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Borough of Torquay.



ANNUAL REPORT

OF THE

MEDICAL OFFICER OF HEALTH,

Twelfth Report on the Sanatorium,

The Sanitary Inspector's Report,

SCHOOL ATTENDANCE OFFICER'S REPORT,

AND

Meteorological Report

FOR 1896.



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Borough of Torquay.

ANNUAL REPORT

OF THE

Medical Officer of Health

for 1896.

MR. MAYOR, ALDERMEN, AND COUNCILLORS,

I beg to submit my nineteenth Annual Report: viz., that for 1896.

BIRTH RATE. During the past year 476 births have taken place in the town, or a rate of 18·6 per 1,000.

DEATH RATE. The number of deaths registered is 437, or a rate of 17·3 per 1,000. Of these 37 occurred among visitors and strangers, and after deducting these, the rate for 1896 will be 15·2 per 1,000.

I beg to call your attention to the following tables of figures, which give the number of births and deaths for the nineteen years during which I have had the honour of being your Medical Officer of Health.

DATE.			BIRTHS.			DEATHS.
1878	...	...	642	...	...	401
1879	...	...	643	...	...	381
1880	...	...	629	...	...	430
1881	...	...	631	...	...	372
1882	...	...	610	...	...	363
1883	...	...	608	...	...	414
1884	...	...	561	...	...	385
1885	...	...	595	...	...	396
1886	...	...	520	...	...	412
1887	...	...	522	...	...	333
1888	...	...	523	...	...	408
1889	...	..	506	...	...	370
1890	...	...	516	...	...	429
1891	...	...	555	...	...	402
1892	...	...	534	...	...	420
1893	...	...	520	...	...	435
1894	...	...	497	...	...	410
1895	...	...	484	...	...	456
1896	...	...	476	...	...	437
			10,572		7,654	

Average for nineteen years :—Births, 556·4 ; Deaths, 402·8.

In 1878 the population might have been 24,600 ; the census of 1881 gave it as 24,760 ; and we are now calculating by the census of 1891, viz., 25,500. There must have been an increase since 1891, but I know of no reliable basis on which to calculate it. We are thus met by this curious fact, viz., that during nineteen years there has been a steady diminution in the number of births ; the past year has 80 less than the average, and 160 less than in 1878.

The column of deaths shows a very erratic variation, the lowest being 333 in 1887, and the highest 456 in 1895. The

difference between the number of births and deaths in 1878 showed a gain of 241 ; last year it was only 39. It is not that the death rate has increased out of proportion to the population, but that the birth rate has diminished.

This fact is confirmed by the figures of the School Attendance Officer. In 1885 there were 3,453 children attending the public schools of the town ; now there are only 3,205.

The causes of mortality will be seen from the following table :—

Death Rate for Torquay, as required by the Local Government Board for 1896.

NAME OF DISEASE			UNDER 5 YEARS.		OVER 5 YEARS.	
Small Pox	...	...	0	...	...	0
Scarlatina	...	...	1	...	...	0
Diphtheria	...	...	1	...	...	0
Membranous Croup	...	...	1	...	...	0
Typhus	...	...	0	...	...	0
Enteric	...	...	0	...	...	3
Continued	} Fevers	...	0	...	...	0
Relapsing		...	0	...	...	0
Puerperal		...	0	...	...	0
Cholera	...	...	0	...	...	0
Erysipelas	...	...	0	...	...	0
Measles	...	...	9	...	...	0
Whooping Cough	...	...	14	...	...	0
Diarrhoea and Dysentery	...	...	3	...	...	0
Rheumatic Fever	...	...	0	...	...	1
Ague	...	...	0	...	...	0
Phthisis	...	...	1	...	...	53
Bronchitis, Pneumonia, and						
Pleurisy	...	...	22	...	...	38
Heart Disease	...	...	1	...	...	48
Influenza	...	...	0	...	...	7
Injuries	...	...	3	...	...	12
All other Diseases	...	...	57	...	...	162
			113		324	

Total for 1896 437

These figures should be compared with those of previous years, as seen in the following table :—

CAUSES OF DEATH IN TORQUAY FOR TEN YEARS.

CAUSES.			'87	'88	'89	'90	'91	'92	'93	'94	'95	'96
Small Pox	...	...	0	0	0	0	0	0	0	0	0	0
Scarlatina	...	...	1	0	1	0	0	0	0	1	2	1
Diphtheria	...	...	0	0	0	0	2	0	1	1	1	1
Membranous Croup	...	...	0	0	1	1	2	1	2	1	1	1
Fevers	Typhus	...	0	0	0	0	0	0	0	0	0	0
	Enteric or Typhoid...	...	1	1	1	1	2	2	0	8	5	3
	Continued	...	0	0	0	0	0	0	0	0	0	0
	Relapsing	...	0	0	0	0	0	0	0	0	0	0
	Puerperal	...	0	0	1	0	0	0	0	0	0	0
Cholera	...	...	0	0	0	0	0	0	0	0	0	0
Erysipelas	...	...	3	1	0	0	1	0	0	0	0	0
Measles	...	...	0	12	2	1	3	8	0	0	16	9
Whooping Cough	...	...	2	1	0	16	0	2	8	4	1	14
Diarrhoea and Dysentery	...	...	3	1	3	1	1	3	2	3	2	3
Rheumatic Fever	...	...	1	3	1	0	4	1	1	0	1	1
Ague	...	...	0	0	0	0	0	0	0	0	0	0
Phthisis	...	...	52	64	52	67	67	60	70	71	73	54
Bronchitis, Pleurisy, and												
Pneumonia	...	...	38	52	51	63	53	6	64	72	79	60
Heart Disease	...	...	39	39	48	36	44	38	35	43	42	49
Influenza	...	...	—	—	—	—	—	—	—	—	—	7
Injuries	...	...	9	6	10	8	9	13	17	9	14	15
All other Diseases	...	...	184	228	199	235	214	228	235	197	219	219
Total	...	...	333	408	370	429	402	420	435	410	456	437

ZYMOTIC DEATH RATE.—This will unfortunately be high, viz., 1·29 per 1,000. In 1895 it was 1·13, and in 1894 it was ·7. I will now proceed to examine the causes of this.

SCARLATINA contributed one death. There have not been so many cases notified as in previous years ; but there ought to have been fewer. When a series of cases occur among the children in one street, or among those who pass through that particular street on their way to or from school, it is evident that some child or children has been the means of distributing the disease ; but those parents did not care to notify, and cared little how many other children suffered. I was obliged to prohibit school attendance to all children living in Waterloo and Wellesley Roads from January 20th to March 9th, on account of the number of cases occurring among the children living in and near these roads, but I was unable to find out who did the mischief. Fortunately during 1896 the cases were for the most part of a very mild type.

DIPHTHERIA.—We have had eight cases notified in six groups, the majority being very mild. With the consent of your Sanitary Committee, I have joined the Clinical Research Association, and specimens of suspected membrane have been sent up for culture from some of the cases. It is satisfactory to know that the diagnosis has been confirmed in most of the experiments.

MEMBRANOUS CROUP claimed one victim, and this is about the average.

TYPHOID FEVER.—There have been three fatal cases, two were strangers who came here suffering from this disease.

MEASLES.—This troublesome ailment broke out among the children attending Ellacombe Schools, and I was obliged to close them for several weeks. I compiled a circular based on some of the specimens published by the Local Government Board, and distributed copies among the children attending Ellacombe, Upton, and Pimlico Schools. Whether the information contained in this circular was appreciated or not, I cannot say, but certainly the mischief was limited to Ellacombe Schools, instead of spreading all over the town, as is usually the case. Mischief enough was caused, and nine fatalities occurred.

