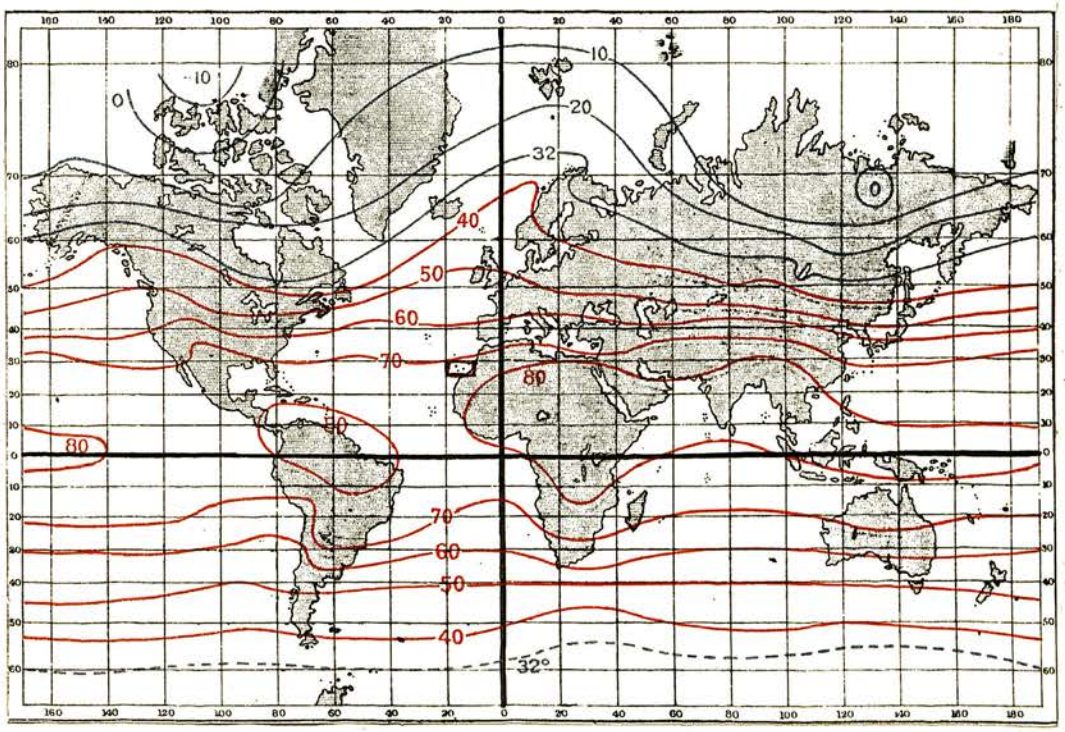
The HEALTH RESORTS of the Canary Islands

ISOTHERMAL LINES SHOWING THE MEAN TEMPERATURE OF THE GLOBE FOR THE YEAR.



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Gibraltar
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Tetuan
Rebat
Mazagan
Safi
Mogador
MOROCCO
N.E. Trade limit January
MADEIRA
N.E. Trade limit January
Salvages
CANARY ISLANDS
Cape Juby
Cape Bogador

Section I

History

The earliest history of the Canary Islands is lost in the mists of Mythology.
'Neptune', 'Atlas', 'Hercules', 'Ulysses', 'The Elysian Fields', 'Hesperides', 'The abode of the Departed Heroes', 'The Legend of the Golden Apples', etc. etc. are all associated with islands (insulæ) placed beyond the columns of Hercules, at the limits of the world, on the edge of the (western) ocean; 'mare tenebrosi';
Their earliest history may have been associated with a large continent of which the present islands are the mountain tops, though probably this is not so, as the islands are rising.
They may have been colonised by Sesotris King of Egypt in 1300 B.C.; they may have been visited by the ships of the navies of King Solomon & Hiram (1000 B.C.)
"For the king had at sea a navy of Tharshish with the navy of Hiram; once in three years came the navy of Tharshish bringing gold silver ivory (elephants teeth) apes & peacocks"
It is sufficient for me to say, there can be no doubt that the islands were known to the ancient Phœnician sailors from very early times & it is probable that the Isles

of volcanoes, warm climate etc. etc. were weaved by poetic fancies + ideas to fit into traditions + legends.
As the Roman empire expanded, these islands came under its notice, perhaps thro the tales of Carthaginian sailors, taken prisoners by them in the Punic wars.
(According to Pliny (Book VI XXXVII)
Statius Sebosus about 45 B.C. explored the islands, named them, + recorded the distances from each other + from the main-land. Juba II King of Mauritania also about this time despatched ships to visit them + reported to Augustus Cæsar that the islands were clothed with fire.
The original name of them was the Insulæ Fortunatæ but on account of a present of hūd dogs received by king Juba, one island was called Canaria, + in time this name embraced the whole group of islands (Islas Canarias of the Spanish).
The Roman empire fell + all knowledge of them was blotted out; + their existence became once more a story of tradition.
In the 14th century AD the islands were rediscovered by the then great Maritime nation, of the Portuguese.
In 1344 the first expedition was fitted out + followed by others from Normandy

France & Spain, finally in the year 1496 the Spaniards completed the conquest of them subduing & Exterminating (?) the original inhabitants.
Since this time the islands have always remained Spanish possessions though they have been the scene of many naval fights. In 1595 Sir Francis Drake & Sir John Hawkins were repulsed off Las Palmas & also off the island of Gomera. In 1657 Sir John Blake, Admiral, attacked Santa Cruz de Teneriffe. In 1706 Admiral Jennings paid a visit to the group & in 1743 admiral Charles Winton attacked several of the islands. Finally in 1797 admiral Nelson attacked Santa Cruz de Teneriffe & whilst standing on the mole had his arm shattered by a cannon shot fired from one of the forts.
Since the time of the earliest Spanish settlements the islands have been more or less noted for their produce. From 1450 - 1490 sugar cane was extensively planted & competed with Madeira then the principal producer. Lord Verulam writing in 1600 says "that being first in an invention doth sometimes cause a wonderful overgrowth of riches as it was with the first sugar man of the Canaries".
In the 16th century the production decreased being unable to compete with the West Indies.
Before the close of the 15th Century the vine was brought from Madeira, where it had been introduced by Prince Henry of Portugal,

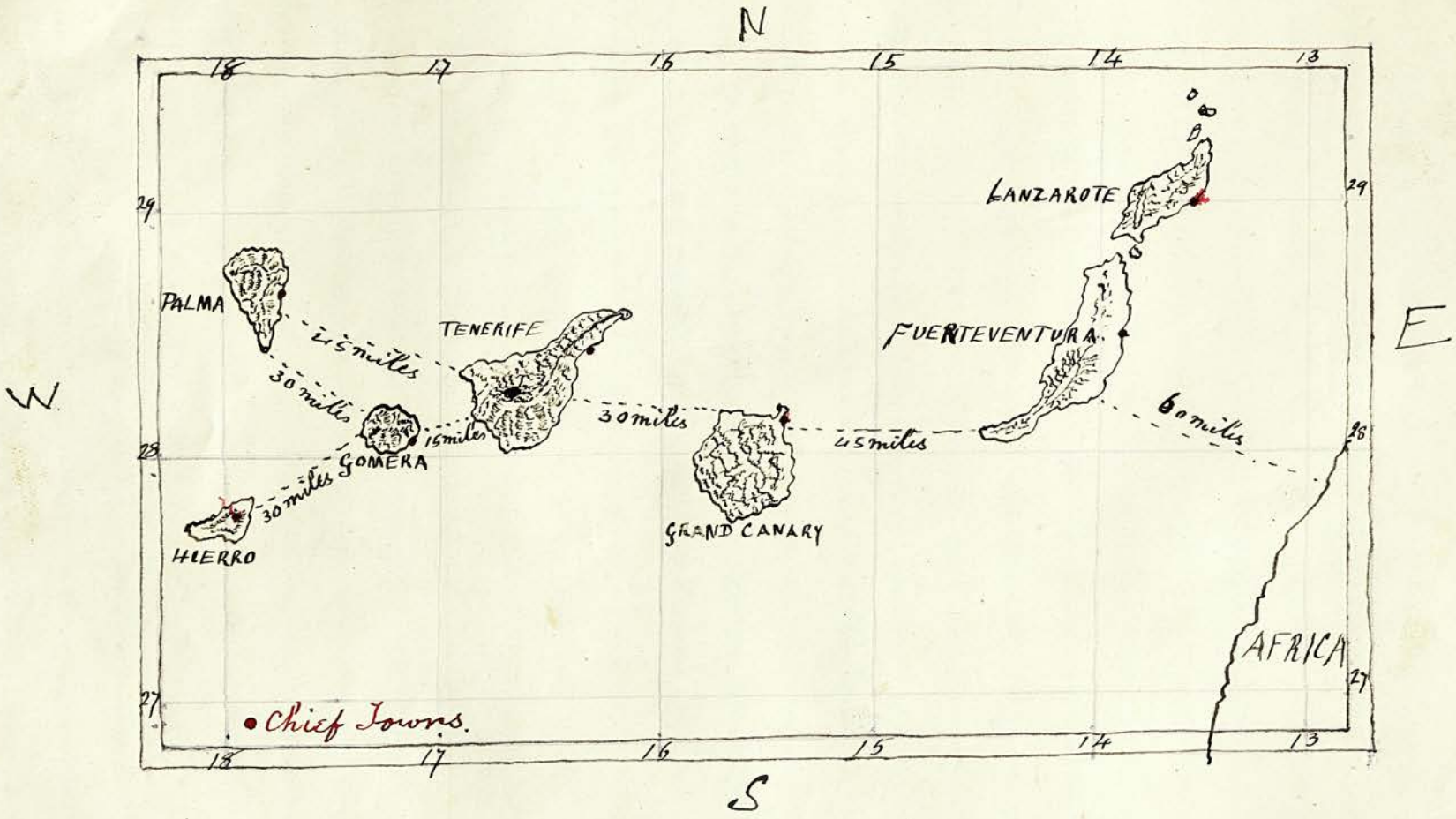
from the famous vineyards of Malmsey & Malvasia in Crete. For a long period the wine from this variety of vine was in much request. Shakespeare puts into the mouth of the Host of The Garter Inn. "Farewell, my hearts, I will to my honest knight Falstaff & drink Canary with him" Till 1850 this vine continued to grow & fruit freely but it was then attacked & nearly exterminated by the ravages of the "Oidium Tuckeri" This special variety of vine has not been able to be replanted & has been replaced by American & other vines.

In 1826 the cochineal insect was first introduced into the islands it was found that the insect throve on the Cactus Opuntia. From 1830 to 1869 the increase of prosperity consequent on this cultivation was out of all proportion to the number of inhabitants, but the discovery of aniline dyes & their subsequent development gradually drove, to a great extent, the cochineal out of the market.

In 1884 the principal ports of Tenerife & Grand Canary began to develope as coaling stations for ocean going steamers & following in the train of increased communications, came the cultivation of Bananas Oranges tomatoes potatoes etc for export, chiefly to the English markets.

Section II

Geographical & Physical features &
their relation to the climate.


N
W
E
S
18
17
16
15
14
13
29
28
27
LANZAROTE
FUERTEVENTURA
PALMA
TENERIFE
GOMERA
HIERRO
GRAND CANARY
AFRICA
15 miles
30 miles
15 miles
30 miles
30 miles
15 miles
60 miles
Chief Towns.

Section II

Geographical & Physical features & their relation to the climate.

The Canary archipelago situated between the 28th & 29th North parallels & the 13th & 18th W Long. extends over a much greater area in regard to Longitude than Latitude.

In considering the climate no account need be taken of the difference in Latitude, & If the islands had been situated in mid ocean, the difference in Longitude need not have been noticed, But the fact; that the easternmost islands extend to within sixty miles of the coast of Africa, & that the westerm islands are about three hundred miles to the west of the coast; considerably modifies not only the climate but necessarily the aspect, the flora, the produce, & even the customs & habits of the islanders themselves.

Lanzarote & Fuenteventura the two most easterly islands have large tracts of land covered either with yellow sand or with lava & cinders.

In Fuenteventura there is less verdure than in any of the islands, there are no forests & very few trees, springs of water are so limited that cultivation depends almost entirely on the precarious rain supply & is therefore confined to those crops, that do not require much water

such as barley wheat & cactus (for cochineal)
The flora is very minute & is more allied to that of the African coast, in fact it has been described as a miniature production. In bad (dry) seasons especially if there are a succession of them, large numbers of the population (with their cattle) emigrate temporarily to the other islands.
The southern part of Lanzarote is similar to the preceding island, in the northern part there are in some places, springs of water, & in the vicinity of these, onions potatoes & tomatoes are cultivated, in the other parts where water is scarce Caracal crops are raised during the winter months.
The western group of islands Palma Hierro & Gomera are well wooded covered with vegetation, & produce Bananas figs peaches sugar cotton & silk. The island of Hierro does not possess any springs of water, the inhabitants are dependant on the rain supply both for domestic & agricultural purposes.
In the island of Teneriffe the north west side is much more fertile than the eastern, as the land is not so dependant on irrigation & springs of water are more abundant.
The eastern side is more similar to Grand Canary into its aspect & crops, more cochineal is reared more cactus & cereals are grown; where water is available for irrigation bananas tomatoes & potatoes are also grown.

In the island of Grand Canary large tracts of land are barren & uncultivated owing to paucity of water for irrigation. Near the sea water tanks for its storage are a marked feature
As in Teneriffe the mountain ranges are destitute of trees.
In considering the differences of climate in the islands proximity to the african coast is I think one of the main factors, but not the only one.
The height of the mountain ranges must be taken into account as a subsidiary & more of a local factor. The greater the altitude of the island the rainfall in the immediate vicinity is greater, the northern & western slopes receiving the greater part.
The following table gives the altitude & indicates the general climate of each island enumerating them from east to west

Island	altitude in feet	climate
Lanzarote	2,244	Dry
Fuerteventura	2,770	Dry
Grand Canary	6,400	Moderately Dry
Teneriffe	12,180	East-Slope Mod. Dry, West-Slope Humid
Gomera	4,400	Humid
Palma	7,730	Humid
Hierro	4,400	Humid

Another factor is the amount of vegetation & the extent to which irrigation can be ~~accomplished~~ practiced; as I have already indicated &

The former
increases in proportion to the distance of the island
from the coast + pari passu the necessity for
irrigation decreases.
The Physical features of the group have to some extent
been indicated in regard to productions etc but
there are two other features to be noted common
to all the islands viz the traces of volcanic
eruptions + the great number of deep ravines,
(sometimes perhaps partaking more of a valley)
that are known by the name of 'barrancos' + that run
from the mountains to the sea.
Volcanic activity has ceased for many years
but at the base of the cone of the peak of Teneriffe
+ in the 'Monte de Fuegos' in Lanzarote
the ground is so hot that the heat will
boil eggs + cook eggs.
The dates of eruptions in Modern times are as follows
In the island of Palma 1585 + 1677 AD
.. .. .. Teneriffe 1706 (Guanches) 1705 (Guinions)
.. .. .. Lanzarote 1730, 1733, 1765 + 1823 ..
In the island of Palma there is an enormous
crater with its breach to the west side of the
island, it is 6,780 feet deep + from five to
seven miles across at its edge.
In all the islands extinct craters + streams
of lava are seen. In many places underlying
the strata of larval ash, may be seen strata
of basalt; the substance of which, in some
cases, is much more open + honeycombed than

others. In some parts strata of lava alternate with strata of alluvial clay in which are embedded boulders of a dense bluish stone. The sand of the sea shore except in two or three regions is a black volcanic sand. Near the summit of the peak of Teneriffe large quantities of pumice stone are found associated with deposits of sulphur. Limestone has only been found in Lanzarote the south of Grand Canary.

