9	+ 0.4
Charleston, S. C.	51.2	51.1	— 0.1	51.3	+ 0.1

I believe these data and tables will be of interest to our officials and perhaps of value in enabling them to readily answer the various questions bearing on that subject so often asked by newspaper men and others.

TABLE 2.—*Mean monthly and winter temperatures.*

Year.	Fort Snelling, Minn.					Fort Leavenworth, Kans.					New Orleans, La.					St. Louis, Mo.					Chicago, Ill.					Year.
	Dec.	Jan.	Feb.	Mean	Dept.	Dec.	Jan.	Feb.	Mean	Dept.	Dec.	Jan.	Feb.	Mean	Dept.	Dec.	Jan.	Feb.	Mean	Dept.	Dec.	Jan.	Feb.	Mean	Dept.	
1854-55	20.6	17.1	12.6	16.8	+ 3.4	34.4	28.1	38.2	33.6	+ 4.3	52.4	55.1	50.3	52.6	—2.8	35.6	32.1	28.0	31.9	—1.6	28.0	26.0	18.0	24.0	— 1.2	1854-55
1855-56	9.5	6.1	11.7	9.1	— 4.3	23.4	10.1	24.6	19.4	— 9.9	55.1	43.0	54.8	51.0	—4.4	30.7	18.4	25.0	24.7	—8.8	22.0	13.0	17.0	17.3	— 7.9	1855-56
1856-57	8.8	—2.5	16.4	7.6	— 5.8	22.5	12.1	33.2	22.6	— 6.7	54.2	51.6	66.3	57.4	+2.0	29.3	19.0	41.6	30.0	—3.5	18.4	10.7	30.6	19.9	— 5.3	1856-57
1857-58	25.4	18.0	7.6	17.0	+ 3.6	39.2	40.1	25.6	35.0	+ 5.7	58.5	60.4	56.5	58.5	+3.1	40.2	40.2	27.0	35.8	+2.3	31.4	33.0	19.0	27.8	+ 2.6	1857-58
1858-59	12.0	7.8	14.2	11.3	— 2.1	31.9	32.6	32.5	32.3	+ 3.0	62.0	53.9	63.7	59.9	+4.5	38.0	33.1	37.2	36.1	+2.6	28.0	27.0	29.0	28.0	+ 2.8	1858-59
1859-60	0.5	9.8	14.2	8.2	— 5.2	18.9	29.6	35.2	27.9	— 1.4	53.2	55.1	59.6	56.0	+0.6	34.2	32.7	36.8	34.6	+1.1	15.7	18.1	26.8	20.2	— 5.0	1859-60
1860-61	10.0	7.7	15.5	11.1	— 2.3	26.2	22.7	33.7	27.5	— 1.8	55.4	54.0	62.2	57.2	+1.8	31.3	32.4	40.4	34.7	+1.2	20.5	21.9	29.4	23.9	— 1.3	1860-61
1861-62	15.9	2.1	1.9	6.6	— 6.8	35.4	20.2	24.1	26.6	— 2.7	.....	.....	.....	.....	.....	39.6	29.7	30.2	33.2	—0.3	28.4	18.2	20.9	22.5	— 2.7	1861-62
1862-63	17.4	14.4	11.7	14.5	+ 1.1	41.0	34.9	29.7	35.2	+ 5.9	.....	.....	.....	.....	.....	41.2	37.4	35.6	38.1	+4.6	30.3	33.5	20.6	28.1	+ 2.9	1862-63
1863-64	17.9	11.4	20.0	16.4	+ 3.0	28.8	25.0	34.3	29.4	+ 0.1	.....	.....	.....	.....	.....	35.7	29.1	37.8	34.2	+0.7	26.3	16.2	23.6	22.0	— 3.2	1863-64