WHOOPIING COUGH was very prevalent from March to July, and caused fourteen deaths. Measles and whooping cough contribute between them twenty three deaths out of the total of thirty two due to Zymotic diseases. Twenty three is exactly one nineteenth of the whole mortality, and this from diseases over which we have practically not the slightest control.

DIARRHŒA caused three deaths among children, this being about the average.

PHTHISIS.—There were only 54 deaths from this disease, while the average is 63. The medical opinion of to-day is decidedly in favour of the theory that phthisis is infectious, and anything that helps to curb this terrible ailment will be doing good. I have prepared a circular pointing out what to do and what to avoid in these cases, and have supplied copies to the members of the Medical Profession for distribution

among their patients. Among other details I have pointed out the necessity of disinfecting the bedrooms of phthisical patients, and offered to have this performed by your officers.

INFLUENZA.—Now that a spare column has been provided in the forms supplied by the Local Government Board, I have devoted it to influenza, and no less than seven deaths have been attributed to this disease during the past year.

VISITORS.—The causes of death among visitors were as follows :—Phthisis, 17 ; bronchitis and pneumonia, 3 ; heart disease, 5 ; diarrhœa, 1 ; influenza, 2 ; typhoid fever, 2 ; and all other diseases, 7 ; total, 37. This is much lower than last year, viz., 53.

COMPARATIVE TABLE OF THE AGE AT WHICH DEATH OCCURRED.

	At all ages.	Under 1 year.	1 and under 5.	5 and under 15.	15 and under 25.	25 and under 65.	65 and upwards.
1886	412	73	27	9	37	124	142
1887	333	54	18	9	36	85	131
1888	408	68	36	12	35	120	137
1889	370	67	25	18	28	102	130
1890	429	81	37	16	30	112	153
1891	402	55	25	19	27	105	171
1892	420	74	34	8	25	103	176
1893	435	69	25	9	28	151	153
1894	410	62	38	8	36	114	152
1895	456	75	58	13	34	141	135
1896	437	76	37	11	28	148	137

VACCINATION.—Consequent on the fearful epidemic of small pox at Gloucester, and the much less important one at Exeter, considerable anxiety was felt as to what would happen if a case occurred in Torquay. In the first place, if cases had found their way here, there was the Sanatorium with ten beds kept ready to receive such. And it may interest our townsmen to know that since that hospital has been built it has twice housed undoubted cases of small pox, and twice it has isolated cases suspected at first to be small pox. Any town like Torquay, with a constant coming and going of large numbers of travellers, must expect now and then to have a case of small pox, and when a case has come it has been isolated and taken care of, and no one outside the Sanitary Committee has been much the wiser. What has been effected in the past can be done in the future, and with perfect immunity to the community at large.

One interesting fact was revealed during the scare, and that is that Torquay is a well vaccinated town. Mr. Barclay, the Vaccination Officer, tells me that in the whole of his district, and which includes many parishes outside as well as in Torquay, there are only ten unvaccinated children, and these are in seven families.

SALE OF FOOD AND DRUGS ACT.—The County Police took twenty-eight samples of milk, spirit, and bread, and submitted them to the County Analyst, but all passed the examination satisfactorily.

BAKEHOUSES.—I have visited these, but did not find much to complain of.

HOUSING OF THE WORKING CLASSES.—In addition to the usual general inspection of the district, I am able to report that minute work has not been neglected. Last year I told you that no detailed inspection of a poor quarter had been made for two years, for the simple reason that your Sanitary Inspector's time was fully occupied with villa work. Early last year the Sanitary Committee provided a temporary assistant inspector, and consequently the working classes have been able to share in the advantages of sanitary progress. The particulars of this work I shall leave to Mr. McMahon, and trust that a like result may be forthcoming next year.

RETURN OF NEW CASES OF SICKNESS MADE BY POOR LAW MEDICAL OFFICER; AND OF NEW PATIENTS RECEIVED IN THE TORBAY HOSPITAL, AS REQUIRED BY THE LOCAL GOVERNMENT BOARD.

NAMES OF DISEASES.				POOR Aged under 5 yrs.	LAW. Aged 5 yrs. and up.	HOSPITAL Aged under 5 yrs.	IN-PATIENTS. Aged 5 yrs. and up
Small Pox	..	...	..	0	0	0	0
Scarlatina	...	...	...	2	4	0	0
Diphtheria	...	...	...	0	0	0	0
Membranous Croup	...	...	...	0	0	0	0
Fevers	{ Typhus	...	...	0	0	0	0
	{ Enteric or Typhoid	...	...	0	0	0	2
	{ Continued	...	...	0	0	0	0
	{ Relapsing	...	...	0	0	0	0
	{ Puerperal	...	...	0	0	0	0
Cholera...	...	...	...	0	0	0	0
Erysipelas	...	...	...	0	0	0	0
Measles	...	...	...	1	3	0	0
Injury	...	...	...	0	0	1	43
Other Diseases	...	...	...	39	206	11	247
				42	213	12	292

TOTAL:—Poor Law, 255; Hospital, 304.

I append the twelfth report of the Sanatorium, and remain,

Mr. Mayor and Gentlemen,

Your obedient servant,

PAUL Q. KARKEEK, M.R.C.S. & L.S.A.

Medical Officer of Health.

Torquay, February 2nd, 1897.





Borough of Torquay.

THE MEDICAL OFFICER'S TWELFTH REPORT

ON

THE SANATORIUM

For the Year ending 26th March, 1896.

TO THE CHAIRMAN OF THE SANITARY COMMITTEE.

SIR,

At the commencement of the past financial year there were nine patients in the Sanatorium ; and from that date to March 26th, 1896, there were admitted 70 fresh cases ; so that altogether 79 patients were under treatment during the twelve months.

Seventy six of these patients were suffering from scarlatina ; two were admitted to the isolation ward because of symptoms suggestive of scarlatina, but who were discharged after a few days' residence ; and one was a case of typhoid.

This case was of interest and importance. The patient was a farmer living in a neighbouring parish and supplying Torquay with a great deal of milk. The case having been brought under my notice, I thought it best to take him into the Sanatorium, and thus prevent any contamination of the milk sent from his farm. His house was closed until thorough disinfection had been made, the cows were milked in another part of the farm; and everything passed off satisfactorily. The plan answered admirably, and is one I should adopt on a like occasion, if such should arise.

One death occurred, viz., a child, from scarlatina; fifty-two were discharged cured, and seventeen were in the building on March 26th of the current year.

Of the seventy fresh patients, seven were visitors and strangers, one was admitted at the request of the Cockington District Council, eighteen were from the families of small tradesmen and post-office officials, and forty-four were members of the artizan class.

Four were paupers and paid for by the Guardians, and it was necessary to pay for medical attendance in thirty-nine cases.

The cost of working during the twelve months will be seen from the following statement of accounts:—

EXPENDITURE.

	£	s.	d.
Diet of Patients	214	19	0
Wages and Diet of Nurses	150	12	3
Laundress	34	15	2
Curator	53	0	0
Surveyor's Account	59	3	7
Tradesmen's Accounts	75	18	9
Rent, Rates, and Insurance	17	0	11
Drugs	8	8	10
Medical Fees	40	19	0
Conveyance of Patients	16	13	6
Coal, Coke, and Wood	39	4	3
Telephone, 1 year	10	10	0
Repair of Carriage	5	5	0
	<u>£726</u>	<u>10</u>	<u>3</u>

RECEIPTS.

	£	s.	d.
Paid by Patients	89	3	5
Deficit... ..	637	6	10
	<u>£726</u>	<u>10</u>	<u>3</u>

It will be interesting to compare the cost of working in previous years with that of the past :—

Eighth Report...	11	Patients	...	Cost, £259	15	6	...	Deficit, £234	17	0
Ninth	"	...	50	"	...	529	1	2	...	498 5 5
Tenth	"	...	76	"	...	740	9	8	...	651 10 4
Eleventh	"	...	138	"	...	1,374	13	4	...	1,257 16 2
Twelfth	"	...	79	"	...	726	10	3	...	639 6 10

The inventory has been gone through, and a great deal of worn out material replaced with new. Among other items a complete set of new blinds have been fitted to the building.