From what has been indicated the 'barrancos' of the eastern islands are usually bare of trees whilst those of the western are as a rule more or less clothed with trees scrubs etc.

The island of Hierro is somewhat of an exception the whole island being more or less elevated of a tableland, elevated to a greater or less extent above sea level the barrancos are much shorter more precipitous. The peaks of this island are most noted

a difference in the temperature of the sea has been stated to affect the climate of different islands. as will be seen the temperature of the sea at Grand Canary has practically the same at the eastern & western islands though one degree colder at the former islands. There is a cold current running southwards, along the african coast, that varies in breadth & temperature & may be ten or more degrees lower than that of the ocean; but it is very slightly if at all felt at Fuerteventura or Lanzarote. In this cold water current are found what may be called cold water fish, these are not found round the islands as a general rule. The catching & salting of these fish form a staple industry of the islands which has Grand Canary as its great depot.

Section III.

Part I

Meteorology

winds.

Temperature of Sea

Temperature in Shade

Temperature in open.

Humidity.

Section III

Meteorology

The meteorology of the islands has been unsatisfactorily recorded the data being scanty & often unreliable.

The most extensive & complete set of observations, as far as I can ascertain, are those observed by myself in Las Palmas Grand Canary & as in addition Las Palmas is, owing to its position, more free from purely local influences than any other part, I will, first, describe its meteorological conditions illustrating them by my data; & afterwards, I will give those of the other parts, using what data I have been able to obtain.

There are certain regions of the globe that go under the name of the "Heart of the Trade" on account of a wind prevailing more or less steadily, day after day, throughout the year, from a certain quarter.

The particular Heart of the Trade in the region under consideration is that of the North East-Trades.

In any insular climate, where the island is of small Extent; the greatest factor must be the winds & it may be inferred that the greatest factor in this region is the north east trades, that with few intermissions prevail all through the year.

From observations made daily at the hours of

Statistics of winds from the Northern Direction

Number of occasions N.W. N. & NE winds observed

9 a.m.	Jan	Feb	Mar	April	May	June	July	Aug	Sept	October	Nov	Dec	Total	Mean of 6 years
1888	—	—	—	—	—	—	—	—	—	10[1]	19	21	49	87
1889	21	16	20	27	26	—	—	—	—	23[2]	19	21	172 (265)	286
1890	12	19	22	27	28	27	31	—	24	17	19	22	248	331
1891	15	10	17	27	26	29	29	30	24	22	23	9	258	358
1892	16	11	21	27	28	30	30	—	26	24	25	17	255	331
1893	10	15	17											
average	14·8	14·2	19·4	26·2	27	28·6	30	30	24·6	21·5	21	18	(256)	(344)
Noon														
1888	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1889	—	—	—	—	—	—	—	—	—	20[2]	20	20	60	83
1890	16	17	23	27	27	29	31	—	27	22[2]	19	23	261	331
1891	16	11	19	26	27	30	29	29	27	25	24	9	272	358
1892	15	13	20	22	28	30	30	—	28	25	25	19	255	331
1893	8	13	19											
average	13·7	13·5	20·4	25	27·3	29·6	30	29	27·3	23	22	18	(263)	(340)
9 p.m.														
1888	—	—	—	—	—	—	—	—	—	12[1]	17	21	50	81
1889	19	20	24	29	29	—	—	—	—	19[2]	15	25	179 (255)	230
1890	13	17	22	28	26	30	30	—	15	7	20	16	224	331
1891	14	5	17	23	27	28	28	29	22	20	20	12	245	358
1892	15	14	22	24	28	30	25	—	25	22	20	15	240	330
1893	14	22	19											
average	15·0	15·6	20·8	26	27·5	29·3	27·6	29	20·6	17	18·4	17·8	(243)	(345)

1 — 21 days observations only & not calculated in average
2 — 22 days " "

9 am noon & 9 pm from October 1888, up to the present time, it will be seen that; morning noon & night throughout the various months of the years, the wind prevails from a northern direction more than from any other direction. From October to april though fairly constant the winds are not so constant, as from May to September & the daily variation in force is less marked during the latter period than the former. Usually this set of winds are light at sunise & increase in force during the morning, after sunset they may diminish veering a few points towards the west; though the winter months they may diminish in force & occasionally die away & the atmosphere is calm or a land breeze from the west springs up.

I have not given separate tables for the various winds from the northern direction as it would multiply them out of all proportion. It may be noted that the wind from the North west does not prevail continuously though any length of time & often, if early in the morning it is blowing from that direction, it soon veers towards the North East. Thus

		9 am	Noon	3 pm	9 PM
1889 Nov. 14	Direction of wind	N.W.	N.E.	N.E.	W.
1890 March 30	"	N.W.	N.	N.	N.
1891 Dec 31	"	N.W.	N.	N.	N.

Observations made at noon

		Wind Direction	Force	Form of Clouds	State of Sea	Temperature in the Shade	Sunshine Hours Min.	Rainfall Inches
June 1891	1	N.E.	3	cirro-cumuli	slight	72.5°7	5 — 50	Trl
	2	N E	2	—	..	71.0	11 — 30	..
	3	N	2	—	Moderate	71.5	11 — 40	..
	4	N N W	3	Cirro Cumuli	..	71.0	6 — 30	..
	5	N	3	ditto	..	72.5	6 — 10	..
	6	N	3	—	..	72.5	11 — 50	..
	7	N	3	Cirri	..	72.5	8 — 00	..
	8	S N E	2	—	..	73.0	10 — 10	..
	9	N	3	Cumuli	..	70.5	4 — 10	..
	10	N	3	ditto	..	72.5	2 — 30	..
	11	N E	4	ditto	..	70.0	0 — 40	..
	12	N N E	4	ditto	..	69.5	2 — 00	..
	13	N	3	—	..	71.5	11 — 20	..
January 1891		—	—	—	—	—	—	—
	1	N.W	2	—	slight	68.5	7 — 40	..
	2	N	1	—	..	67.0	9 — 30	..
	3	S N E	2	Cirro Cumuli	..	66.5	6 — 00	..
	4	N E.	2	Cumuli	..	64.5	1 — 40	..
	5	S.E.	1	cirro cumuli	..	65.0	6 — 10	..
	6	N.W	2	ditto	..	64.0	0 — 20	..
	7	N.E.	2	ditto	..	64.5	6 — 40	..
	8	N. E.	4	ditto	Mod.	64.5	0 — 30	..
	9	N.N.E	3	cumulo stratus	Mod	61.0	0 — 10	..
	10	N	3	Cirri	Mod	64.5	5 — 20	..
	11	N N E	4	Cumuli	Mod	62.0	1 — 20	.015
	12	E	4	cirro cumuli	Mod	63.5	3 — 10	Trl
	13	S.S.E.	2	ditto	Mod	63.0	8 — 00	..

Through summer (May to October) a wind from this direction is rarely felt as then the direction is from the N or N.E.

The effect of this northern wind on the climate may be divided into two parts, according to the time of year viz from april to October, & November to March. During the first period it prevails more continuously, more from the North & Northeast; its force is more constant & it is accompanied with little or no rain though as will be seen the sky is more clouded (see sunshine). During the latter period this northern set of winds are the prevailing winds but not so constant as in summer, the force is not so regular & if the force is strong (3-4) the weather is apt to be cloudy & may be accompanied by short sharp showers of rain.

This however will be more distinctly seen when the rainfall is under consideration. On the page facing this, I have given examples ~~first~~ of weather in June & of the weather in January The force of the wind in the tables is estimated according to Beaufort's scale, being nothing more than pure guesswork it is used here & in succeeding examples as approximate.

The force of these northern set of winds is more constant than the summer months than the winter & at sunset it does not tend to abate.

Statistics of the wind from the Eastern Direction

Number of occasions wind observed in the E. during the months

9 a.m.	Jan.	Feb	March	April	May	June	July	Aug	Sept.	Oct.	Nov.	Dec	Total	Prop.
1888	—	—	—	—	—	—	—	—	—	2	4	2	8	81
1889	3	5	5	2	2	—	—	—	—	1	3	6	27	234
1890	5	3	5	0	2	0	0	-	0	9	5	2	31	331
1891	3	1	2	3	2	1	2	1	2	0	2	9	28	358
1892	0	5	1	0	3	0	0	—	0	1	2	4	16	331
1893	3	7	2										+	+
average	2·8	4·2	3·0	1·25	2·2	·3	·6	1	·6	2·6	3·2	4·6	(25)	(344
Noon	+	+	+	+	+	+	+	+	+	+	+	+	+	+
1888	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1889	—	—	—	—	—	—	—	—	—	1	4	5	10	83
1890	4	5	8	0	4	0	0	—	1	5	6	3	36	331
1891	3	1	4	0	1	0	2	2	0	0	3	8	24	358
1892	2	5	1	1	3	0	0	0	0	0	3	4	19	331
1893	3	7	7											
average	3·0	4·5	5·0	·3	2·6	0	·6	1·0	·3	1·5	4·0	5·0	(26)	(340
9 p.m.														
1888	—	—	—	—	—	—	—	—	—	0	1	0	1	81
1889	0	0	1	0	0	—	—	—	—	0	0	1	2	234
1890	0	0	1	0	0	0	0	—	0	4	2	1	8	331
1891	3	1	0	0	0	0	0	0	0	0	0	3	7	358
1892	0	2	0	0	0	0	0	—	1	0	0	0	3	330
1893	0	0	0										~~2~~	~~344~~
	·6	·6	·4	0	0	0	0	0	·4	·8	·6	1·0	14	344

A wind from an eastern direction is almost entirely absent from June to October. Through the winter months it prevails for a day or two It is rare for its force to be strong usually at sunset the direction changes or through the evening a wind from the west prevails or else there may be a calm.

This wind may occasionally be of a local nature when the weather participates in the weather prevailing in the vicinity of the islands which under these circumstances is usually cloudy perhaps with rain. The following examples show however what is the typical weather associated with this wind

	Wind		Temperature in Shade		Rainfall	Sunshine		Humidity. Sat = 100			
	Direction	Force	Max	Min	Inches	Hours	Min.	9 a.m.	noon	3 p.m.	9 p.m.
			7°	7°							
1889 Jan. 27th	E	0-1	69.5	58.5		9	00	59	62	62	79
1889 Feb 17th	E	0-1	69.0	58.0		10	20	68	58	56	87
1890 May 8th	E	0-1	71.5	57.0		9	00	54	59	64	70
" " 9th	E	0-1	71.5	59.0		12	40	65	57	66	59
1891 March 20th	E	1-2	70.0	60.5		7	20	68	56	68	80
" " 27	E	0-2	72.0	57.5		10	40	52	55		59

In all its characters it approximates much more (as will be seen) with those of the south wind, only its force is never so great nor does not blow so continuously as the South wind may do. Occasionally it may prevail for a day when the wind is veering round to the South

Statistics of winds from the Southern direction

Number of occasions wind observed from the SE. S during the Months

9 a.m.	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	Regular observ.
1888	—	—	—	—	—	—	—	—	—	7	7	1	15	81
1889	6	5	2	1	0	—	—	—	—	0	4	2	20	236
1890	8	3	1	0	1	0	0	—	0	3	0	3	18	331
1891	8	9	7	2	2	0	0	0	1	3	1	10	42	358
1892	8	4	6	2	0	0	0	—	0	4	1	6	31	331
1893	12	4	6											
	8·4	5·0	4·5	1·2	·75	0	0	0	·3	3·4	2·6	4·4	(28)	(344)
Noon														
1888	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1889	—	—	—	—	—	—	—	—	—	0	5	3	8	83
1890	7	5	0	0	0	0	0	—	0	4	1	0	17	331
1891	9	12	8	4	2	0	0	0	1	4	1	10	51	358
1892	10	9	8	4	0	0	0	—	1	5	2	6	45	331
1893	14	7	5											
	7·5	8·2	5·2	2·6	·6	0	0	0	·6	3·2	2·2	4·7	(37)	(340)
9 p.m.														
1888	—	—	—	—	—	—	—	—	—	0	1	0	1	81
1889	1	0	1	0	0	—	—	—	—	0	1	1	4	236
1890	0	0	0	0	0	0	0	—	0	1	0	0	1	331
1891	0	2	2	0	0	0	0	0	0	0	1	0	5	358
1892	4	1	1	0	0	0	0	—	0	0	0	0	6	330
1893	6	0	1											
	2·5	·6	1·0	0	0	0	0	0	0	·2	·6	·2	4·5	344

The winds from the Southern direction S.E. to S. similar to the preceding are much rarer during the summer months than winter months. Usually they do not prevail continuously but may blow strongly. on the days during which they prevail the force is light at sunrise perhaps there may be no breeze at all but in the course of three or four hours the force increases; at sunset they usually die down being replaced by a calm or a breeze from the west; very rarely does a wind from the north spring up
The sky during this wind is usually clear but often there is a yellow haze on the horizon
The humidity is usually low, though there may be a high degree; if especially from any reason the sky is clouded.
The excessive range of temperature & Barometric pressure etc. will be considered under the various heads.

Examples of weather during South wind.