1864-65	6.4	9.7	19.1	11.7	— 1.7	20.2	25.4	34.3	26.6	— 2.7	.....	.....	.....	.....	.....	30.0	28.4	37.8	32.1	—1.4	17.8	17.2	26.0	20.3	— 4.9	1864-65
1865.66	7.1	8.2	5.9	7.1	— 6.3	22.6	26.3	29.0	26.0	— 3.3	.....	.....	.....	.....	.....	31.2	32.6	33.2	32.3	—1.2	20.2	17.7	17.9	18.6	— 6.6	1865-66
1866-67	10.0	13.2	18.0	13.7	+ 0.3	28.1	21.0	32.3	27.1	— 2.2	.....	.....	.....	.....	.....	33.7	25.9	39.7	33.1	—0.4	25.8	19.9	30.8	25.5	+ 0.3	1866-67
1867-68	16.1	4.2	13.9	11.4	— 2.0	34.6	19.6	32.2	28.8	— 0.5	.....	.....	.....	.....	.....	35.7	25.8	34.7	32.1	—1.4	28.8	17.9	24.7	23.8	— 1.4	1867-68
1868-69	15.5	18.2	19.4	17.7	+ 4.3	26.4	33.8	32.9	31.0	+ 1.7	.....	.....	.....	.....	.....	28.9	38.7	37.1	34.9	+1.4	22.6	31.2	29.3	27.7	+ 2.5	1868-69
1869-70	19.5	12.6	17.0	16.4	+ 3.0	26.4	29.1	35.1	30.2	+ 0.9	49.0	54.6	54.8	52.8	—2.6	33.1	33.6	36.1	34.3	+0.8	28.6	25.9	27.5	27.3	+ 2.1	1869-70
1870-71	19.6	13.1	20.2	17.6	+ 4.2	28.6	30.4	38.2	32.4	+ 3.1	*47.8	53.6	60.5	54.0	—1.4	31.0	*37.7	39.9	36.2	+2.7	27.1	30.9	30.2	29.4	+ 4.2	1870-71
1871-72	7.7	13.8	18.4	13.3	— 0.1	24.1	24.7	30.9	26.6	— 2.7	55.5	48.1	55.3	53.0	—2.4	30.2	28.3	32.2	30.2	—3.3	20.0	23.0	25.5	22.8	— 2.4	1871-72
1872-73	3.9	4.4	11.0	6.4	— 7.0	21.0	18.7	29.7	23.1	— 6.2	51.1	49.3	60.3	53.6	—1.8	25.3	25.7	33.6	28.2	—5.3	19.0	20.4	24.1	21.2	— 4.0	1872-73
1873-74	17.2	12.2	13.0	14.1	+ 0.7	31.5	28.5	28.9	29.6	+ 0.3	56.5	55.8	58.9	57.1	+1.7	37.1	35.2	36.1	36.1	+2.6	32.0	28.9	31.4	30.8	+ 5.6	1873-74
1874-75	17.7	—4.4	—2.1	3.7	— 9.7	32.6	15.1	20.5	22.7	— 6.6	58.6	54.3	55.8	56.2	+0.8	37.5	23.9	26.0	29.1	—4.4	33.5	17.9	14.7	22.0	— 3.2	1874-75
1875-76	25.4	17.1	11.7	18.1	+ 4.7	39.9	35.9	38.3	38.0	+ 8.7	61.6	60.3	59.0	60.3	+4.9	43.4	41.5	40.8	41.9	+8.4	36.8	33.0	31.8	33.9	+ 8.7	1875-76
1876-77	6.6	6.9	30.8	14.8	+ 1.4	23.3	23.9	39.5	28.9	— 0.4	47.9	53.5	55.6	52.3	—3.1	24.9	31.3	41.5	32.6	—0.9	20.0	21.9	36.4	26.1	+ 0.9	1876-77
1877-78	31.5	20.1	30.7	27.4	+14.0	44.1	33.9	40.0	39.3	+10.0	55.6	50.9	55.4	54.0	—1.4	47.9	35.8	41.1	41.6	+8.1	42.8	31.2	35.7	36.6	+11.4	1877-78