Mr. and Mrs. Arnall have continued to give satisfaction, and your permanent nurse, Miss Hunt, has been all I could wish. Owing to certain severe cases it has been found necessary frequently to obtain assistance in the wards, and as many as two day and two night nurses have been there at a time.

According to your instructions a permanent laundress is now resident in the building, and this arrangement has many advantages over the old plan of hiring one from outside.

I remain, Sir,

Your obedient servant,

PAUL Q. KARKEEK, M.R.C.S. & L.S.A.

Medical Officer of Health.

September 15th, 1896.



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Borough of Torquay.

ANNUAL REPORT

OF

The Sanitary Inspector.

Town Hall, Torquay,
2nd February, 1897.

TO THE WORSHIPFUL THE MAYOR, ALDERMEN, AND
COUNCILLORS OF THE BOROUGH OF TORQUAY.

MR. MAYOR AND GENTLEMEN,

I have the honour to lay before you my Nineteenth Annual Report, which will be found to contain the best record of Sanitary work yet achieved in the Borough.

This result is mainly due to the fact that the Sanitary Committee, following up the recommendation of the Medical Officer in his previous Annual Report, engaged temporarily,

in the early part of last year, a qualified Assistant Inspector, who has enabled me to obtain an increase of about 50 per cent. in the sanitary improvements effected during the year; and also to make certain house-to-house inspections in the poorer quarters, which previously could not be done so systematically.

The places examined were Upton Church Road, Waterloo Road, Lower Wellesley Road, and certain tenements behind Victoria Parade, tabulated reports upon which have been prepared, giving details of population, cubic space, condition of the conveniences, ventilation of drains, and water supply; further reference to which I will make later on.

The following figures will support my statement :—

- 318 Houses were thoroughly examined; of which
- 193 were Villas or superior houses; as compared with
- 196 Houses, of which 89 were Villas &c., inspected in 1895
- 156 New Sanitary Conveniences were fixed.
- 48 Old ones cleaned and repaired.
- 51 New external Soil-pipes were fixed.
- 174 Drain and Soil-pipe Ventilators were erected.
- 37 Blocked Drains and Traps cleared.
- 427 New Interceptors, or Gully Traps, were set.
- 130 Waste Water and Rain-pipes were cut off from drains.
- 103 New sets of Pipe Drains were laid.
- 15 Masonry Drains were abolished, and
- 1 Cesspool destroyed.
- 28 Yards were bricked and drained.
- 45 Offensive accumulations were removed.
- 14 Pig or Fowl nuisances abated.
- 71 Bedrooms, bedding, &c., were disinfected.
- 61 Supplies of Disinfectants distributed.
- 13 Premises were limewashed.
- 172 Flushing Cisterns to Closets were fixed.
- 16 New Drinking Cisterns.
- 27 Cisterns were cleaned and covered.
- 7 Overcrowding cases were abated.
- 33 Defective or Choked Vent-pipes were repaired.
- 10 Bedrooms were provided with External Ventilation.

These items together give a total of

- 1639 Sanitary operations executed on
- 584 Separate premises, as compared with
- 1114 Improvements carried out on
- 414 Dwellings in the year 1895.

The customary inspections of the Common Lodging Houses, Slaughter House, and Milk Shops and Dairies were made from time to time, and improvements in same made where found necessary,

Building operations declined a little, in comparison with those of the previous year. The numbers were 47 new buildings as against 56 in 1895.

Two new ecclesiastical buildings were also erected, viz., Trinity Church and a private Chapel at St. Vincent's Orphanage.

Only two legal notices were required and no legal proceedings were instituted ; thus conclusively proving the desire of the public in Torquay to carry out promptly and effectively any recommendations from the Sanitary Authority.

The custom of asking for examinations of dwellings, previous to re-occupation, has been availed of more extensively than ever, and, I may say, I believe very few houses are let without a thorough examination and smoke-testing of the sanitary arrangements ; at any rate, it is no fault of the Department if our services are not asked for.

No fewer than 449 applications of the smoke-test were made, as well as the use of "Sanitas" oil, which has always maintained its detective qualities in difficult cases. The drains of new houses are also subjected to the smoke-test, at various stages, before being covered in. This, however, is done by the Borough Surveyor's Department.

Of course, the office work has kept pace with that out of doors, viz., keeping the necessary books recording our action in every case, and the preparation of sanitary reports and notices. Of these latter 67 were issued, as compared with 40 in 1895 ; whilst letters numbered 570, as against 467 in the previous year.

The house-to-house inspection, as stated before, included Waterloo Road, Lower Wellesley Road, Upton Church Road, and some tenements at the rear of Victoria Parade, inhabited by fishermen.

The number of houses thus examined was 70, occupied by 105 families, comprising 211 adults and 177 children—total 388 persons.

With the exception of Lower Wellesley Road, which was only inspected in December, the necessary repairs and reconstruction of the drainage and water supply, and with regard to the cleanliness of the houses, have been carried out, in the other roads referred to, in nearly every case.

I had the privilege to be one of a deputation from this Council to attend the Health Congress which sat at Glasgow last July, and derived much valuable information on practical sanitary subjects, which cannot fail to be of service ; though I venture to say (without offence) that all the methods practised in the famous city did not elicit admiration, or call for imitation.

I beg to thank the Council for appointing me a delegate.

I am,

Your Worship and Gentlemen,

Yours obediently,

CHAS. MACMAHON, Cert. San. Inst., A.M.I.B.P.H.

Chief Sanitary Inspector and New Building Surveyor.





Borough of Torquay.

SCHOOL ATTENDANCE

Annual Report

For the Year ending December 31st, 1896.

GENTLEMEN,

Having received the usual returns from the head teachers of the Torquay Elementary Schools, I beg to submit for your information the results obtained therefrom.

The total number of children on the books is 3,205, against 3,159 at the end of 1895, shewing an increase of 46.

The average attendance is 2631·0 against 2536·5 last year, an increase of 94·5.

Average per cent :—82·0 against 80·3 in 1895, an increase of 1·7 per cent.

The returns of boys, girls, and infants given separately are as follows, viz.,

BOYS.

Year 1896.	On Books	...	971
„ 1895.	„	...	949
		Increase	22
1896.	In Average Attendance...	863·6	or 89 per cent.
1895.	„	757·2	or 85·6 „
		Increase	106·4 or 3·4 „

GIRLS.

Year 1896.	On Books	...	940
„ 1895.	„	...	923
		Increase	17
1896.	In Average Attendance...	824·1	or 87·6 per cent.
1895.	„	757·2	or 82·0 „
		Increase	66·9 or 5·6 „

INFANTS.

Year 1896.	On Books	...	1294
„ 1895.	„	...	1287
		Increase	7
1896.	In Average Attendance...	943·3	or 72·8 per cent.
1895.	„	966·9	or 75·1 „
		Decrease	23·6 or 2·3 „

Included in the number of infants on the books who are under five years of age there are 510 against 488 in 1895. They are not under the law of compulsory attendance, but they adversely affect the average attendance.

The accommodation in the present schools is for 3470 children, shewing, as compared with the number on books (3205), 265, and with the average attendance 839 vacant places. The new schools at Upton will be ready about Easter, and there will then be over 300 places more.

During 1896, 59 warnings and 5 notices to employers have been served, and visits were paid to investigate complaints of irregular attendance in 4353 cases.

Prosecutions have been instituted in 43 cases, against 45 the year previous.