	Wind Direction	Force	Temperature Max	Temperature Min	Rainfall Inches	Sunshine Hours	Sunshine min	Humidity Sat. = 100 9 A.M.	Humidity Sat. = 100 Noon	Humidity Sat. = 100 3 pm	Humidity Sat. = 100 9 pm
1889 Feb 19th	S.E.	1-2	68·07	56·0		10	— 30	75	58	58	63
" 20th	S	1-2	71·0	61·0		10	- 30	46	43	36	52
" Nov 23rd	S.E.	2	73·0	63·0		9	- 40	60	50	53	29·5
" 24th	S.E	2	71·0	63·0		8	- 30	61	51	—	53·5
1890 Jan. 23	S.E	1-2	67·5	55·5		9	- 50	55	54	62	81
" 24	S.S.E.	1-2	70·0	57·5		9	- 00	54	50	60	52
" 25	S.S.E.	1-2	69·0	59·0		9	- 50	52	62	60	71

Statistics of wind from S.W. & W. Noon of the days from the S.W. Noon of the night from the West.

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct.	Nov	Dec	Total	No of observ.
1888	—	—	—	—	—	—	—	—	—	0	0	0	0	81
1889	0	0	0	0	0	0	—	—	—	0	0	0	0	236
1890	0	0	0	0	0	0	0	—	0	0	0	0	0	331
1891	0	0	0	0	0	0	0	0	0	0	1	1	2	358
1892	1	0	0	0	0	0	0	—	0	0	0	0	1	331
1893	0	0	0											
	·2	0	0	0	0	0	0	0	0	0	·2	·2	(·6)	(344)
Noon														
1888	—	—	—	—	—	—	—	—	—	0	0	0	—	—
1889	0	0	—	—	—	—	—	—	—	0	0	0	0	83
1890	0	0	0	0	0	0	0	—	0	0	0	0	0	331
1891	0	0	0	0	0	0	0	0	0	0	1	0	1	358
1892	0	1	0	0	0	0	0	—	0	0	0	0	1	331
1893	1	0	0											
	·2	·2	0	0	0	0	0	0	0	0	·2	0	(·5)	(340)
9 pm														
1888	—	—	—	—	—	—	—	—	—	2	11	6	19	81
1889	5	5	2	0	0	—	—	—	—	4	6	3	25 (28)	236 (358)
1890	10	5	2	2	0	0	1	—	11	9	4	7	49	331
1891	7	6	4	1	0	0	0	0	1	3	3	6	29	358
1892	4	3	3	6	0	0	0	—	0	3	7	10	30	330
1893	8	5	7	—	—	—	—	—	—	—	—	—		
	6·8	4·8	3·6	·6	0	0	·3	0	4	4·2	6·2	6·4	34	344

Examples of weather in south wind Continued

		Wind Direction	Force	Temperature Max.	Min	Rainfall	Sunshine Hours. Min	Humidity Sat = 100 9 am	Noon	3 pm	9 pm
1891	Jan. 27	S. E.	2	67·5	55·0		10 — 10	60	60	60	70
	.. 28	S.S.E.	1	69·0	56·5		10 — 10	62	62	51	81
	.. 31	S E	1-2	71·0	57·5		9 — 30	67	49	62	81
1892	Oct 28th	S E	0-1	80·0	63·5		10 — 00	59	57	—	85

Example of moist weather with south wind.

1888	Oct 13	S.S.E.	2-3	77·5	66·0		Not registered.	74	—	—	88
	.. 14	S S E	2·3	79·8	65·5			86	—	—	81
	.. 15	S.S.E	2·3	78·0	66·5			71	—	—	88
1892	Oct 10	S.S.E.	1-2	78·5	66·5		1 — 20	81	72	70	83
..	Dec. 1st	S. E	3-4	69·5	58·0		4 · 00	73	70	71	83
..	Dec. 2nd	S. E.	3-4	68·5	60·5	—	0 30	78	78	86	83
..	Dec. 3	N.E.	1-2	73·5	54·5		7. 00	73	71		77
..	Dec. 4	S. E.	2	72·0	61·5	·210	6. 00	80	76		90
..	Dec. 5	S. E.	3	72·5	65·5	·240	6. 50	73	73		85
..	Dec. 6	S.E-NE	0-1	71·0	65·0	·030	0. 00	83	83·6		73
..	Dec. 7	E. N	0	74·5	66·0		1. 20	79	72		78
..	Dec. 8	S. E	1-2	74·5	65·0		5. 00	71	77		83

It will be noted that in addition to excess of humidity there is a more cloudy state of the atmosphere & the range of temperature is not so great, the causes of the difference are difficult to state, but the little evidence at hand seems to indicate that this latter wind is of a local character due to disturbances of the weather to the North, & that it does not extend any distance to the South of this region — therefore is not affected by the coast of african desert. Whilst the dry character of the wind is due to this factor the general extension to the South & East

Examples of weather in South wind Continued

		Wind Direction	Force	Temperature Max.	Min	Rainfall	Sunshine Hours. Min	Humidity Sat = 100 9 a.m.	Noon	3 p.m.	9 p.m.
1891	Jan. 27	S.E.	2	67·5	55·0		10 — 10	60	60	60	70
	" 28	S.S.E.	1	69·0	56·5		10 — 10	62	62	51	81
	" 31	S E	1-2	71·0	57·5		9 — 30	67	49	62	81
1892	Oct 28th	S E	0-1	80·0	63·5		10 — 00	59	57	—	85

Example of Quiet weather with south wind.

1888	Oct. 13	S.S.E.	2-3	77·5	66·0		Not Registered.	74	—	—	88
	" 14	S S E	2-3	79·8	65·5			86	—	—	87
	" 15	S.S.E	2-3	78·0	66·5			71	—	—	88
1892	Oct 10	S.S.E.	1-2	78·5	66·5		1 — 20	81	72	70	83
"	Dec. 1st	S E	3-4	69·5	58·0		4 · 00	73	70	71	83
"	Dec. 2nd	S E	3-4	68·5	60·5		0 30	78	78	86	83

winds from the South west are rarely observed in Las Palmas, as if blowing out at sea from this direction, the wind itself is not felt though its effects are. Thus during the first week of March 1890 strong South Gales were prevalent in the vicinity of the islands the weather was the worst on record, yet (as will be seen under rainfall) no South west wind was felt, but one from the East. For this reason I have combined the tables of the wind from this quarter with those from the west. A wind from the west during the day is very rare. This is essentially a land breeze springing up at sunset after a day of south or east wind. much more rarely after a south wind. It is therefore entirely a local wind + does not present any further characteristics of importance.

A wind from the west during the day is usually associated with very boisterous rough weather.

Statistics of "No wind"

From observations made during each day of each month

9am	Jan.	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov.	Dec	Total	No. of observ.
1888	—	—	—	—	—	—	—	—	—	1	0	7	8	87
1889	2	2	4	0	3	—	—	—	—	0	5	2	18 (20)	236
1890	6	3	3	3	0	2	0	—	5	2	6	4	34	331
1891	5	6	5	2	3	0	0	0	0	1	3	3	28	358
1892	6	9	3	1	1	0	0	—	0	3	2	6	31	331
1893	6	2	6											
	5.0	4.8	4.2	1.5	1.7	.6	0	0	1.6	1.4	3.2	4.4	(28)	(344)
Noon														
1888	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1889	—	—	—	—	—	—	—	—	—	2	1	2	5	83
1890	4	1	0	0	0	1	0	—	2	0	4	5	17	331
1891	3	3	0	0	0	0	0	0	0	1	0	3	10	358
1892	2	2	1	2	0	0	0	—	0	1	0	2	10	331
1893	5	1	0											
	3.6	1.7	.2	.6	0	.3	0	0	.6	1.0	1.2	3.0	(12)	(341)
9pm														
1888	—	—	—	—	—	—	—	—	—	5	1	3	9	81
1889	6	3	4	0	3	—	—	—	—	1	8	1	26 (29)	236
1890	8	6	6	2	5	0	0	—	0	10	4	8	49	331
1891	7	14	8	6	4	2	3	2	4	5	5	10	71	358
1892	8	9	4	6	4	0	4	—	1	5	3	4	48	330
1893	3	1	4											5
	6.4	7.0	5.2	3.5	4.0	.6	2.3	2	1.6	5.2	4.2	5.2	49	344

"No wind" of any description lasting thro the entire day is very rare in comparison with the other winds. At 9 a.m. it is more frequent than at noon & again it is more observed in the evening. In many cases where a calm is observed at 9 a.m a breeze from some-where springs up in the course of the morning naturally it is much rarer thro the summer months than the winter. The weather during these calm days is not very pleasant as if the sky is clear the heat of the sun is oppressive if the sky is cloudy then the degree of humidity is high & the weather equally oppressive.

The <u>Force of the Wind</u> is recorded according to Beaufort's scale 0 – 12. This mode is somewhat rough & perhaps often erroneous. The value of the table of statistics is therefore open to some doubt & I have refrained from giving them.

Rarely does the North wind exceed ℔ 4 usually it is 1. 2 or 3; the East & South winds are 1 & 2 rarely 3 or 4.

Associated with the force of the winds is the condition of the sea. When is it calm usually it may be described as 'Moderate' or 'Ground Swell' occasionally it may be 'rough'. The table of statistics have been omitted as their value is not great.

Of much more importance is the temperature

Degrees Fah. Temperature of the Sea at a depth of 3 feet Means.

Noon	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1888	—	—	—	—	—	—	—	—	—	72.8	70.1	68.7
1889	66.7	65.0	65.8	64.6	66.7	—	—	—	—	70.3	69.9	66.0
1890	64.1	63.9	63.3	64.5	65.4	68.1	70.0	—	72.1	72.7	69.6	66.9
1891	64.2	63.9	65.2	66.5	67.8	69.9	73.0	74.3	74.5	73.0	70.7	68.2
1892	66.6	66.0	66.0	66.6	67.1	69.9	72.0	72.8	73.5	73.5	70.5	67.8
1893	66.9	66.5	66.7									
Mean av.	65.7	65.1	65.4	65.5	66.8	69.3	71.6	73.5	73.4	72.4	70.2	67.5
Highest Recorded Observation												
1888	—	—	—	—	—	—	—	—	—	74.0	72.0	70.0
1889	68.0	66.0	67.5	65.0	68.0	—	—	—	—	70.5	70.5	68.0
1890	64.5	64.0	65.0	65.0	67.0	69.0	71.0	—	72.5	73.0	71.0	68.0
1891	65.5	64.5	65.5	68.0	69.0	72.5	74.0	75.0	75.0	74.0	72.0	69.5
1892	67.0	66.0	66.0	67.0	67.5	71.0	72.5	73.0	74.0	74.0	72.0	69.0
1893	67.0	66.5	67.0									
Mean av.	66.4	65.4	66.2	66.2	67.9	70.8	72.5	74.0	73.8	73.1	71.5	68.9
Lowest Recorded Observation												
1888	—	—	—	—	—	—	—	—	—	72.0	70.0	67.8
1889	66.0	64.5	65.0	64.0	64.5	—	68.5	—	—	70.0	69.5	64.0
1890	64.0	63.7	63.0	64.0	64.0	67.0	68.5	—	71.5	71.0	68.0	65.5
1891	64.5	63.5	64.5	65.5	67.0	69.0	72.5	74.0	73.5	71.0	69.0	67.0
1892	66.0	66.0	66.0	66.0	67.0	67.0	71.0	72.5	73.0	72.0	69.0	67.0
1893	66.5	66.5	66.5	—	—	—	—	—	—	—	—	—
Mean av.	65.4	64.8	65.0	64.9	65.6	67.6	70.6	73.2	72.6	71.2	69.1	66.2

Temperature of the sea on the last day of December 1888 67.8° Fah.

.. .. .. 1889 64.0 ..

.. .. .. 1890 65.5 ..

.. .. .. 1891 67.0 ..

.. .. .. 1892 67.0 ..

of the Sea. This was ascertained at a depth of from two to three feet ~~blow~~ below the surface in never less than eighteen feet of water usually much more. The observations were usually taken at noon. The highest temperature of the sea is in August & September & the lowest in February & March. ~~In November~~. From October to December it falls rapidly & then May June July it rises as rapidly the other months it is more stationary though there is some oscillations to be observed. as far as I have observed, external influences have not much influence on the temperature The currents are all from the north & the prevailing winds assist the currents in making the sea run from north to south. The South wind does not blow continuously enough to affect the temperature or the current to any appreciable extent.

To shew the connection between the temperatures of the sea & air the figures for December 1889/1890 are very interesting, as the fall of sea temperature that month was much greater than usual, & the temperature of the air was also (as will be seen) under the average.

The temperature of the sea round these islands does not vary much Thus at the end of November 1892 it was 69°.7 at Las Palmas; on Nov 27th to 30th at Fuerteventura it was 68°.7, on Nov. 28th to 29 at Lanzarote it was 68.0°.7 In March 1893 whilst 66°.5 at Las Palmas, on Feb. 28th at Hierro it was 66°.7, on March 1st at Gomera 66°.7 on March 2nd at La Palma 66.0°.7 & on March 3rd at Santa Cruz de Tenerife 66°.7.

Mean Monthly Shade Temperatures

Maximum Shade Temperature

	Jan.	Feb	Mar.	April	May	June	July	Aug	Sept	Oct.	Nov	Dec
1888	—	—	—	—	—	—	—	—	—	78·0	72·8	68·7
1889	65·2	66·2	66·7	65·8	69·7	—	—	—	—	73·0	71·5	66·8
1890	67·0	66·9	64·7	67·8	69·4	72·0	72·2	—	76·3	75·8	71·2	67·3
1891	65·2	67·1	69·9	71·0	70·7	74·6	78·1	80·0	78·0	76·2	71·8	70·7
1892	68·5	70·2	69·6	70·5	72·0	74·3	78·0	78·5	78·8	76·9	73·2	70·3
1893	68·5	70·0	70·8	—	—	—	—	—	—	—	—	—
	66·8	68·1	68·3	68·8	70·4	73·6	76·1	79·2	77·7	76·0	72·1	68·8

Minimum Shade Temperature

1888	—	—	—	—	—	—	—	—	—	67·7	63·6	60·8
1889	57·4	57·8	59·5	58·8	62·1	—	—	—	—	65·3	63·3	58·6
1890	57·5	57·8	57·6	60·1	63·0	65·4	66·5	—	67·8	67·3	62·8	58·1
1891	57·0	56·2	58·3	60·6	62·8	66·8	70·0	69·6	68·0	67·4	62·7	61·0
1892	58·7	60·0	58·7	59·6	63·0	66·2	70·0	70·8	69·3	66·6	63·8	60·2
1893	58·6	57·9	60·3	—	—	—	—	—	—	—	—	—
	57·8	57·9	58·9	59·8	62·7	66·1	68·8	70·2	68·4	66·8	63·2	59·7

Range of Temperature

1888	—	—	—	—	—	—	—	—	—	10·2	9·2	7·9
1889	7·8	8·7	7·2	7·0	7·6	—	—	—	—	7·7	8·2	8·2
1890	9·5	9·1	7·2	7·7	6·4	6·6	5·7	—	8·5	8·5	8·4	9·2
1891	8·2	10·9	11·2	10·4	7·9	7·8	8·0	10·4	10·0	8·8	8·1	9·7
1892	9·8	10·2	10·9	10·9	9·0	8·1	8·0	7·7	9·5	10·3	9·4	10·1
1893	9·9	12·1	10·5	—	—	—	—	—	—	—	—	—
	9·0	10·2	9·4	9·0	7·7	7·5	7·2	9·0	9·3	9·1	8·7	9·1

Mean Monthly Shade Temperatures Continued.