1878-79	15.4	11.6	8.2	11.7	— 1.7	23.2	23.6	32.8	26.5	— 2.8	50.8	53.1	55.8	53.2	—2.2	27.1	28.3	33.9	29.8	—3.7	23.7	21.4	27.4	24.2	— 1.0	1878-79
1879-80	8.0	22.4	19.4	16.6	+ 3.2	26.4	41.4	37.9	35.2	+ 5.9	59.5	63.0	60.4	61.0	+5.6	32.3	45.7	39.2	39.1	+5.6	30.3	40.1	34.6	35.0	+ 9.8	1879-80
1880-81	10.4	5.0	4.2	6.5	— 6.9	25.6	20.5	25.1	23.7	— 5.6	52.9	50.3	56.0	53.1	—2.3	27.1	21.7	30.3	26.4	—7.1	23.0	19.5	24.7	22.4	— 2.8	1880-81
1881-82	26.6	15.3	26.3	22.7	+ 9.3	40.2	32.4	42.0	38.2	+ 8.9	59.2	62.4	62.5	61.4	+6.0	40.8	32.1	43.9	38.9	+5.4	37.1	28.3	38.2	34.5	+ 9.3	1881-82
1882-83	11.6	—2.8	8.9	5.9	— 7.5	31.6	19.4	27.9	26.3	— 3.0	54.0	53.8	62.9	57.9	+2.5	32.3	23.2	31.3	28.9	—4.6	20.0	16.3	23.0	19.8	— 5.4	1882-83
1883-84	15.8	3.7	8.0	9.2	— 4.2	35.1	21.1	27.9	28.0	— 1.3	60.3	47.1	60.7	56.0	+0.6	39.5	25.8	35.5	33.6	+0.1	30.1	19.2	27.7	25.7	+ 0.5	1883-84
1884-85	8.9	—0.8	4.6	4.2	— 9.2	24.1	19.0	21.6	21.6	— 7.7	58.7	52.1	53.1	54.6	—0.8	32.8	26.0	27.0	28.6	—4.9	28.4	18.3	16.1	20.9	— 4.3	1884-85
1885-86	21.3	3.5	14.5	13.1	— 0.3	32.8	14.4	30.2	25.8	— 3.5	53.1	45.5	53.2	50.6	—4.8	38.9	24.8	35.1	32.9	—0.6	31.1	21.4	28.1	26.9	+ 1.7	1885-86
1886-87	7.3	—1.1	8.4	4.9	— 8.5	23.7	20.7	28.9	24.4	— 4.9	51.6	51.4	65.2	56.1	+0.7	29.8	30.8	40.6	33.7	+0.2	25.0	17.3	27.1	23.1	— 2.1	1886-87
1887-88	16.1	—2.3	10.5	8.1	— 5.3	27.2	16.3	31.4	25.0	— 4.3	52.9	55.6	58.6	55.7	+0.3	31.5	24.3	32.2	29.3	—4.2	28.1	15.1	23.0	22.1	— 3.1	1887-88
1888-89	25.4	18.3	5.9	16.5	+ 3.1	35.8	29.8	27.5	31.0	+ 1.7	53.8	53.4	53.4	53.5	—1.9	38.2	34.8	31.4	34.8	+1.3	32.2	29.0	19.9	27.0	+ 1.8	1888-89
1889-90	29.1	10.9	19.9	20.0	+ 6.6	45.3	28.1	32.3	35.2	+ 5.9	64.3	65.1	64.0	64.5	+9.1	49.8	39.2	40.2	43.1	+9.6	40.6	30.8	32.4	34.6	+ 9.4	1889-90
1890-91	21.7	19.6	8.7	16.7	+ 3.3	37.0	33.2	29.8	33.3	+ 4.0	56.4	53.2	62.6	57.4	+2.0	37.6	36.6	35.9	36.7	+3.2	30.6	30.2	28.6	29.8	+ 4.6	1890-91
1891-92	29.4	10.8	23.0	21.1	+ 7.7	39.3	23.9	36.4	33.2	+ 3.9	55.9	49.3	60.6	55.3	—0.1	42.8	25.9	40.0	36.2	+2.7	35.4	19.5	30.2	28.4	+ 3.2	1891-92
1892-93	14.8	3.2	9.1	9.0	— 4.4	26.0	21.8	26.6	24.8	— 4.5	55.8	50.2	61.2	55.7	+0.3	33.0	24.8	30.8	29.5	—4.0	23.4	12.0	21.5	19.0	— 6.2	1892-93