Under the bye-laws there were 23 cases resulting in 22 fines and one dismissal. The fines were 10 of 2s. 6d. ; 4 of 1s. 3d. ; and 8 of 1s. each.

For non-compliance with Attendance Orders 8 cases ; 2 fines of 5s. ; 2 of 2s. 6d. ; one boy committed to the Mount Edgecumbe Training Ship ; one to the Devon and Exeter Industrial School ; and two to the Plymouth Truants' School.

Summonses for Attendance Orders were issued in 11 cases. Nine orders were granted and two cases not heard, the girls being sent to an Industrial School on another charge.

There was also one case of illegal employment heard, and a fine of 2s. 6d. inflicted, the costs being remitted.

The total amount of fines were £2 15s. 6d., and the costs £10 10s.

At the end of 1896 there were two Torquay boys in the Truants' School, two in the Devon and Exeter Industrial School, and three on board the Training Ship. Three boys have been returned to the Truants' School during the year through having broken the terms of their licenses. One was sent for his second, one for his fourth, and one for his sixth time.

Under the Elementary Education (Blind and Deaf Children) Act, 1893, a blind boy named John Thomas Ridgeway was, on the 4th February last, placed in the Devon and Exeter Institution, and will have to be provided for until 29th April, 1898.

I beg, in conclusion, to thank the School Attendance Committee for their kind support.

I am, Gentlemen,

Your obedient servant,

G. R. STONE,

School Attendance Officer.

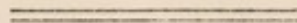


BOROUGH OF TORQUAY.



METEOROLOGICAL REPORT

FOR THE YEAR 1896.



ALFRED CHANDLER, F R. Met. Soc.,

Borough Meteorologist

THE
JOURNAL OF THE
ROYAL ANTHROPOLOGICAL INSTITUTE

Volume 10, Part 1, 1880



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❖ REPORT. ❖

*To the Mayor and Corporation of the
Borough of Torquay.*

GENTLEMEN,

In submitting my Annual Meteorological Report for 1896, I beg to inform you that during the past year the Observatory and all the Instruments entrusted to my care, both at Chapel Hill and Cary Green, have been kept in good order and working continuously.

The readings have been made twice daily, viz., at 9 a.m. and 4 p.m (local time), the figures carefully entered, checked off, and the computations made.

The necessity of protecting in some way the Instruments on Cary Green has been seen for some time, and I understand the Council is willing that a fencing, sufficiently high to prevent interference, shall be fixed, and when this is done I will ask the Council to provide me with a verified Minimum Grass Thermometer, similar to the one on Chapel Hill.

The Anemometer at Chapel Hill, with its complicated gear work, I have taken down, with the assistance of the Gardener, thoroughly cleaned, oiled, and re-fixed.

This Instrument has had very considerable wear, but it is still in fairly good order, except that some of its parts will require renewal in the course of a year or two.

During the Year I have sent upwards of two thousand five hundred Afternoon Reports of the Weather by Telegram, which have been published daily, in the following Newspapers, under the heading "Weather at the South, Torquay," and others the "Weather at the Sea-side Resorts."

The names of the Newspapers are:—

Newcastle Chronicle	Liverpool and Manchester
Glasgow Mail	Journal of Commerce
Sheffield Telegraph	Birmingham Post
Yorkshire Post	Birmingham Gazette
Liverpool Post	Bradford Observer
	Bristol Times & Mirror

Seven of the above Newspapers publish the Telegrams throughout the Year, both Summer and Winter, and three publish during the Summer period only, viz., from June to September.

During the Summer months I send a Noon Telegram daily to the Sheffield Evening Telegraph.

The Daily Reports have also been supplied to Mr. C. H. Chandler for insertion in the London Standard, Daily Chronicle, and Western Morning News, and also to Mr. W. E. Thomas for insertion in the Western Daily Mercury.

The Weekly, Monthly, and Yearly Reports are supplied regularly to and published by the Royal Meteorological Society, the Meteorological Office, Symons's Meteorological Magazine and British Rainfall, the Torquay Directory, Times, Standard, and the Natural History Society.

Our Meteorological Observations are also published, with others relating to the County of Devon, in the Transactions of the Devonshire Association.

Every Saturday, during the Winter Months, a special report has been prepared and sent to the Travel Editor of the Queen, for insertion in that popular and widely read Newspaper.

The usual daily reports, with the assistance of Mr. Chas. Shapley, F.R. Met. Soc., have been placed on the Strand, at the Natural History Museum, and sent to the principal Hotels and Boarding Houses.

The Borough Meteorologist to the Corporation of Plymouth, Mr. H. Victor Prigg, M.Inst.C.E., having made at the desire of his Council, an official visit to our Observatory, to obtain information as to the instrumental equipment, its organisation, and the system adopted for distributing the Observations, I readily gave him these particulars, and Mr. Prigg, in his last Report, acknowledges the same, and adds "It is undoubtedly by these means (*i.e.*, the system for distributing by telegraph the daily weather at Torquay) that the Climate of Torquay is so widely known and so fully appreciated."

The Medical Officer of Health for the Borough of Scarborough has also communicated with me on the subject.

The Correspondence during the year has again been considerable, many applications having been made to me by the Medical Profession and intending visitors, for information on the Climate of Torquay, which I have readily given, and, besides much correspondence, I have distributed a large number of the Papers and Reports. The number of postages, letters and reports, is 375.

And in this connection I have also undertaken the Secretarial work on the Climate of Devon, which has been, for many years, carried on and published by a Committee of the Devonshire Association.

A Special Report was prepared on the Climate of Torquay, and printed in the Pier Programme, and I have also revised the Meteorological particulars relating to Torquay, published in the "Health Resorts of Europe."

As in previous years, I have had a large number of Visitors at the Observatory, to whom I have shewn and explained the Instruments, and many of the printed reports have been taken away.

It is now nearly 9 years past since I commenced the work on Chapel Hill, and as the work has more than trebled, is continually increasing, and there being much work which has to be done in connection with the measuring of the Charts and the accumulation of figures, I should be very glad if the Council would now take into their consideration the necessity of providing me with an Assistant.

What I require is an educated youth, fresh from school, capable at figures and calculations, and with some mechanical ability, whom I can train in the work, so that in case of my illness or temporary absence there would be no break in the continuity of the work.

Hitherto I have often been placed in some difficulty, in case of illness or temporary absence, as the work at the Observatory cannot be taken up without previous training.

When I have obtained and trained an Assistant at Chapel Hill, I am anxious that we should commence taking the sea temperatures daily at Noon, and I hope then to carry out a desire I have seen expressed in the local Newspapers, that our wind velocity, pressure, and direction should be published daily or weekly, instead of monthly as at present.

I shall also then be able to have some of the Instruments read at 9 p.m., a matter of great importance during the Winter Months.

I have much pleasure in informing the Council that Mr. Chas. Shapley, F.R. Met. Soc., has again rendered me valuable aid in daily reading the Instruments on Cary Green, sending the readings to me at the Observatory and distributing the daily reports.

I beg to express my thanks to Mr. Shapley, and also to the Council of the Torquay Natural History Society for their kind loan of several valuable Instruments in use at Chapel Hill.

I am, Gentlemen,

Your obedient Servant,

ALFRED CHANDLER, F. R. Met. Soc.

*Borough Meteorological Observatory,
Chapel Hill,
February 1st, 1897*



THE OBSERVATORY.

POSITION AND BUILDING.

The Observatory is built on limestone rock at the summit of the quarry, and at the back or N. side of the old ruined Chapel; about $\frac{3}{4}$ mile from the sea, overlooking Torbay and the English Channel. The ground level is 276 ft., and the top of the building 286 ft. above mean sea level. The part of the building immediately under the Sunshine Instruments is built of solid limestone to prevent vibration. This was designed in 1888 by Mr. J. Hall, Assoc. M. Inst. C.E., and the last addition, with the erection of the Anemometer and a larger computing room for the Observer, early in 1894 by Mr. H. A. Garrett, Assoc. M. Inst. C.E.