Mean Shade Temperature

	Jan.	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1888	—	—	—	—	—	—	—	—	—	72.8	68.2	64.7
1889	61.3	62.1	63.7	62.3	65.9	—	~~6~~	—	—	69.1	67.3	62.7.
1890	62.2	62.7	61.1	63.9	66.2	68.7	69.3	~~74.3~~	72.0	71.5	67.0	62.7
1891	61.1	61.7	64.3	65.8	66.7	70.7	74.0	74.8	73.0	71.8	67.3	65.8
1892	63.6	65.1	64.1	65.0	67.5	70.2	74.0	74.6	74.0	71.7	68.5	65.2.
1893	63.5	63.9	65.5	—	—	—	—	—	—	—	—	—
	62.3	63.0	63.7	64.3	66.6	69.8	72.4	74.7	73.0	71.4	67.6	64.2

The Thermometer for registering these Shade temperatures were exposed in a Stevensons screen. Both the maximum & minimum were self registering ~~were~~ 'read' & 'set' every day of the various months recorded. The main distinctive feature about the Shade temperature is its equability not only is the daily range very small 7 - 10 degrees but ~~the~~ yearly range is also small; the mean Shade Temperature ranges from 62°7 to 63°7 ~~the~~ in the coldest months; to 73°7 to 75°7 in the warmest months. January February & March are the coldest months July August & September the warmest. The temperature falls rapidly in November & December & ~~January~~ & rises rapidly in May June July

Usually in observations of this kind the highest & lowest recorded observations are given for each

Maximum Shade Temperature recorded. Degrees Fah.

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1888	—	—	—	—	—	—	—	—	—	85.5	75.5	73.5
1889	07.5	72.5	72.0	69.0	77.0	~~87.5~~	—	—	—	77.5	74.5	70.5
1890	71.0	74.5	72.0	71.5	80.0	87.5	76.0	—	82.0	80.5	74.5	72.5
1891	71.0	71.0	75.0	82.0	80.0	77.5	83.0	85.5	81.0	81.5	79.5	76.0
1892	78.5	75.5	82.0	76.5	77.0	77.5	81.5	82.0	80.0	80.5	77.5	76.0
1893	73.5	73.5	81.5	—	—	—	—	—	—	—	—	—

Minimum Shade Temperature Recorded.

1888	—	—	—	—	—	—	—	—	—	62.5	58.5	57.0
1889	55.0	54.5	56.5	53.5	58.0	—	—	—	—	58.0	61.5	52.5
1890	54.0	53.5	51.5	56.0	57.0	61.5	64.5	~~67.5~~	65.5	65.0	58.0	53.5
1891	51.5	52.0	54.5	58.5	59.5	64.5	67.5	67.5	66.0	63.0	58.0	57.5
1892	56.5	57.0	55.0	56.0	56.5	61.0	67.5	68.5	65.0	63.5	59.5	55.0
1893	53.0	55.0	55.0	—	—	—	—	—	—	—	—	—

Effect of the Northern wind on temperature etc

1890 March	Wind Direction	Wind Force	Sunshine Hours	Sunshine Min.	Shade Temperature Maxim	Shade Temperature Minim	Shade Temperature Range
16	N	0-2	9	- 30	72.5°7	60.5 F°	11.5 Fo
17	N	1	7	- 00	68.0	61.5	7.0
18	N	2-3	4	- 40	64.0	58.5	4.0
19	N	2-3	3	- 20	65.5	59.0	6.5
20	N	2-3	1	- 30	64.5	59.5	5.0
21	N	2-3	1	- 20	63.5	59.5	4.0
22	N	2-3	0	- 50	64.5	60.5	4.0
23	N.E.	1-2	2	- 20	63.5	59.5	4.0
24	N.E	1-2	3	- 10	65.5	61.0	4.0
				average for the Month	64.7	57.6	7.2

month. The value of them appears to me rather slight as they are usually nothing more than eccentricities.

The effect of the winds on the temperature may be gathered from the remarks on the winds.

When the wind is from the Northern direction; the greater the force is, the mean temperature is lower; it often is more cloudy; this is seen much more in the winter time, especially when there is cold perhaps snowy weather in the South West of Europe This low temperature however is not so much due to the temperature being lower at nighttime as it is due to a low temperature thro the day. In fact the temperature at nighttime on such days may be higher than the average, making the range of temperature lower than the average range. This is seen more clearly from the example given with the South wind on the contrary the greater the force, the temperature is higher, the range greater on account of the low temperature at nighttime, this beg due to radiation

1891 Jan	wind. Direction	Force	Sunshine Hours Min	Shade Temperature Maxim	Minim.	Range
25	S.E.	0-2	6 — 50	63.5°F	57.5°F	6.0°F
26	E.S.E.	1-2	9 — 10	67.0	56.5	10.5
27	S.E.	2	10 — 10	67.5	55.0	12.5
28	S.S.E.	1-2	10 — 10	69.0	56.5	13.5
29	—	—	10 — 00	70.5	55.0	15.5
30	N.E.	0	10 — 00	68.0	56.0	12.0
31	S.E.	1-2	9 — 30	71.0	57.5	13.5
	average for the Month			65.2	57.0	8.2

Mean of Shade Temperatures recorded at Hours indicated Degrees F°

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
9 a m												
1888	—	—	—	—	—	—	—	—	—	75.0	70.7	66.5
1889	62.9	63.7	64.5	63.5	67.2	—	—	—	—	70.6	69.3	63.3
1890	64.0	63.2	61.9	65.0	66.5	69.5	69.8	—	73.5	73.5	68.2	64.5
1891	63.0	63.1	67.0	68.4	68.6	72.6	75.8	77.4	76.0	74.0	69.5	69.0
1892	65.2	67.0	66.1	67.6	69.9	71.6	75.0	—	75.8	74.2	69.6	67.5
1893	66.0	66.0	68.3	—	—	—	—	—	—	—	—	—
average	64.2	64.6	65.5	66.1	68.5	71.2	73.5	77.4	75.1	73.2	69.4	66.1
Noon 1888	—	—	—	—	—	—	—	—	—	76.3	71.9	68.4
1889	64.7	65.5	65.5	64.5	68.2	—	—	—	—	72.2	70.3	66.0
1890	66.1	65.3	63.6	66.2	67.5	70.5	70.7	—	75.2	74.7	70.0	66.3
1891	63.8	65.4	68.2	69.3	69.3	73.2	76.6	79.0	76.5	74.8	70.5	70.2
1892	67.6	69.0	68.5	68.7	70.9	73.0	76.0	—	76.9	75.0	71.5	68.4
1893	67.4	68.5	70.0	—	—	—	—	—				
average	65.9	66.7	67.1	67.2	69.0	72.2	74.4	79.0	76.2	74.6	70.8	67.8
3 pm 1888	—	—	—	—	—	—	—	—	—	—	70.9	67.1
1889	64.2	65.8	65.5	65.3	68.9	—	—	—	—	71.4	69.3	65.0
1890	65.6	65.5	63.5	66.1	67.7	69.1	71.1	—	74.4	75.0	69.1	66.0
1891	65.8	64.6	67.5	69.4	69.6	73.1	77.4	(76.6)	76.1	74.1	—	—
Average 1892	65.2	65.3	65.5	66.9	68.4	71.1	74.2	(76.6)	75.2	73.5	69.8	66.0
9 pm 1888	—	—	—	—	—	—	—	—	—	70.9	66.8	64.2
1889	61.3	61.0	62.6	62.3	65.2	—	—	—	—	68.8	65.9	62.3
1890	60.1	60.7	59.6	62.6	63.8	67.2	68.3	—	69.3	69.3	65.6	61.2
1891	58.9	58.8	62.1	64.0	64.8	68.8	72.6	73.2	72.5	70.1	65.8	63.2
1892	61.5	62.4	63.1	63.3	65.7	69.1	71.5	—	70.4	69.2	66.4	63.4
1893	61.2	60.8	62.5									
Average	60.6	60.7	61.8	63.0	64.9	68.4	70.8	73.2	70.7	69.6	66.1	62.9

In recording the observations of the Dry & Wet bulb Thermometers for the purpose of estimating the humidity, the readings of the dry bulb are also the readings of the shade temperature at the time of observation. As these were read, always three times a day, & for three years four times a day I am enabled to give a record of the shade temperature at 9 a.m. noon. 3 p.m & 9 p.m.
From the accompanying table it may be seen that by nine a.m. the temperature has risen from 5° to 7°·7 from the minimum temperature, & approximates by that hour much more to the maximum temperature By noon it has risen from 1° to 2° more, but the maximum is not reached till one p.m or two p.m. & at 3 p.m. it has commenced to fall although it appears to be still higher than at 9. a.m. at sundown the temperature falls rapidly to a minimum about an hour after sunset when there is a slight rise of a degree or more but by ten p.m a fall again commences the absolute minimum temperature is reached in the early hours of morning.
From what has been said it can be understood that the fall in temperature is least on cloudy dull days, as the radiation on these days is very slight. & that it is greatest

on days of South wind, when the fall after sunset may be 10° or 15°

In connection with this it may be noted that in tropical & semitropical climates a fall of a few degrees in temperature is often felt, as much as, a much greater fall.

Before leaving this subject of temperature & its influence I should have mentioned in its proper place that on days of South wind it is much cooler at the sea level than in the interior & at a higher level; the weather becomes more unbearable the greater the altitude. There is a much greater variation in temperature, but on this point I have no statistics

In order to possess some idea of the outside temperature. I suspended a thermometer so that it was under the influence of the sun (when it was shining) & also under that of any wind & recorded the observations at the same time as those of the Shade Temperatures. This I called the Temperature in the Sun & wind. The value of these observations I admit is open to doubt as they vary according to the prevalence of sunshine & wind. as has been seen the winds are constant & as will be seen the average of sunshine is very Equal.

They however show how during the summer

Mean of Temperature in the Sun & wind. degrees Fah.

9 a.m.	Jan	Feb	March	April	May	June	July	Aug	Sept.	Oct	Nov	Dec
1888	—	—	—	—	—	—	—	—	—	83.0	76.1	70.4
1889	66.1	69.8	71.5	67.8	71.2	—	—	—	—	77.0	76.4	69.0
1890	72.6	71.5	68.5	70.5	71.5	74.7	73.6	—	85.4	86.5	71.3	73.7
1891	70.0	71.4	78.2	74.6	73.3	76.7	83.6	86.7	82.8	82.5	79.0	77.0
1892	77.8	79.6	74.8	75.4	77.4	78.6	83.5	—	87.2	79.5	73.3	70.7
1893	69.6	71.4	74.0									
average.	71.2	72.7	73.4	72.2	73.3	76.6	80.2	86.7	85.1	81.7	75.2	72.1

Noon												
1888	—	—	—	—	—	—	—	—	—	83.6	77.6	74.5
1889	69.6	74.5	74.5	74.4	74.6	—	—	—	—	79.3	78.7	74.0
1890	75.2	75.0	71.5	74.3	74.5	77.0	76.0	—	83.6	82.6	77.7	70.0
1891	70.0	70.2	78.0	77.3	70.9	78.1	80.0	86.5	86.8	82.9	76.0	77.0
1892	75.2	78.2	72.0	75.2	78.5	79.7	81.5	—	86.9	81.5	76.5	76.0
1893	71.8	73.3	74.3									
average	72.3	74.2	74.0	75.3	74.6	78.3	79.2	86.5	86.4	82.0	77.3	74.5

3 pm												
1888	—	—	—	—	—	—	—	—	—	80.7	74.9	69.7
1889	68.5	72.8	72.3	68.9	73.0	—	—	—	—	74.8	77.9	68.4
1890	74.5	70.6	64.6	70.1	71.5	75.1	75.8	—	80.6	79.2	77.0	71.5
1891	70.0	73.3	75.1	75.9	75.8	78.6	84.0	82.4	81.0	77.4	—	—
average	71.0	72.2	70.6	71.6	73.4	76.8	79.9	82.4	80.8	78.0	76.6	69.9

9 pm												
1888	—	—	—	—	—	—	—	—	—	71.5	66.4	63.6
1889	60.7	60.3	62.0	61.1	64.3	—	—	—	—	68.5	65.9	61.6
1890	59.8	59.9	59.0	61.7	63.5	66.7	68.2	—	69.8	69.0	64.8	61.1
1891	58.5	57.4	61.0	63.1	63.6	67.9	72.6	72.1	71.0	70.1	65.0	62.0
1892	60.6	60.7	61.8	62.0	64.8	68.1	70.1	—	70.2	69.0	66.4	63.7
1893	60.3	60.3	62.2									
average.	59.8	59.7	61.2	62.0	64.0	67.5	70.3	72.1	70.3	69.6	65.7	62.4

months the wind tempers the heat, keeping down the temperature. (whilst during the winter months the temperature is elevated in some degree by that of the sea. These two influences combining to make the climate for equable)
The temperature at 9 p m is perhaps of more value as it is independant of the influence of the sun in corresponding months there is less variation the average of this temperature at this time, is a little lower than the Phoebe temperature for the corresponding time

From the readings of the dry & wet bulb there has been calculated by means of Glaisher's tables, the amount of moisture present in the atmosphere
This I have expressed only in the form of humidity Saturation = 100.
The Statistics of the dry & wet bulb the other calculations of Dew point; Elastic force of vapour, &c &c I have omitted as the tables of Statistics would be greatly multiplied & they are already numerous enough.
The readings were taken at the same hour as the previous one the various tables I have kept distinct.
Naturally the degree of humidity is highest in the morning. although it is rare that saturation

Humidity Saturation = 100

9 a.m.	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1888	—	—	—	—	—	—	—	—	—	71	65	68
1889	68	62	67	65	66	—	—	—	—	71	69	66
1890	66	71	72	64	68	68	75	~~65~~	74	74	73	65
1891	67	72	68	70	66	66	69	65	68	66	66	66
1892	70	66	60	68	67	69	66	—	70	70	71	71.5
1893	73	68	68									
Average	69	68	67	67	67	67	70	65	70	70	69	67
Noon 1888	—	—	—	—	—	—	—	—	—	—	62	63
1889	66	59	63	63	62	—	—	—	—	65	67	63
1890	64	67	67	64	65	69	73	—	70	70	69	68
1891	67	68	64	68	67	66	69	64	67	62	67	65
1892	65	64	60	66	69	70	68	—	67	68	69	71
1893	71	64	66									
Average	67	64	64	65	66	68	70	64	68	66	67	66
3pm 1888	—	—	—	—	—	—	—	—	—	—	64	65
1889	65	59	67	59	63	—	—	—	—	69	69	67
1890	65	64	67	65	66	68	75	—	72	67	65	68
1891	67	72	70	70	66	68	67	—	69	70	—	—
Average	66	64	68	65	65	68	71	—	70	68	66	67
9pm 1888	—	—	—	—	—	—	—	—	—	—	68	77
1889	71	72	69	68	70	—	—	—	—	74	73	72
1890	73	76	76	75	74	73	78	—	83	80	75	77
1891	76	78	77	79	74	75	75	74	73	75	73	76
1892	72	74	74	75	77	73	76	—	78	80	79	82
1893	80	80	77	—	—	—	—	—	—	—	—	—
Average	74	76	74	74	74	74	76	74	78	77	74	77

point is reached & equally rare that there is much dew deposited as for it a calm clear night is necessary & as has been seen the former is somewhat rare. The nights of greatest deposit are those, following days of Southern wind that has died down at Sunset. From an inspection of the tables the humidity falls as the morning advances & rises again in the afternoon.