1893-94	12.4	10.2	14.2	12.3	— 1.1	35.4	29.6	27.2	30.7	+ 1.4	58.4	58.0	54.9	57.1	+1.7	36.4	35.5	32.4	34.8	+1.3	25.4	27.5	23.0	25.3	+ 0.1	1893-94
1894-95	27.0	6.0	10.7	14.6	+ 1.2	37.8	24.0	24.9	28.9	— 0.4	57.8	52.2	45.0	51.7	—3.7	38.8	26.2	25.1	30.0	—3.5	32.4	17.6	17.0	22.3	— 2.9	1894-95
1895-96	21.1	15.6	20.8	19.2	+ 5.8	32.6	31.4	35.8	33.3	+ 4.0	53.8	52.2	56.2	54.1	—1.3	37.0	35.0	36.8	36.3	+2.8	29.6	27.0	26.6	27.7	+ 2.5	1895-96
1896-97	23.3	9.4	18.6	17.1	+ 3.7	40.4	27.4	32.9	33.6	+ 4.3	54.6	51.1	58.0	54.6	—0.8	40.8	30.6	36.8	36.1	+2.6	32.9	21.8	28.6	27.8	+ 2.6	1896-97
1897-98	15.4	22.6	20.8	19.6	+ 6.2	28.0	32.4	35.4	31.9	+ 2.6	57.0	58.6	56.6	57.4	+2.0	32.8	37.3	38.4	36.2	+2.7	25.0	28.6	27.6	27.1	+ 1.9	1897-98
1898-99	13.3	13.7	7.6	11.5	— 1.9	27.4	30.9	19.4	25.9	— 3.4	50.8	53.2	49.4	51.1	—4.3	32.6	32.6	24.1	29.8	—3.7	24.3	23.0	17.9	21.7	— 3.5	1898-99
1899-00	21.2	21.1	8.4	16.9	+ 3.5	30.2	34.6	25.2	30.0	+ 0.7	54.6	52.2	53.4	53.4	—2.0	33.0	37.4	29.8	33.4	—0.1	27.2	28.7	20.1	25.3	+ 0.1	1899-00
1900-01	21.7	16.2	12.6	16.8	+ 3.4	35.8	34.7	26.7	32.4	+ 3.1	55.6	55.6	53.4	54.9	—0.5	38.0	37.2	31.0	35.4	+1.9	30.0	26.0	17.0	24.3	— 0.9	1900-01
1901-02	15.8	18.5	17.8	17.4	+ 4.0	28.4	30.8	23.4	27.5	— 1.8	52.0	53.4	50.2	51.9	—3.5	30.2	32.4	26.4	29.7	—3.8	24.0	25.2	20.8	23.3	— 1.9	1901-02
1902-03	15.9	15.0	15.0	15.3	+ 1.9	29.0	31.6	28.5	29.7	+ 0.4	54.0	52.0	56.4	54.1	—1.3	34.0	33.7	33.6	33.8	+0.3	26.5	24.0	25.0	25.2	0.0	1902-03
1903-04	12.9	7.6	6.2	8.9	— 4.5	31.9	26.8	29.0	29.2	— 0.1	52.2	51.4	60.3	54.6	—0.8	29.8	27.8	30.8	29.5	—4.0	20.0	17.7	17.2	18.3	— 6.9	1903-04
Av'rage	.....	.....	.....	13.4	.....	.....	.....	.....	29.3	.....	.....	.....	.....	55.4	.....	.....	.....	.....	33.5	.....	.....	.....	.....	25.2	.....	
Mean [1]	.....	.....	.....	12.9	— 0.5	.....	.....	.....	29.1	— 0.2	.....	.....	.....	55.2	—0.2	.....	.....	.....	33.5	0.0	.....	.....	.....	25.0	— 0.2	
Mean [2]	.....	.....	.....	13.8	+ 0.4	.....	.....	.....	29.6	+ 0.3	.....	.....	.....	55.5	+0.1	.....	.....	.....	33.5	0.0	.....	.....	.....	25.5	+ 0.3	