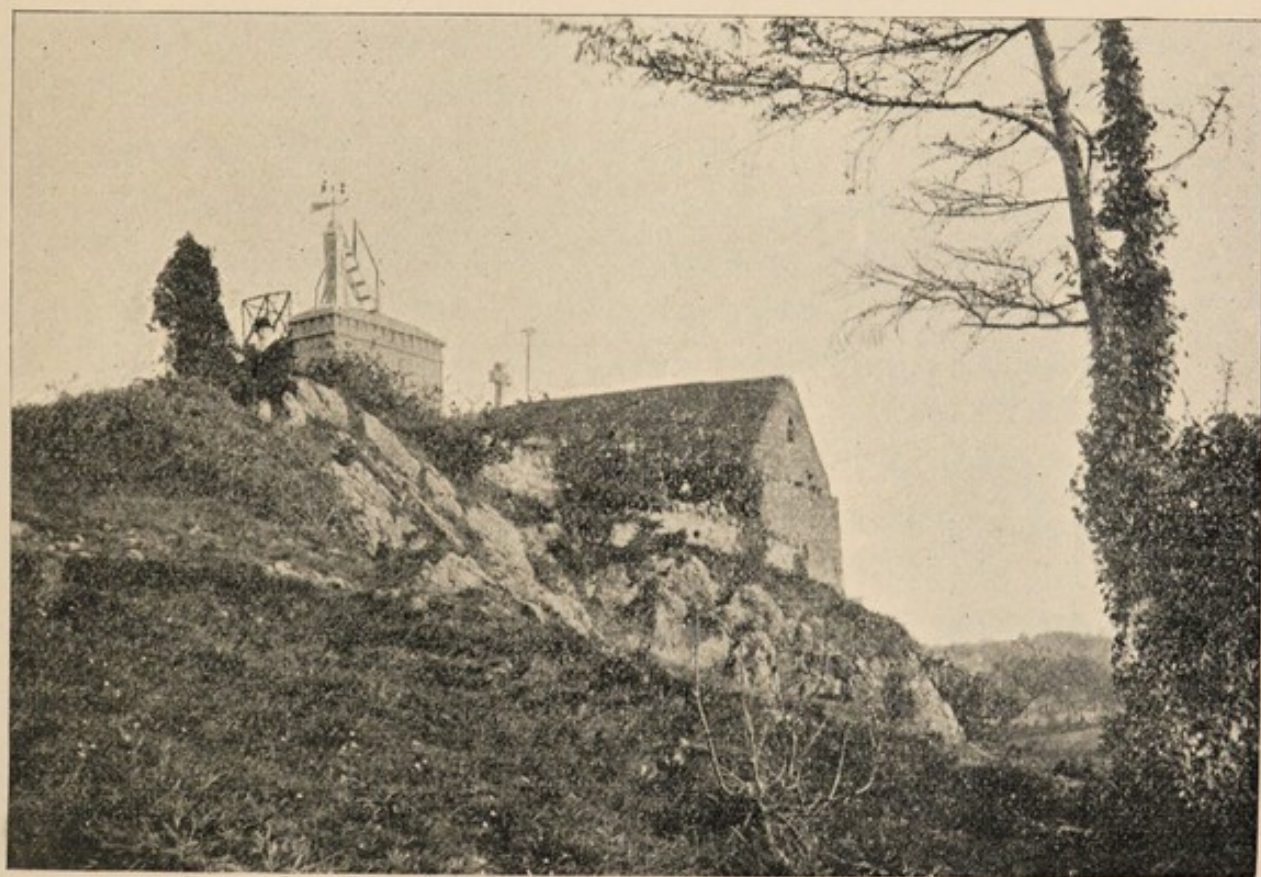
Through a slight error in the foundations of the original building, the Observatory is not quite true astronomical N. and S., but the instruments are all fixed in a true direction.

The latitude is $50^{\circ}29'$ N., and the longitude $3^{\circ}32'$ W. = to 14 minutes after Greenwich Mean Time.

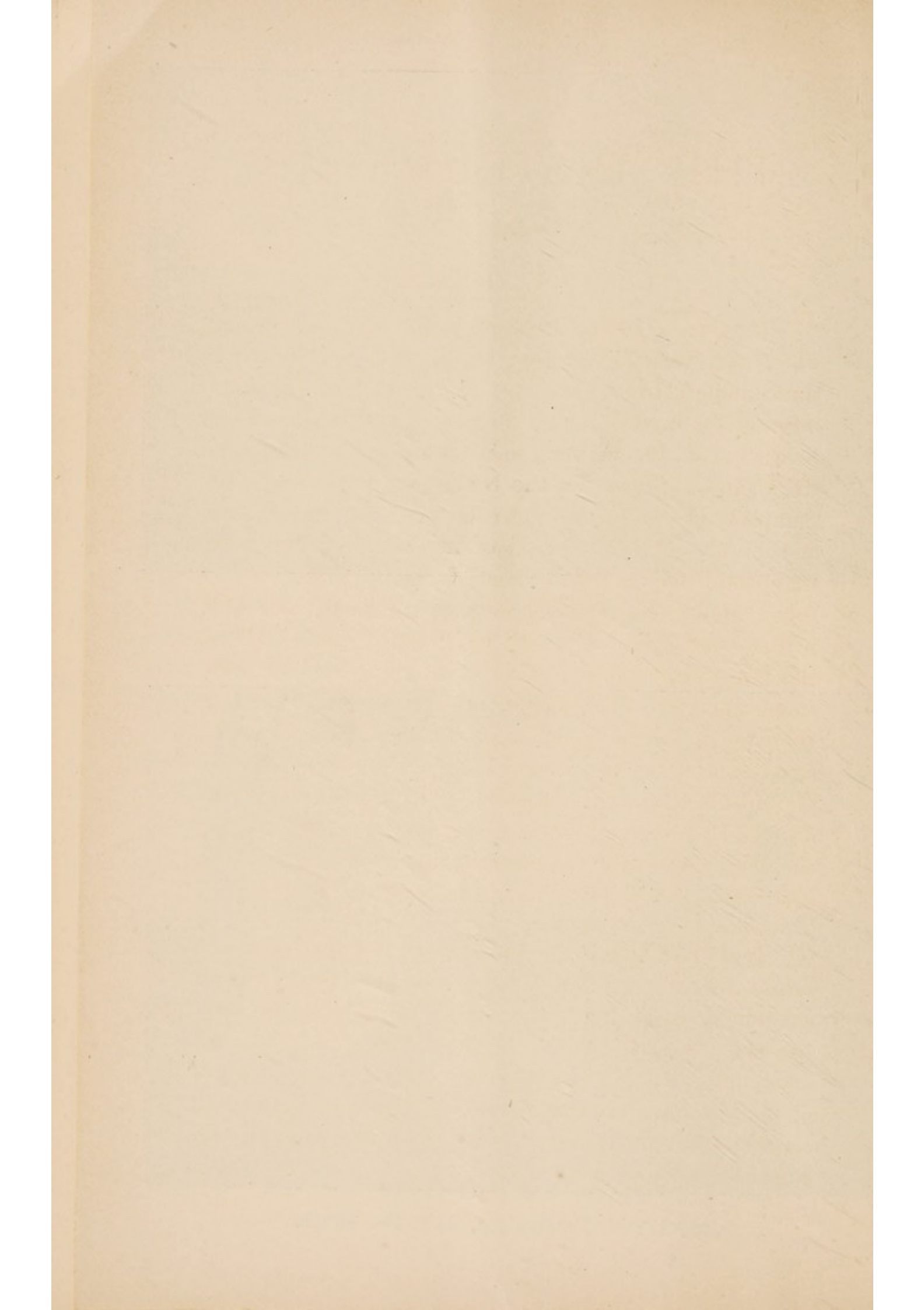
The Observatory is organised and maintained by the Town Council, under the supervision of the Royal Meteorological Society.