There seems to be a slight increase thro the months of June July August (?) & September corresponding to the time of continuous Northern winds & it will be seen that thro this period the sky is more clouded than any other part of the year. And during this period further to the north, opposite the south west point of Europe, there is a liability to foggy weather. No doubt the absence of south wind increases the mean of humidity & also the fact that as the temperature is higher, a given volume of air can contain more moisture than if the temperature was lower.

The effect of the Northern set of winds on the humidity can be very well gathered from the table of Statistics as these winds are the main factor in the humidity. Usually the stronger the wind the degree of humidity is lower whether there is much rain or not. This latter usually, does not affect the general humidity much to any

permanent-
great extent for (as will be seen) the rain is small
in amount, the ground so porous a day that
the surface effect is much more transient
than in England & any other similar climate.
With the South & East wind the air is different
usually they are dry but the degree of humidity
varies even in one day; after sunset
the degree rises & generally there is a
great deposit of dew, but on the other
hand if the wind continues after dark
the low degree of humidity continues also.
Example of degree of humidity in South wind

	Wind Direction	Force	Thermometers	Temperatures at 9 am	Noon	3 pm	9 pm	Humidity Sat=100 9 am	Noon	3 pm	9 pm
1892 Nov. 20	S.E - ESE	1-2	Dry	70·5	73·5	73·0	66·0	69	62	65	78
			Wet	64·5	66·5	65·5	62·0				
" 21	SE - ESE	2	Dry	72·0	74·0	72·6	65·0	67	60	61	68
			Wet	65·5	66·5	64·5	59·0				
" 22	SE	2	Dry	73·5	73·5	73·0	65·5	62	66	58	61
			Wet	65·0	66·0	64·0	58·0				
" 23	SE	2	Dry	73·0	73·0	71·0	65·0	60	50	53·2	49·0
			Wet	64·5	61·5	61·0	54·5				
" 24	SE	2	Dry	70·5	71·0		64·5	61	51	—	53
			Wet	62·5	60·5		55·0				
" 25	E	1	Dry	69·5	68·5	67·0	67·0	56	52	56	56
			Wet	60·5	58·5	58·0	58·0				
" 26	E	2	Dry	70·0	72·0	69·0	65·0	63	59	66	68
			Wet	62·5	63·5	62·5	59·0				
" 27	S	1	Dry	70·0	75·0	72·0	63·0	53·0	49	56	61
			Wet	60·0	63·5	62·5	55·5				
" 28	S	1	Dry	71·0	73·0	70·0	66·0	51·5	56	71	83
			Wet	60·5	63·5	64·5	63·0				
" 29	N.E.	0	Dry	72·0	71·5	70·0	64·0	61·2	65	69	77
			Wet	64·0	64·5	64·0	60·0				
" 30	S.E	0	Dry	71·5	70·5	75·0	65·0	61·2	65	58	73
			Wet	63·0	63·5	66·0	60·0				

Examples of South wind charged with moisture

1892 Oct 11th	S.E.	3	Dry	73·0	75·5	74·0	71·0	79	86	84	86
			Wet	69·0	72·5	71·0	68·5				
1892 Dec 1st	SE	4	Dry	67·0	68·0	68·5	68·0	73	70	71	83
			Wet	62·0	62·5	63·0	65·0				
1892 2nd	S.E.	4	Dry	67·5	68·0	66·5	66·0	78	78	85	83
			Wet	63·5	64·0	64·0	63·0				

Section III

Part II

Clouds

Rainfall

Sunshine

Barometric Pressure.

Electrical Phenomena

Section III continued

The details of the different forms of clouds have been purposely omitted. The most common form of clouds are 'cirri' 'cirro cumuli' & 'small cumuli'. These are the general form of clouds out at sea for these regions. But these names when floating below a certain level, become entangled on the windward sides of the mountain islands, coalesce & constitute one of the factors that help to form the names of cloud that often cover the mountain tops of the islands. This covering of cloud (pareasol) dependant on the height & position of the mountains varies in different localities of the islands & will be again alluded to.

Rainfall

The rainfall was Estimated by a Howard's four inch gauge. A glance at the tables will shew that the amount of rain & the number of days on which rain fell are out of all proportion (I do not say 'rainy days' as a rainy day is a thing unknown)

Perhaps the best way to grasp the rainfall is to divide the year into three parts viz October to January
February to May
June to September

It can now be seen that the main part of the rainfall falls within the first period

Rainfall amount for each Month

Inches	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	Total for last 3 months
1888	—	—	—	—	—	—	—	—	—	·055	1·105	1·575	—	2·735
1889	1·875	·775	·150	·332	·250	—	—	—	—	1·340	1·465	2·543	8·628	5·348
1890	·330	·630	2·870	·030	1·100	Nil	Nil	Nil	·050	3·000	2·660	2·235	13·305	7·895
1891	·565	·917	·225	·200	·130	Nil	·100	Nil	·010	·500	2·465	·230	5·354	3·195
1892	2·205	·405	·140	1·060	·230	·110	Nil	Nil	·577	·425	1·070	1·305	7·467	2·800
1893	3·430	·155	·775	—	—	—	—	—	—	—	—	—		
	1·681	·576	·832	·405	·427	·036	·033	Nil	·212	1·064	1·733	1·577		

Number of Days on which rain fell.

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	Total for last 3 months
1888	—	—	—	—	—	—	—	—	—	3	14	14		28
1889	20	10	4	6	5	—	—	—	—	13	9	17	84	39
1890	4	6	16	1	3	Nil	Nil	Nil	2	6	12	16	66	34
1891	6	4	4	3	2	Nil	1	Nil	1	5	14	4	45	23
1892	11	4	2	7	2	3	Nil	Nil	1	4	9	9	52	22
1893	9	2	10	—	—	—	—	—	—	—	—	—		
	10	5·2	7·2	4·2	3·0	·75	3	Nil	1·3	6·2	11·0	12·0		

	Number of years	Total rainfall for the periods	average for this period of the year.	average for each month of this period
October	5	5·320 Inches	6·0756 Inches 39·2 Days	1·5189 Inches 9·8 Days
November	..	8·765 ..		
December	..	7·888 ..		
January	..	8·405 ..		
February	4	2·727 ..	2·360 Inches 19·4 Days	0·590 Inches 5 Days
March	..	3·385 ..		
April	..	1·622 ..		
May	..	1·710 ..		
June	3	·110 ..	·281 Inches 3 Days	0·070 Inches ·75 Days
July	..	·100 ..		
August	..	Nil ..		
September	..	·637 ..		

& that nearly the whole of the remainder falls
thro the second period, though more thro
the first half than the second half of this
period. The last period that of summer
is practically rainless
The amount of rainfall & number of days of rain
in the month of October is very uncertain &
depends on the commencement of the rains
which appear to be always uncertain, after the dry season.
Considering the next three months together,
from the statistics of four years, there is some
evidence that if the rainfall in the two
former months is below the average it is made
up by the rainfall of January thus

Year	Months Nov & Dec	Year	Month of January	Total for the 3 months	
1888	2·680 inches	1889	1·875 inches	4·555 Ins.	
1889	4·508 "	1890	·330 "	4·838 "	
1890	5·885 "	1891	·565 "	6·440 "	(1·5 inches fell in hour in 6 hours
1891	2·695 "	1892	2·205 "	4·990 "	
1892	2·375 "	1893	3·430 "	5·805 "	(2·2 inches fell in 12 hours in January)

~~1893~~ After January the rainfall average
seems to diminish till June is reached
when from June till the rains commence
in October the rainfall is practically nil,
the high average for September being due to
the rare occurrence of a heavy thunderstorm.
The number of days on which rain fell are
about twice as numerous in the first period
as the second, & in the third period the average

Greatest amount of Rain registered during one day.

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct.	Nov	Dec	Inches
1888	—	—	—	—	—	—	—	—	—	·045	·305	·345	..
1889	·435	·190	·060	·200	·080	—	—	—	—	·745	·630	·740	..
1890	·160	·360	·840	·030	·970	Nil	Nil	Nil	·040	2·070	1·580	·290	..
1891	·200	·435	·090	·070	·070	Nil	·100	(·002)	·010	·885	·700	·080	..
1892	·880	·240	·120	·600	·190	·060	Nil	Nil	·577	·225	·430	·255	..
1893	2·220	·130	·120										..
average	·974	·271	·246	·225	·302	·020	·033	(·0006)	·209	·674	·729	·342	..
Total amount average	1·681	·576	·832	·405	·427	·036	·033	(·0006)	·212	1·064	1·753	1·577	..
Greatest Rainfall on one day, aver.	·974	·271	·246	·225	·302	·020	·033	(·0006)	·209	·674	·729	·342	..
Total less this one days rain	·707	·305	·586	·180	·125	·016			·003	·390	1·022	1·235	..
Number of Days on which this rain fell	9	4·2	6·2	3·2	2·0	0·3			0·3	5·2	10·5	11·8	Days.

Highest recorded rainfall for the past five years

2·220	·435	·840	·600	·970	·060	·100	(·002)	·577	2·070	1·580	·740	Inches

is three days each year for the four months. Yet it may be noticed that corresponding months differ in amount & number of days in different years thus

	Amount Inches	No. of Days.		Amount Inches	No. of Days
Oct 1889	1.46	13	January 1889	1.87	20
" 1890	3.00	6	" 1892	2.20	11

This is also seen taking one year with another

1889 with 84 days on which rain fell; the amount was 8.6 inches
1890 " 66 " " " " " 13.3 "

This is no doubt due to very heavy rains on the one hand with few days & on the other hand to a large number of days with very slight fall.

If the greatest amount of rain that fell on any one day during each month is taken into account & calculating the average of this for each month & this resultant is deducted from the total average amount of rainfall; the remainder gives some idea, perhaps a finer one, as to how the amount of rainfall & the manner in which it the ~~rainfall~~ is spread over the number of days & months. The total annual rainfall for the past five years averages a little over 8 inches & this fell on an average of about sixty two days (the exact numbers are on the opposite page) The greatest rainfall during one day of every month averages about four inches per annum this leaves

Amount of rain recorded during the daytime & nightime

	Jan		Feb		March		April		May		June		July		Aug		Sept.		Oct		Nov		Dec	
	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N
1888	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	·045	·010	·510	·595	·640	·885
1889	1·295	·580	·465	·320	·070	·080	·152	·180	·080	·170	/	—	–	–	–	–	~~·010~~	~~·040~~	·380	·960	·640	·825	1·330	1·205
1890	·050	·280	·320	·310	1·115	1·725	Nil	·030	·270	·830	Nil	Nil	Nil	Nil	Nil	Nil	·010	~~·040~~ Nil	1·250	1·750	·320	2·140	·765	1·470
1891	·370	·195	·557	·360	·065	·160	·080	·120	Nil	·130	Nil	Nil	Nil	·100	Nil	Nil	·010	Nil	·145	·355	580	1·885	·050	·180
1892	·560	1·645	Nil	·405	Nil	·400	·560	·500	Nil	·230	·030	·080	Nil	Nil	Nil	Nil	Nil	·577	·120	·305	·610	·460	·695	·610
1893	1·950	1·280	Nil	·155	·055	·520	–	–	–	–	/	–	–	–	–	–	–	–	–	–	–	–	–	–
	·845	·836	·266	·340	·261	·577	·198	·207	·087	·340	·010	·026	Nil	·033	Nil		·006	·205	·388	·676	·572	1·181	·707	·870
	1·681		·576		·838		·405		·427		·036		·033		Nil		·212		1·064		1·753		1·577	

	Number of years	Total Amount Inches	Total amount in the Daytime Inches	Total Amount in the Nightime Inches	Average Rainfall Daytime Inches	Average Rainfall Nightime Inches
October	5	5·320	1·940	3·380	·388	·676
November	..	8·765	2·860	5·905	·572	1·181
December	..	7·888	3·538	4·350	·707	·870
January	..	8·405	4·225	4·180	·845	·836
Totals		30.378	12·563	17·815		
February	4	2·727	1·332	1·395	·333	·349
March	..	3·385	1·250	2·135	·312	·534
April	..	1·622	·792	·830	·198	·2075
May	..	1·710	·350	1·360	·0875	·340
Totals		9·444	3·724	5·720		
June	3	·110	·030	·080	·0078	·026
July	..	·100	Nil	·100	Nil	·033
August	..	·002	Nil	·002 (?)	Nil	·0006(?)
September	..	·637	·020	·617	·006	·205
Totals		·849	·050	·799		

rather more than four inches to fall on the remaining fifty days. These days occur during the first & second periods in the relation of two to one. From these tables it will be seen that November & December have the largest rainfall & rainy days & that January comes next on the list. October February & March keep very similar both in amount & number of days.

In the preceding, the word day means twenty four hours but if this be split up into day & night (which for convenience I reckoned by 9 a.m. & 9 p.m.) it is found that more rain falls during the nighttime than daytime with only four exceptions as this so1 For the first two periods from sixty two sixty five per cent of the rain falls during the nighttime for the last period ninety four per cent falls during the nighttime & six per cent thro the day.

Rain also falls more frequently during the nighttime than the daytime

	Number of Days Observed	Rain fell during Daytime		Rain fell during Nighttime		Rain fell Once during.			
October & January	615	on 112 occasions		on 146 occasions		5·5 Days	4·2 Nights	5 years of Observation	
February & May	481	" 35	"	" 69	"	14	" 7	" 4	"
June & September	366	" 3	"	" 6	"	122	" 61	" 3	"

Number of times rain fell during daytime and nighttime

	Jan.		Feb		March		April		May		June		July		Aug		Sept		Oct		Nov		Dec	
	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N
1888	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	2	7	12	9	8
1889	13	17	6	8	2	2	4	5	1	4	0	0	—	—	—	—	—	—	7	11	2	7	15	9
1890	2	3	2	6	10	15	0	1	1	3	0	0	0	0	0	0	1	1	4	3	8	9	7	14
1891	3	4	3	2	2	3	2	3	0	2	0	0	0	1	0	0	1	0	2	3	2	14	2	3
1892	9	7	0	4	0	2	2	7	0	2	1	2	0	0	0	0	0	1	2	3	7	3	4	7
1893	6	6	0	2	2	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
average	6·6	7·2	2·2	4·5	3·2	6·4	2	4	·5	2·7	·3	·6	hil	·3	hil	hil	·6	·6	4	5·2	5·2	9·2	7·4	8·2

Detail of weather & their usual manner of Rainfall

1889.	Wind. Direction	Force	Rainfall for 24 hours	Sunshine Hours.	Min
Jan 1	N.	2	·070 Inches	6	— 00
" 2	N	2	·070 "	4	— 30
" 3	N W	2	·025 "	3	— 10
" 4	N. W	2	·060 "	6	— 20
" 5	N W	2	·220 "	6	— 50
" 6	N	3	·260 "	4	— 50
" 7	N	1		5	— 10
" 8	N W	2.		1.	— 10
" 9	N E.	3	·030 "	4	— 10
" 10	N. E.	3		2	— 10
" 11	N	1	·050 "	1	— 30
" 12	N	2	·090 "	1.	— 50
" 13	N	2	·020 "	2	— 20
" 14	N	2	·140 "	3	— 20
" 15	N	2	·040 "	2	— 50
15 Days amount			1·070 "	56	— 40
Total for Month			1·875 "	137	— 00

20 days for January 1889
Rainy Days for January weekly for 5 years 10
Monthly Average for January 1·581 Inches

1890	Wind. Direction	Force	Rainfall for 24 hours	Sunshine Hours	Min
March 1	N N W	2	·060 In	0	— 00
" 2	E. N E	1		0	— 40
" 3	N. E	2	·	0	— 00
" 4	E	1	·300 "	0	— 40
" 5	E	1	·840 "	0	— 00
" 6	E	1	·060 "	0	— 00
" 7	E	1	·170 "	6	— 40
" 8	N	2	·020 "	9	— 50
" 9	N	3	·030 "	5	— 30
" 10	N	2	·010 "	6	— 10
" 11	N	3	·140 "	7	— 10
" 12	N W	2	·300 "	7	— 20
" 13	N	2	·150 "	9	— 00
" 14	N	2	·220 "	8	— 40
" 15	N	1	·040 "	9	— 20
15 Days amount			2·040 "	71	— 00
Total for Month			2·870 "	135	— 00

Number of Rainy Days for March weekly for 1890 8 days
Monthly average for March weekly for 16 years 8·52 "

The rainfall of the groups of islands may be very conveniently & naturally divided into general & local rainfall. The general being the rainfall of this region of the globe - influenced only by the general meteorological conditions.
The local rainfall in addition to the general meteorological conditions has the mountainous regions as an important factor this naturally varies according to the position proximity & height of the mountains.
The rainfall of Las Palmas may be considered somewhat free of local influences, owing to its position on the north east point of the island the mountain tops ~~[illegible]~~ more than twenty miles distant & the intervening ground slopes very gradually
The rainfall due to general meteorological conditions may be classed according as it is associated with Northern or southern winds.
That associated with the northern is by far the most common - & has has been seen it chiefly falls during the last three - first months of the year. On the preceding page I have given two examples (They are the worst I have observed here & the ~~same~~ amount of rain, rainy days are very much above the average) That shews the usual manner of the ~~the~~ rainfall (March 1890 4th 5th 6th 7th 8th excepted) & how it falls in short little showers often of a very local character

the weather before + after being fine. These squalls of rain can often be seen approaching Las Palmas or passing at some little distance + they are usually preceded for five or ten minutes by a temporary increase in the force of the wind. The more stormy + unsettled the weather over South East Europe + North west Africa the more often these short squalls occur. Rain associated with South west gales does not occur often, when this kind from this direction is not felt in Las Palmas usually it comes from east or south but the rain is more of a tropical character + is usually associated with thunder + lightening. The rainfalls of March 1890 Oct. 1890 Nov 1890 Oct. 1891 Janry 1892 September 1892 + Janry 1893, as seen in the table of "Greatest amount in one Day" are all from this cause. Speaking of the weather of the first week in March 1890 the "Pilot chart of the North atlantic Ocean" states "Next a noteworthy feature of the month was the presence of barometric depression with marked cyclonic features between the Cape Verde Islands + the Azores". as can be seen this was felt in this region + its effect continued afterwards. The two last tables I have given shew what will be again referred to that the sunshine may have a very fair average even if the number of days of rain has been excessive

Sunshine (Recorded by Jordan's Instrument)

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	
Total amount Possible	326	314	372	382½	419	418	426	406½	370	353½	320¼	318.	Hours
Total amount 1888	—	—	—	—	—	—	—	—	—	122[1]	166	129	..
1889	137	167	193	140	212	—	~~108~~	—	—	124[2]	186	137	..
1890	203	161	135	186	195	172	~~128~~	—	196	164	165	185	..
1891	152	210	237	220	203	238	227	214	202	167	146	190	..
1892	171	186	172	197	256	171	208	165	214	200	154	164	..
1893	178	194	211										..
	168	183	189	185	216	194	182	190	204	189	165	161	..

Average Daily amount

	H m	H m	H m	H m	H m	H m	H m	H m	H m	H m	H m	H m	Hours	Mins
1888	—	—	—	—	—	—	—	—	—	8[1]0'	5-32	4-09	..	..
1889	4-26	5-58	6-14	4-40	6-51	—	—	—	—	5-23[2]	6-13	4-22	..	..
1890	6-34	5-40	4-22	6-16	6-18	5-44	3-30	—	6-32	5-18	5-10	6-00	..	..
1891	4-55	7-38	7-40	7-21	6-34	7-36	7-20	6-35	6-45	5-23	4-53	6-09	..	..
1892	5-32	6-25	5-33	6-35	8-15	5-42	7-08	5-21	7-00	6-27	5-08	5-20	..	..
1893	5-45	6-56	6-48											
	5-26	6-31	6-07	6-12	6-35	6-24	5-59	6-08	6-49	6-12	5-23	5-12	..	..

Total amount possible Daily

H m	H m	H m	H m	H m	H m	H m	H m	H m	H m	H m	H m	Hours	Mins
10-31	11-18	12-00	12-45	13-37	13-56	13-42	13-07	12-22	11-24	10-45	10-23	Hours	Mins

Percentage of available amount 100 = Total Avail. amount

1888	—	—	—	—	—	—	—	—	—	[8]6	57.9	40.5
1889	43.4	53.1	52.0	36.5	50.6	—	—	—	—	64[2]	58.0	43.0
1890	62.0	51.2	36.5	48.7	46.8	41.0	25.4	—	53.0	46.5	51.5	58.3
1891	47.0	66.8	64.0	57.8	48.6	56.4	53.3	52.7	54.6	47.3	45.6	59.7
1892	52.4	59.2	49.9	51.6	60.2	40.2	48.7	38.8	56.3	56.5	48.1	51.1
1893	54.6	58.2	56.5									
Average	51.9	57.7	51.8	48.6	51.5	45.9	42.4	45.7	54.3	53.6	52.2	50.5

1 Sunshine observed for last 14 days only (not reckoned in average)
2 .. .. 24 .. ..

notwithstanding the large number of days on which rain falls, the percentage of sunshine is high, in a few cases some correspondence may be seen but generally there is does not appear to be any great relation. This is accounted for by the rain falling in short sharp showers & the weather being fine both before & after.

The averages for november december & January show the lowest record but the sun is at this period of the year the shortest time above the horizon & if the 'percentage of total' possible amount be taken there is really more sunshine & therefore less cloudy weather through these months than the other times of the year. Similarly June July & August show a higher daily average yet the percentage of total possible amount is lower than the other months & although rain is rarely recorded as falling during these three months yet the sky is more uniformly clouded viz is with this factor with the steady North East Trades that make the summer months so temperate & therefore more agreeable, naturally the humidity is somewhat higher but still not excessive. This cloudiness will be better understood if the year is divided into the

Sunshine arranged according to three periods

		Total amount Possible	Average amount Monthly	Average amount Daily	Average Daily amount for this period	Percentage of available amount for periods of four months	Monthly percentage
		Hours	Hours	Ho. Min			
5 years	October	353	189	6 – 12	H m 5 – 33	52.0	53.6
..	November	320	165	5 – 23			52.2
..	December	318	161	5 – 12			50.5
..	January	326	168	5 – 26			51.9
	Total	1317	683				
4 years	February	314	181	6 – 25	H m 6 – 12	52.1	57.6
.. ..	March	372	184	5 – 37			50.6
.. ..	April	382½	185	6 – 12			48.6
.. ..	May	419	216	6 – 35			51.6
	Total	1487½	766				
3 years	June	418	194	6 – 24	H m 6 21	47.1	45.9
	July	426	161	5 – 59			42.4
	August	406½	190	6 – 08			45.7
	September	370	204	6 – 49			54.3
	Total	1620½	749				
average Total for whole year		4425	2198				

Number of Days with only one hour or less of Sunshine

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	
1888	—	—	—	—	—	—	—	—	—	0	3	4	Days
1889	2	2	1	1	2	—	—	—	—	0	2	4	..
1890	1	2	7	3	5	4	9	—	4	2	1	1	..
1891	6	0	1	0	3	1	2	1	0	3	2	0	..
1892	1	2	4	1	1	2*	1	5	0	3	2	2	..
1893	3	4	1	—	—	—	—	—	—	—	—	—	..
Average	2.6	2.0	2.8	1.2	2.75	2.3	4.0	3.0	1.3	1.6	2.0	2.2	..

* 7 Days with less than two hours sunshine

same periods as for rainfall. The first two periods although they differ in the acutual number of hours yet agree very nearly in the percentage of available amount. But the rainless period from June to August especially has a much lower average of sunshine while in September the amount again rises, this corresponds with the greatest continuity of the trade winds. This apparent cloudiness is more a less of a local character due to the formation of clouds around the mountain tops & at this time spreading even beyond the limits of the island. Generally speaking more sunshine is prevalent thro the morning than afternoon as even in winter the sun sinking to the west goes behind the parasol of clouds sheltering over the centre of the island, whilst overhead in Las Palmas it may be perfectly clear. Naturally there are days of very little sunshine due to general meteorological conditions but these are not very numerous; on the opposite page is seen a table with the numbers of days with 'one hour or under of sunshine'. The difference in time between sunrise & sunset during the summer & winter is not more than two & a half hours after sunset there is naturally little & no twilight darkness coming on within half an hour or so.

Effects of winds on Barometric Pressure

1891	Prevailing Wind Thro the Diurnal Day	Force	Barometric Pressure 9 a.m.	9 p.m.
April 1	N-NNW	3	30.07	30.07
" 2	N-NNE	3	30.07	30.07
" 3	NE	2	30.07	30.07
" 4	NE-ENE	2	30.07	29.99
" 5	NE	0	29.97	29.91
" 6	NW	2	29.93	29.85
" 7	S.E.	1	29.92	29.85
" 8	ENE-NE	2	30.02	30.02
" 9	NE.	3	30.05	30.06
" 10	NE	3	30.07	30.12
" 11	NE	3	30.18	30.21
" 12	NE	3	30.25	30.23
" 13	NW	2	30.19	30.11
" 14	Nil-SE.	1	30.02	29.97
" 15	S.E.	1	29.97	29.93
" 16	Nil-NE	0	29.87	29.89
" 17	N-NE	1	29.93	29.99
" 18	NE	0	29.95	29.99
" 19	N-NNE	2	30.05	30.05
" 20	ENE	0	30.07	30.07
" 21	NE	2	30.07	30.09
" 22	NNW	3	30.12	30.12
Average for Month			30.03	30.03

1892.	Prevailing Wind Thro Day		Barometric Pressure 9 a.m.	9 p.m.
Feb 12	Nil-E.	0	29.98	29.89
" 13	SE	3	29.85	29.85
" 14	SE	1	29.87	29.85
" 15	Nil-E	0	29.85	29.85
" 16	N	2	29.89	29.93
" 17	Nil	—	29.97	29.89
" 18	Nil-NE	0	29.87	29.79
" 19	SE	0	29.82	29.85
" 20	ESE	0	29.87	29.89
" 21	NE	2	29.89	29.90
" 22	SE	1	29.92	29.93
" 23	SE	2	29.87	29.85
" 24	S	2	29.82	29.82
" 25	S	3	29.79	29.83
" 26	NW	3	29.85	29.97
" 27	N	3	30.05	30.05
" 28	N	1	30.05	30.05
" 29	N	3	30.07	30.07
Average for Month			30.00	29.99

as has been indicated there is a little correspondence to be seen between sunshine & rainfall & also between sunshine & temperature. To exemplify this I have taken the month of January

January	Sunshine	Rainfall		Mean Temperature (Shade)			Temperature of the sea	For December	Rainfall for the last three months of (Oct. Nov. & Dec.)	
	Hours	amount	Days	Max.	Min.	Mean	Mean	Minimum.		
.. 1889	137	2.875 In.	20	65.2°	57.4°	61.3°	66.7°	57.8° (1888)	(1888)	2.735 in
.. 1890	203	.330 ..	4	67.0	57.5	62.2	64.1	64.0 (1889)	(1889)	5.348 ..
.. 1891	152	.665 ..	6	65.2	57.0	61.1	64.2	65.5 (1890)	(1890)	7.895 ..
.. 1892	171	2.205 ..	11	68.5	58.7	63.6	66.6	67.0 (1891)	(1891)	3.195 ..
.. 1893	178	3.430	9	68.5	58.6	63.5	66.9	67.0 (1892)	(1892)	2.800 ..