Chapel Hill Observatory, from the South.



Chapel Hill Observatory, from the North.



THE INSTRUMENTS.

SUNSHINE RECORDERS.

These are (1) a Jordan Photographic Twin Instrument, which has been in use here for 9 years, and is used as the Standard Instrument; (2) A Campbell-Stokes Lens-burning Instrument, with Professor Stokes's zodiacal card holder. The Photographic instrument is on the S. and the Campbell-Stokes on the N. side of the tower. The Campbell-Stokes is the older of the two instruments, and in its original form was invented by Mr. J. F. Campbell; but in its present form, with its zodiacal frame, and in the patterns for use in different latitudes, it has been much improved by Professor Stokes, F.R.S., the Greenwich and Kew Observers, and Messrs. Beckley, Casella, and Negretti and Zambra. There is at the present time much discussion amongst Meteorologists as to the exactitude of the two instruments, which give a difference of sunshine duration of from 5 to 16 per cent., the Jordan Instrument always giving in the monthly totals the larger amount; but occasionally in the daily totals less than the Campbell-Stokes Instrument.

It is alleged that the Campbell-Stokes measures only bright sunshine, and that the Jordan measures sunlight as well as sunshine; but from the work done here for the past 9 years with the Photographic Instrument no trace of measured sunlight has been on the charts after they have been immersed in water, face upwards, according to the instructions issued to Observers by the Royal Meteorological Society.

The Photographic Instrument is more troublesome than the Campbell-Stokes Instrument, but taking the different states of the atmosphere into consideration all the year round, it is the more accurate and sensitive instrument of the two.

These Instruments, which are also Sun Dials, for the measurement of sunshine and of time, are open to great improvement, and doubtless will in the future be made as exact in measurement and definition as the Telescope, the Spectroscope, the Barometer, and the Thermometer.

ANEMOMETER.

The Anemometer, for registering the velocity and direction of the wind and the time of its various changes, is a Robinson embossing, self-recording instrument by Casella. The general principle of this instrument is the invention of Dr. Robinson, of Armagh, in which four hemispherical cups of five inches diameter, fixed on twelve inch arms, revolve with the pressure of the wind. The very ingenious registering parts of the instrument and also the vane are new, and were designed by Mr. Beckley, of Kew Observatory, and Mr. Casella. The force-and-die principle of embossing is the means of registration here adopted. The paper employed for receiving the hourly velocity and direction marks is blue in colour and formed of narrow strips, rolled round a small attached roller, from which it is drawn and embossed on one edge by the action of the rollers, which are divided to represent miles, figured at every five miles of horizontal wind velocity. The clock raises the hammer, which falls once in every hour, impressing the other edge of the paper with an arrow, whose movements correspond with the

larger one driven by the wind, and this shows its exact direction at every hour of time. The rate of speed is also shown during each preceding hour by the distance travelled over on the paper between each successive imprints of the arrow. The projection under the large arrow (outside) contains metal balls which firmly support the top and aid in giving freedom of action to the vane. The square box (outside) is of cast iron, and contains the stronger portion of the wheelwork, and chains from this gear-work act on the velocity rollers and the arrow attached to the clock-work below. From these automatic hourly observations are obtained the velocity of the wind, its direction and estimated force, but the latter is not very reliable, and, to make the instrument complete, an automatic pressure plate should be added, as in Osler's Anemometer, which shows the maximum push or thrust of the wind in pounds weight on the square foot, and the time when such maximum pressure takes place, the speed of the wind at the same time being recorded by the Robinson Cups.

BAROMETERS.

The Standard Barometer is one of Negretti and Zambra's Mercurial Instruments, on the Fortin adjusting principle. The mercurial reservoir is 279 ft. above mean sea level. The instrument is read twice daily, with the Vernier index, and the readings are reduced to mean sea level and 32° Fahr.

The self-recording Aneroid Barometer is placed by its side for purposes of comparison.

THERMOMETERS AND SCREENS.

The Shade Thermometers, by Casella, consist of a mercurial Maximum, a spirit Minimum, a Dry and Wet Bulb Thermometers for hygrometrical measurements. The screen containing these instruments is a Stevenson's double louvre, placed over grass, with the bulbs of the Thermometers 4 ft. from the ground.

An exact duplicate of these Instruments and screen is at Cary Green (12 ft. above mean sea level).

The Solar Thermometers, by Negretti and Zambra, are a black bulb and a bright bulb in vacuo instruments, both mercurial, and both registering the maximum temperature in the sun, the difference in reading between the two instruments being a measure of the amount of solar radiation.

The Grass Thermometer is one of Hick's spirit Minimum Instruments, placed on grass about one inch above the level of the ground.

The Richard Self-Recording Thermometer is placed in a Stevenson's screen, and shows approximately the time when the highest and lowest temperature takes place. It is most useful for purposes of comparison and it is wonderfully accurate when its construction is considered; but it cannot be so exact and sensitive as the mercurial or spirit Thermometer, depending as it does upon the lengthening and shortening of a metal plate, as the temperature varies, acting on a crank lever connected to an arm carrying a pen, which writes the curve of temperature on the chart on the clock cylinder.

All the Thermometers are degree marked on the stem, verified at Kew Observatory, and are read with their errors corrected.

RAINGAUGE.

The Raingauges at Cary Green and Chapel Hill are of 5 inches in diameter, placed 1 ft. above the level of the ground. They are the Snowdon pattern, with a deep rim for the measurement of snow.

OZONOMETER.

This is Dr. Moffat's pattern, which consists of strips of paper prepared with Iodide of Potassium and Starch: these papers are suspended in a copper box with a double covering of fine wire gauze, so as to allow of the free access of air to the suspended papers, protected from the direct rays of the sun, and also from rain. The papers, when affected by ozone, are tinged with various shades of brown, the intensity of which is measured by a scale of ten gradations of colour.

AVERAGES.

The averages of Sunshine are for nine years' observations. Those of Temperature, Rainfall, and the Barometer are twenty years, being the means of Mr. E. E. Glyde's Babbacombe Observations, and the Cary Green and Chapel Hill Observations.

TIME OF READING.

All the Instruments are read twice daily, at 9 a.m. local time = 9.14 G.M.T., and 4 p.m. local time = 4.14 G.M.T., the Instruments at Cary Green being read by Mr. C. Shapley, F.R. Met. Soc.

SUNSHINE.

The Jordan Photographic Sunshine Recorder.

1896.	Possible Sunshine.	Actual Sunshine.	Percentage Actual of Possible.	Morning Sunshine.	Afternoon Sunshine.	Difference from Average.	Greatest Daily Amount of Sunshine.	Percentage Actual of Possible	Date.	Days on which Sun Shone.	Sunless Days.
January ...	H. M. 260. 0	H. M. 43. 40	% 16.8	H. M. 21. 55	H. M. 21. 45	H. M. -27. 10	H. M. 7. 40	% 85.7	29th	15	16
February ...	287. 0	52. 10	18.2	25. 20	26. 50	-30. 20	7. 35	78.3	12th	20	9
March	364. 0	117. 20	32.2	55. 35	61. 45	-32. 0	10. 50	88.4	23rd	28	3
April	410. 0	136. 40	33.3	69. 30	67. 10	-53. 30	11. 10	79.0	22nd	29	1
May	475. 0	296. 45	62.5	149. 25	147. 20	+77. 5	13. 25	88.5	12th	31	0
June.....	486. 0	265. 45	54.7	125. 25	140. 20	+33. 10	14. 35	89.8	29th	30	0
July	487. 0	242. 40	49.8	126. 30	116. 10	+58. 20	14. 20	89.2	6th	30	1
August.....	443. 0	209. 25	47.3	99. 15	110. 10	+21. 45	11. 35	77.6	4th	30	1
September..	373. 0	105. 0	28.2	49. 15	55. 45	-59. 25	9. 55	81.6	19th	28	2
October ...	327. 0	119. 40	36.6	65. 30	54. 10	+3. 40	7. 50	81.7	31st	26	5
November ..	264. 0	83. 20	31.6	42. 45	40. 35	+21. 40	7. 50	86.4	9th	24	6
December ..	241. 0	40. 30	16.7	20. 35	19. 55	-13. 0	6. 0	75.9	5th	20	11
Year...	4417. 0	1712. 55	38.8	851. 0	861. 55	+ 1. 35	14. 35	89.8	June 29th	311	55

SUNSHINE.