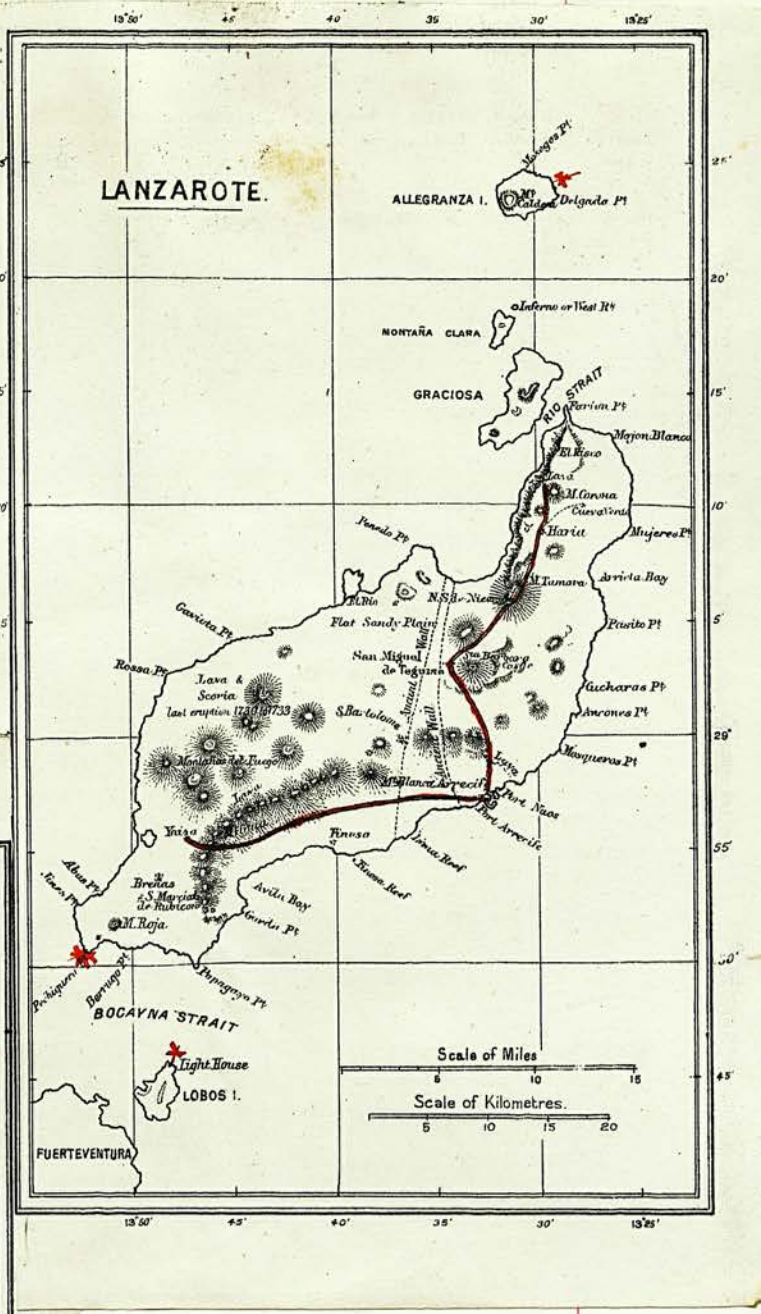
For this month in the years 1890 & 1891 there is a certain relationship between the temperature of the sea & the rainfall this however is a coincidence as the fall in temperature appears to have more connection with the excessive rainfall in the last three months of 1889 & 1890. The Mean temperature of the sea for November of both these years was quite equal to the average but in December the temperature fell much lower than usual & this low temperature existed for some months (see table of temperature of sea)

The Barometric readings do not vary to any great degree nor are there many sudden variations. This is readily understood as the group are out of the region of storms & hurricanes The readings given were recorded by an aneroid, which although an accurate one yet may not be so accurate as a mercurial one. For this reason I have not given the mean

Section IV

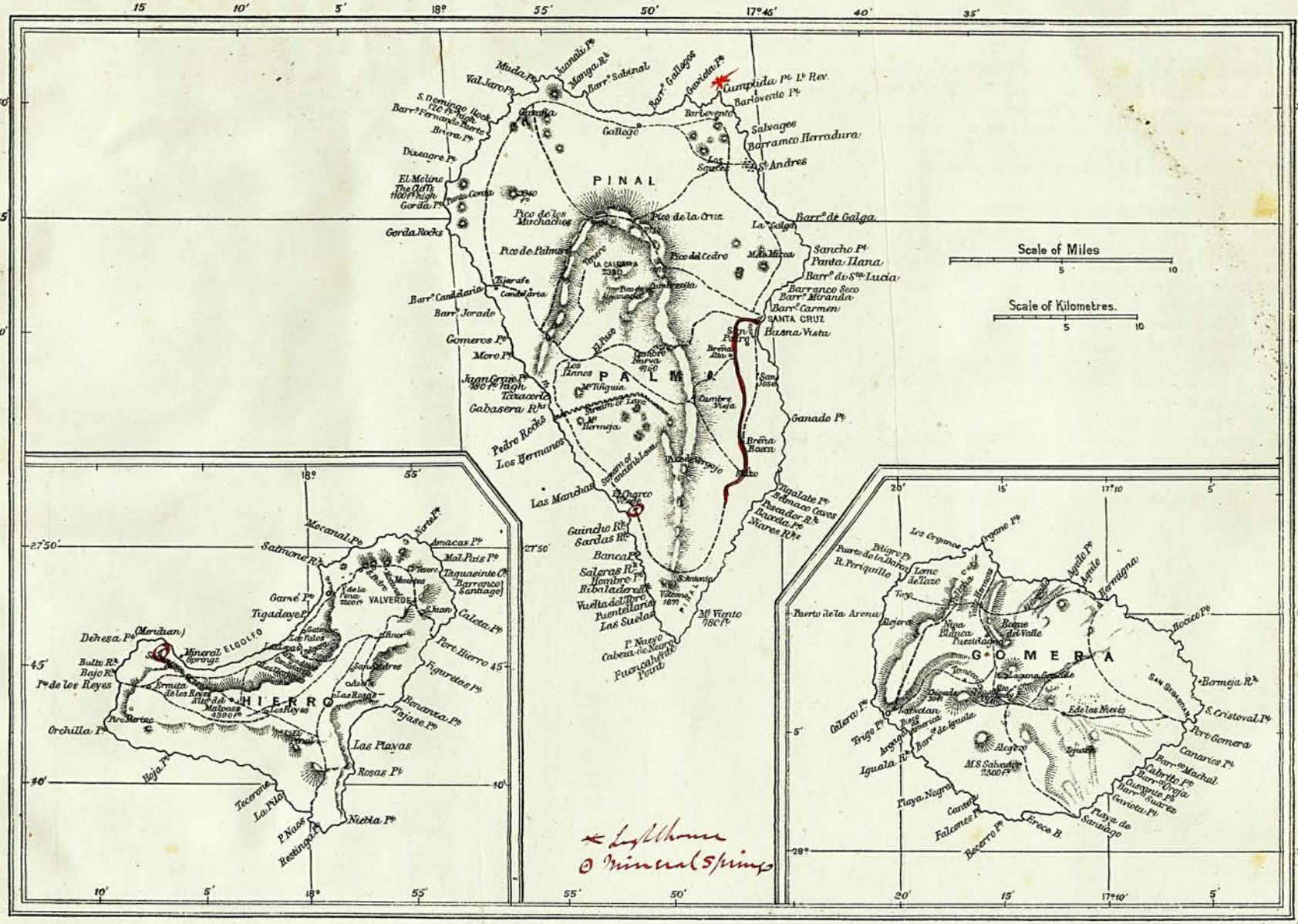
Localities suitable for Health Resorts & their distinctive characteristics

Maps of the Islands of
Lanzarote &
Fuerteventura


LANZAROTE.
ALLEGRANZA I.
Malagues Pt
Delgado Pt
Inferno or West Pt
MONTAÑA CLARA
GRACIOSA
RIO STRAIT
Farrion Pt
Mejon Blanco
El Risco
M. Corona
Cuevaverde
Harit
Mujeres Pt
Penedo Pt
M. Tumara
Arrieta Bay
Pavito Pt
Garita Pt
Rossa Pt
Flat Sandy Plain
San Miguel de Teguina
Lava & Scoria
last eruption 1730 to 1733
S. Bartolome
Montañas del Fuego
Lava
Mancha Blanca
Arrecife
Port Nuevo
Port Arrecife
Mosquetos Pt
Yaiza
Finosa
Janubio Reef
Finosa Reef
Breñas
S. Marcial de Rubicon
M. Roja
Avila Bay
Gordo Pt
Albus Pt
Penedo Pt
Barriga Pt
Papagayo Pt
BOCAYNA STRAIT
Light House
LOBOS I.
FUERTEVENTURA
Scale of Miles
Scale of Kilometres.

FUERTEVENTURA.
LANZAROTE
BOCAYNA STRAIT
Martina Pt
Garla Pt
LOBOS
Tostan Rocks
Tostan
Tigaruga
Manta Pt
Manta
M. Roja
Equinaxo Pt
Tindaya
Oliva
M. Atalaya
M. Mudas
Matellan
Tefia
Tao
Telir
Tegute
Cabras Pt
Cigüeñal del Angel
PUERTO CABRAS
Natural Bay
Sta MARIA DE BETANCURIA
La Antigua
Ancient Wall
Pajara
Triquinimite
Ruinaje
M. Orconera
Ruins
P. Prasonegro
Amanay Pt
P. Nuevo
Gran Tarajal
Gradolompe
Pesebre Pt
Roque del Moro
Mulas blancas
Morro Tarajalejo
Pure Pared
Morro Canarios
Punta Pt Light House
Morro Jable Pt
Scale of Miles.
Scale of Kilometres.

Maps of the islands of
Hierro
Gomera &
Palma.

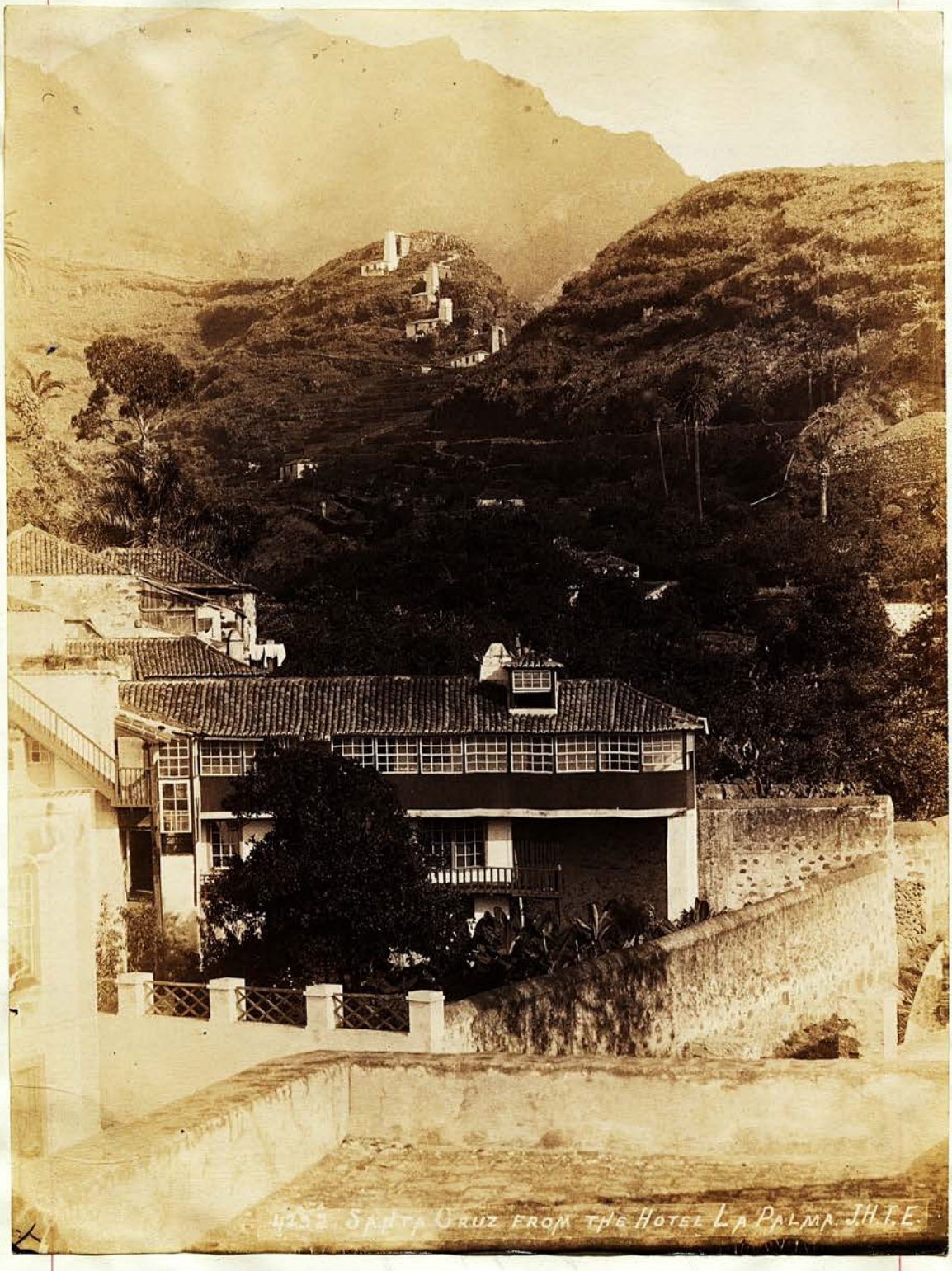

PINAL
PALMA
HIERRO
GOMERA
Scale of Miles
Scale of Kilometres.
Light House
Mineral Spring

Section 4 Localities suitable for Health Resorts & their distinctive characteristics

This is governed by two if not three conditions

1 accessibility by land or sea
2 accomodation
3 The altitude of the part.