The Campbell-Stokes Lens-burning Sunshine Recorder.

1896.	Actual Sunshine.	Percentage of Possible.	Morning Sunshine.	Afternoon Sunshine.	Greatest Daily Amount.	Date.	Days on which Sun Shone.	Sunless Days.
	H. M.	%	H. M.	H. M.	H. M.			
January ...	43.25	16.7	22. 0	21.25	7.30	29th	15	16
February ...	44.25	15.5	22. 0	22.25	8. 0	12th	19	10
March	93.30	25.6	49.25	44. 5	9.20	23rd	26	5
April	124.35	30.4	62.50	61.45	10.25	30th	27	3
May	297.40	62.7	153.35	144. 5	13.40	12th	31	0
June.....	238.45	49.1	111. 0	127.45	14.35	29th	30	0
July	214.15	44.0	110. 5	104.10	14.10	6th	29	2
August.....	196.10	44.3	94.10	102. 0	11.40	16th	29	2
September..	80.40	21.6	39.35	41. 5	8.40	30th	25	5
October ...	101.50	31.1	54.50	47. 0	8. 5	31st	26	5
November..	80.55	30.6	40.15	40.40	8. 0	9th	21	9
December..	34.45	14.4	17.15	17.30	5.50	7th	18	13
Year...	1550.55	35.1	777. 0	773.55	14.35	June 29th	296	70

SHADE TEMPERATURE. Chapel Hill (*The High-Level Station*).

AT 9 A.M. (LOCAL TIME).

1896.	Maximum mean.	Minimum mean.	Max. and Min. mean.	Range mean.	Highest.	Date.	Lowest.	Date.	Difference of <i>Mean</i> Temperature between High and Low-Level Stations.
January ...	46.3	38.6	42.5	7.7	54.7	26th	29.4	7th	1.1 higher at Cary Green
February ...	47.6	37.3	42.5	10.3	55.1	10th	27.2	2nd	0.9 "
March	52.7	42.0	47.4	10.7	59.5	23rd	32.6	4th	0.4 "
April	57.9	43.2	50.6	14.7	63.5	26th	35.4	22nd	0.1 lower
May	65.1	46.7	55.9	18.4	77.1	29th	37.4	1st	0.2 higher
June	69.8	53.2	61.5	16.6	80.4	16th	44.1	1st	0.2 lower
July	71.1	54.3	62.7	16.8	78.4	7th	47.9	28th	0.1 higher
August	68.9	52.5	60.7	16.4	77.9	23rd	45.5	27th	0.3 "
September..	61.9	52.1	57.0	9.8	66.5	10th	44.2	21st	0.9 "
October ...	52.4	40.6	46.5	11.8	67.2	3rd	31.7	23rd	1.3 "
November ..	46.3	36.4	41.4	9.9	52.1	18th	28.5	7th	1.4 "
December ..	45.7	37.6	41.7	8.1	50.7	28th	26.2	18th	1.1 "
Year...	57.2	44.6	50.9	12.6	80.4	June 16th	26.2	Dec. 18th	0.6 higher at Cary Green

SOLAR AND GRASS TEMPERATURES.

In SUN, Black Bulb in vacuo				ON GRASS				
1896.	Maximum <i>mean.</i>	Mean Solar Radiation.	Highest.	Date.	Minimum <i>mean.</i>	Lowest.	Date.	Number of Days at 32° and below.
January ...	62.5	16.2	88.3	28th	35.9	25.6	10th	12
February ...	74.6	27.0	98.0	13th	33.6	24.3	27th	12
March	92.0	39.3	108.2	24th	39.0	29.0	19th	4
April	102.4	44.5	112.9	19th	39.7	32.8	30th	0
May	110.9	45.8	120.1	29th	43.6	34.0	1st	0
June.....	114.9	45.1	125.4	3rd	51.2	41.9	1st	0
July	108.5	37.4	125.5	10th	52.6	47.0	2nd & 29th	0
August.....	113.2	44.3	125.1	23rd	50.0	43.3	27th	0
September .	98.5	36.6	114.0	10th	49.6	40.4	21st	0
October ...	86.4	34.0	110.2	3rd	38.2	29.2	23rd & 29th	10
November...	71.5	25.2	89.2	10th	33.7	24.8	7th	13
December ..	61.6	15.9	81.4	11th	34.4	24.2	18th	9
Year...	91.4	34.2	125.5	July 10th	41.8	24.2	Dec. 18th	60

RAINFALL. Cary Green (The Low-Level Station.)

1896.	Total Amount.	Difference from Average.	Wet Days, or falls of 0.01 in. and more.	Mean Wet Day Rate of Rainfall.	Greatest Fall in 24 hours.	Date of Greatest Fall.
January	inch 0.64	inch - 2.73	12	inch 0.05	inch 0.17	24th
February	0.46	- 2.17	6	0.08	0.22	8th
March	3.42	+ 1.05	23	0.15	0.62	20th
April	0.10	- 2.36	5	0.02	0.03	13th & 24th
May	0.03	- 2.04	1	0.03	0.03	21st
June	1.97	- 0.31	12	0.16	0.41	8th
July	1.52	- 1.27	10	0.15	0.84	24th
August	1.03	- 1.81	11	0.09	0.20	30th
September	5.45	+ 3.22	28	0.19	1.08	21st
October	3.99	- 0.33	21	0.19	0.86	6th
November	0.84	- 3.36	6	0.14	0.62	14th
December	7.37	+ 4.09	24	0.31	1.43	1st
Year	26.82	- 8.02	159	0.17	1.43	Dec. 1st

RAINFALL. Chapel Hill (The High-Level Station).

1896.	Total Amount.	Difference from Average.	Wet Days, or falls of 0.01 in. and more.	Mean Wet Day Rate of Rainfall.	Greatest fall in 24 hours.	Date of Greatest Fall.
January	inch 0.69	inch -2.68	14	inch 0.05	inch 0.20	20th
February	0.52	-2.11	7	0.07	0.20	8th & 19th
March ..	3.00	+0.63	24	0.13	0.58	20th
April	0.12	-2.34	5	0.02	0.04	16th & 24th
May	0.03	-2.04	1	0.03	0.03	21st
June.....	1.89	-0.39	10	0.19	0.32	8th
July	1.78	-1.01	11	0.16	0.85	24th
August.....	1.22	-1.62	12	0.10	0.31	2nd
September	5.34	+3.11	28	0.19	0.93	21st
October	3.87	-0.45	22	0.18	0.68	6th
November	0.77	-3.43	7	0.11	0.54	14th
December	7.33	+4.05	26	0.28	1.45	1st
Year.....	26.56	-8.28	167	0.16	1.45	Dec. 1st

BAROMETER AT 9 A.M. (LOCAL TIME).

1896.	Mean.	Difference from Average.	Highest.	Date.	Lowest.	Date.
January	inch 30.381	+0.322	inch 30.896	9th	inch 29.562	14th
February	30.339	+0.301	30.666	1st	29.609	20th
March	29.872	-0.095	30.321	10th	28.950	4th
April	30.219	+0.356	30.494	19th	29.787	29th
May	30.254	+0.293	30.451	4th	29.981	22nd
June.. ..	29.964	-0.047	30.328	29th	29.422	9th
July	30.054	+0.078	30.304	18th	29.687	25th
August.....	30.086	+0.130	30.350	11th	29.788	26th
September	29.780	-0.239	30.443	30th	28.828	25th
October	26.781	-0.173	30.502	1st	29.192	19th
November	30.162	+0.236	30.639	22nd	29.539	15th
December ..	29.795	-0.214	30.476	27th	28.541	6th
Year.....	30.057	+0.079	30.896	Jan. 9th	28.541	Dec. 6th

ANEMOMETER.

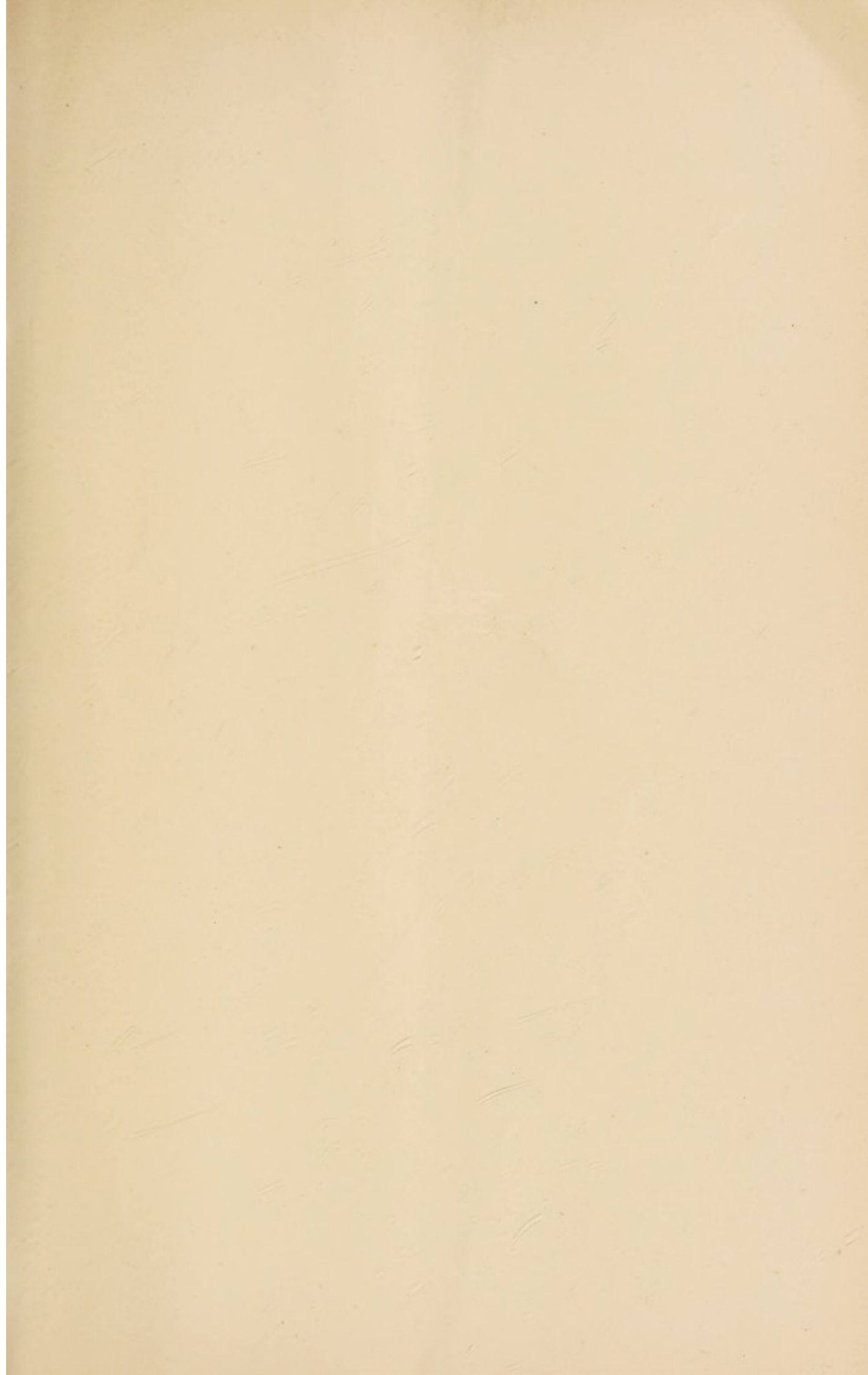
1896.	Total Horizontal Motion.	Mean Daily Velocity.	Mean Hourly Velocity.	Greatest Daily Velocity.	Mean Hourly Velocity.	Greatest Velocity in One Hour.	Date.	Time.	Direction.	
									Southerly to Westerly	Northerly to Easterly
	<i>miles</i>	<i>miles</i>	<i>miles</i>	<i>miles</i>	<i>miles</i>	<i>miles</i>				
January	6040	194.8	8.1	565	23.5	35	15th	10 to 11 a.m.	17	14
February	4810	165.8	6.9	449	18.7	33	8th	11 a.m. to 12 noon	13	16
March	10416	338.2	14.1	790	32.9	50	6th	1 to 2 p.m.	25	6
April	6786	226.2	9.4	550	22.9	33	11th	5 to 6 a.m.	25	5
May	4612	148.8	6.2	401	16.7	26	20th	12 noon to 1 p.m.	13	18
June	5356	178.5	7.4	450	18.7	25	30th	4 to 5 p.m.	20	10
July	5570	179.7	7.5	406	16.9	31	4th	6 to 7 a.m.	22	9
August	6235	201.1	8.4	381	15.9	29	24th	10 to 11 a.m.	24	7
September ...	8689	289.6	12.1	784	32.7	46	25th	2 to 3 p.m.	25	5
October	7732	249.4	10.4	626	26.1	38	25th	9 to 10 a.m.	21	10
November ...	6316	210.5	8.8	502	20.9	30	28th	10 to 11 a.m.	13	17
December ...	8894	286.9	11.9	576	24.0	38	9th	12 noon to 1 p.m.	21	10
Year.....	81527	222.8	9.3	790	32.9	50	March 6th	1 to 2 p.m., March 6th	239	127

OZONE.

1896.	Mean Daily Amount.	Greatest Daily Amount.	Direction of Wind.	Date.	Least Daily Amount.	Direction of Wind.	Date.
January ...	46.8	90	S. to W.	15th	% 0	N. to E.	30th, 31st
February ...	53.8	85	S. to W.	8th, 20th, 28th, 29th	0	N. to E.	2nd
March	70.0	90	S. to W.	2nd, 7th, 9th	20	N. to E.	21st
April	64.8	85	S. to W.	14th, 28th	45	N. to E.	19th, 22nd
May	57.4	90	W.	22nd	40	N. to E.	10th, 11th
June	60.3	85	E. to S.S.W.	7th	35	E.	14th
July	55.3	85	S. and S.W.	25th	25	N.	7th
August	66.9	85	S.W. and W.N.W.	21st, 28th	40	E. & E.N.E.	1st
September..	66.7	85	W. and W.S.W.	10th, 20th, 25th	5	N. to E.	6th
October ...	56.1	90	W.	11th	5	N. to E.	22nd, 23rd
November..	43.7	85	N.N.W. and S.S.W.	19th	5	N. to E.	3rd, 23rd, 24th
December..	55.3	90	S.W.	5th, 10th, 28th	5	N. to E.	19th, 23rd
Year...	58.1	90	Southerly to Westerly.		0	Northerly to Easterly.	







1050

146

251