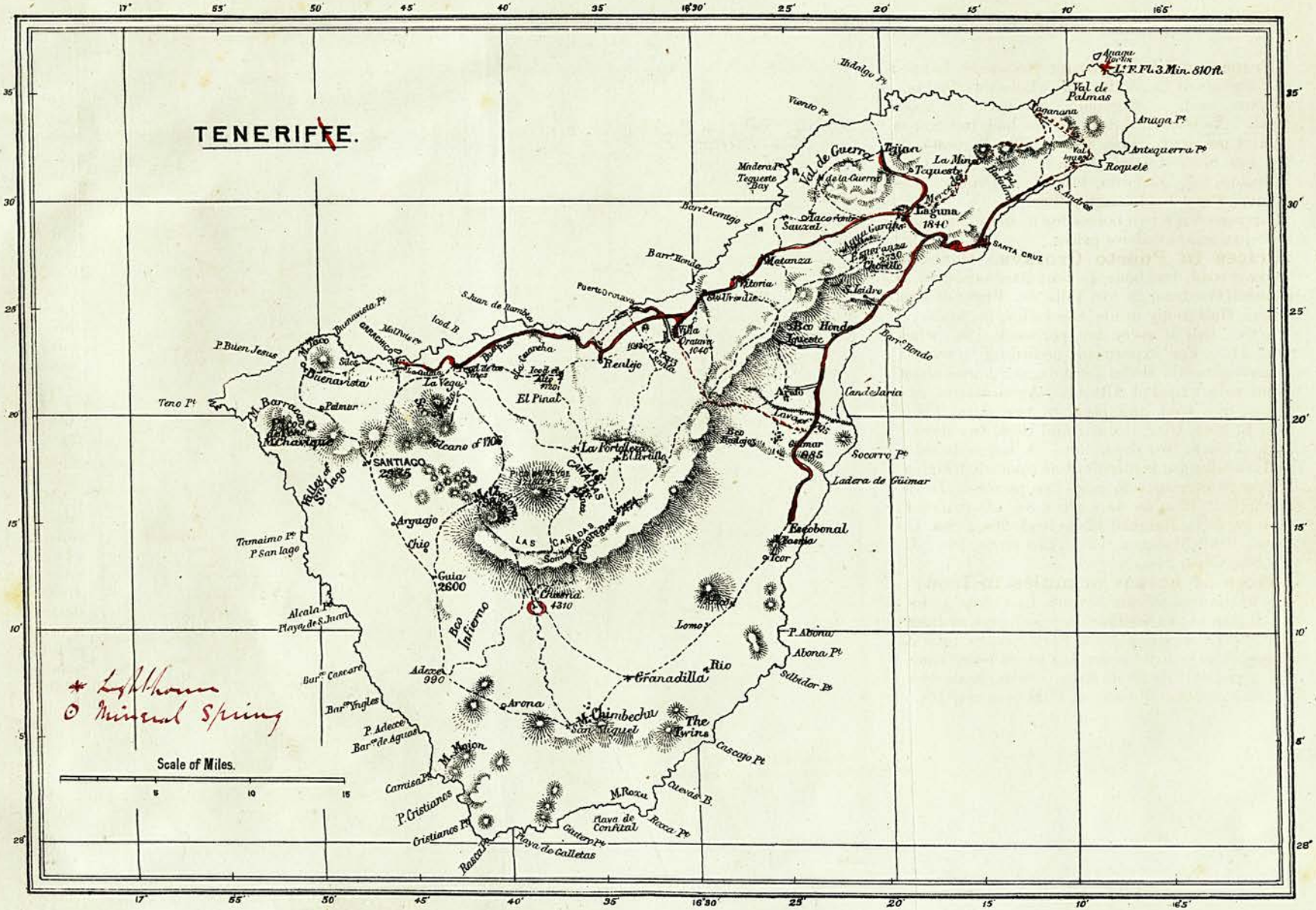
The islands of Hierro, Gomera Fuerteventura & Lanzarote can be easily dismissed. They have all communication once a week by steamer with the islands of Tenerife & Grand Canary. In the first two islands there is no accomodation in the latter two there are small Spanish inns in the two principal towns, (Puerto Cabras & Arrecife) There are no meteorological data with regard to any of these islands as to their capabilities, in Hierro & Gomera the climate is not so good as in Palma or the North side of Tenerife therefore nothing is to be gained by residing there, as, in addition they are so much out of the way.
With regard to Lanzarote & Fuerteventura they no doubt possess the driest & sunniest climate of the group, if there was accomodation advantage might be taken of them, but for the present they are outside the pale of Health resorts


4252 Santa Cruz from the Hotel La Palma. J.H.T.E.

The island of Palma has also communication once a week with Tenerife & Grand Canary & once a month with London.
The mountain ranges run due North & South & though the island is only 32 miles long & 19½ broad yet the mountain tops rise over 7000 feet. The effect of this is that though the mountains collect & form the clouds yet they have a tendency to roll along the sides of the slopes of the mountains.
The chief town of La Palma is Santa Cruz de la Palma & as can be imagined its surroundings are most picturesque, the mountains running up more or less abruptly to the height of over 7000 feet & are covered with vegetation in the upper parts with pines (Pinus Canariensis) laurels & heather ~~growing~~ as a tree to a fair height.
In the town of Santa Cruz de la Palma there are two Spanish hotels & an hotel that has hitherto been under English management

I left this space for observations that I know are taken in La Palma although it is six months since I first applied for them The answer is still 'mañana'

Map of the Island of.
Teneriffe


TENERIFFE.
Scale of Miles.
5
10
15
Light House
Mineral Spring
Anaga Pt
L.F.Fl.3 Min. 810 ft.
Val de Palmas
Anaga Pt
Antequerra Pt
Roquele
Tejina
La Mina
Taqueste
Val de la Guerra
Madera Pt
Teguete Bay
Laguna 1840
Barr.co Acentejo
Sauzal
Barr.co Hondo
Matanza
Victoria
Santa Cruz
Puerto Orotava
Villa Orotava 1640
Reloj
Barr.co Hondo
Buenavista
Teno Pt
Palmar
Volcano of 1706
El Pinal
La Portella
El Burrullo
SANTIAGO 2885
Arguajo
Chio
Tamaimo Pt
P. San Iago
Guia 2600
Alcala Pt
Playa de S. Juan
Adeje 990
Arona
Granadilla
Rio
Lomo
P. Abona
Abona Pt
Salvador Pt
Escobonal
Icor
Ladera de Guimar
Guimar 885
Socorro Pt
Candelaria
Barr.co Cascaro
Barr.co Ynglés
P. Adeje
Barr.co de Aguas
M. Chimbechu
San Miguel
The Twins
Cuscajo Pt
M. Roxo
Oteras B.
Rocca Pt
Playa de Confital
Cristianos Pt
Playa de Calletas
Rasca Pt
P. Cristianos
Camisal Pt
M. Jaion

The island of Tenerife sixty miles long × 37 ~~and~~ wide in its broadest part has as its main feature a back bone of mountains running from the N. E. to the S. W. points of the compass; & rising from 3000 feet in the northern part to 12,180 feet in the southern. The slopes of this ridge fall more or less abruptly to sea level & the climates of the two slopes vary considerably.

The Northern slope

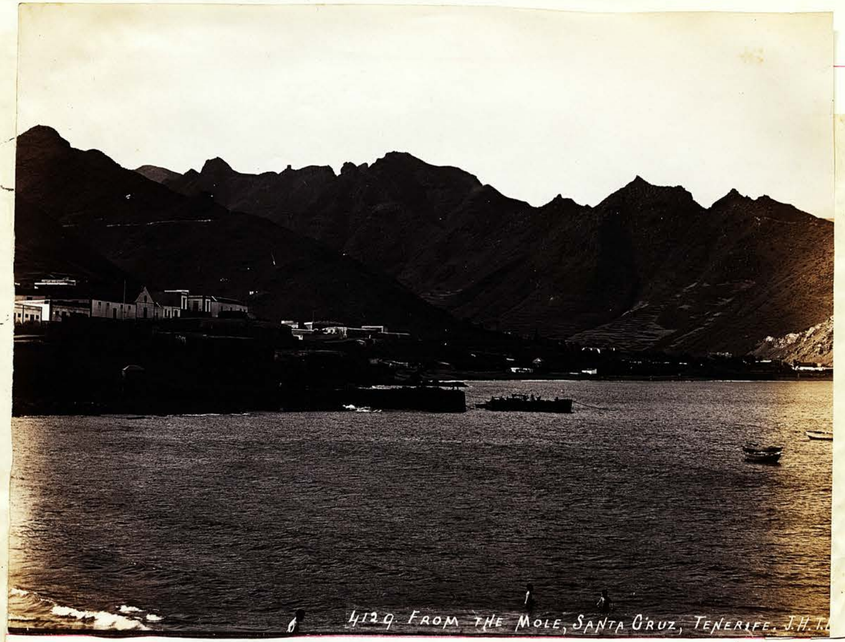
The prevailing winds are from the northern direction & these blowing against this slope of the range are deflected upwards, as the air ascends it naturally becomes colder & as it becomes colder, it can contain less moisture per each cubic foot, the excess of moisture after saturation point has been reached being deposited in the form of cloud that cling to this ~~side~~ slope of ridge.

The Eastern slope.

Unless the prevailing winds are far round to the North east they not not so much felt though in the northern part where the range of mountains is not so high the force may be only slightly mitigated. In the southern part when the ranges rise over 7000 feet high, a wind from the east is more frequently felt than in

7000 feet above the sea level on the (ridge of the) Cordillera
Looking North.

other parts & is probably only a local wind due to the deflection upwards of the winds on the other side of the island.
The eastern slope is however more sunny & warm though naturally it participates in the weather of this region; occasionally the clouds from the northern slope may pour over the ridge (cordillera) of the mountain range in a very similar manner to which the clouds pour over Table mountain near Cape Town; where very analogous circumstances occur. Usually the clouds of the Northern slope is confined to that side it is very interesting to stand on the summit of the cordillera seven thousand feet above sea level; on the one side you look upon a sea of cloud extending along the ranges of the mountains & not to see for a mile or more; whilst overhead & on the other side (east) of the ridge there is bright sunny weather.
Any of the cloud attempting to pass a certain definite invisible boundary being instantly absorbed
Access to the island of Tenerife & accomodation in it are much more varied than in any other of the islands.



These views of Santa Cruz & surrounding district taken from various parts of the mole & arranged to give a birds eye view

Santa Cruz de Tenerife situated on the eastern slope is the ~~port~~ capital of the whole group & the principal port of Tenerife it has constant communication with England & the Continent. It has several fairly good Spanish inns or fondas & two hotels conducted on English principles.
The country around is dry & barren because water for irrigation is scarce & the land is of a very rocky rugged nature. The climate in many ways resembles that of Las Palmas only it is more sheltered from the winds of the N.E. & N. the temperature is higher especially in summer & autumn, at which time there is a general exodus of the inhabitants to a higher level

5 years means Ly. Tak.	Temperatures Max	Min	Range	Mean	Rainfall Inches	Humidity Sat. = 100
Jan.	69.0	59.0	10.0	63.5	2.314	66.5
Feb	68.0	56.6	11.4	62.8	1.860	66.0
March	69.8	59.2	10.6	64.8	1.690	63.0
april	70.2	60.2	10.0	65.2	1.131	57.0
May	75.5	64.2	11.3	69.0	.404	58.0
June	79.0	65.0	14.0	73.0	Nil	61.0
July	83.5	67.5	15.3	76.2	Nil	56.0
August	83.5	67.5	16.0	76.2	Nil	55.0
Septem	81.0	68.4	12.6	74.7	.102	62.0
October	78.4	64.6	13.8	73.0	1.273	65.0
Novemb	74.2	60.6	13.6	68.8	1.984	66.0
Decemb	71.0	56.6	14.4	65.5	2.244	67.0.

Guimar & the surrounding Mountains
Looking West
Top of Mountain range hidden by clouds.

~~Other parts~~ The only other village accessible on the eastern slope is that of Guimar twenty miles from Santa Cruz & is connected with it by a good carriage road. The surrounding country is dry & barren, as also is the district between Santa Cruz & Guimar. The common crops are cereals grown during the winter months. The mountains behind Guimar rise abruptly over 7000 feet, the village being about 1000 feet above sea level & three miles from the sea coast.

The effect of the mountains is to shield the place to a great degree from the northern winds & hence of producing a local east-wind, whilst the height above sea level makes both the Maximum & minimum temperature lower.

For this place is claimed more sunshine less rainfall & less rainy days than any other place but the meteorological statistics are very scanty & prove nothing.

The hotel is small & will only accomodate eight or ten visitors & as there is nothing to do & absolutely nothing to see, full advantage has not, perhaps, been taken of this place

1889		Temperature				Rainfall Inches	No of Days on which Rainfall	Humidity Sat=100		Sunshine		Absolute Temperature	
		Max	Min	Range	Mean			9 a m	9 p m	Hours	Min	Max	Min
1889	December	65·0	52·3	12·7	57·6	1·063	2	64·8	64·1	5.	19	70·0	50·0
1890	January	63·5	52·0	11·5	57·8	·009	0	60·3	58·7	7	25	76·0	50·0
1890	February	66·7	53·1	13·6	59·9	·025	1	58·7	61·9	6	00	74·0	50·0
1890	March	64·9	50·0	14·9	57·4	2·266	10	61·4	62·7	6	17.	76·0	46·0

A

The western portion of the valley of Orotava shewing
the western wall & western half of the cordillera
Looking South

Crossing by a bridle path (dotted red in the map) (from Guimar) over the mountains thro a pass 7000 feet high, to the other side of the island, the descent is made down into the valley of Orotava. In this valley are comprised the most noted health resorts of the group This valley is likened to a huge amphitheatre a depression in the northern slope of the mountain range & is open to the sea on the north the lateral walls constituting the east & west sides being formed by mountain ranges rising ~~over~~ 7-8000 feet; & the southern posterior wall rising more or less gradually from sea level to the cordillera here some 6 or 7000 feet high & it is on this posterior wall # up to the height of 1200 feet that villages, hotels & villas are dotted
The greater part of this low lying land is under constant cultivation, from 1500 feet upwards to 6000 or 7000 feet the country is more or less covered with trees bushes or scrub, above that height vegitation of any size ceases.
The predominant feature of this part is the overhanging "parasol of cloud".
Dr Perez writing in the British Medical Journal of October 1st 1892 states. 'That the north east winds begin to blow some hours after sunrise ..... when they begin to be perceived

a Photograph of the western part of the valley of Orotava taken at some little elevation & showing the parasol of cloud. The photograph is printed darker than it should be & perhaps gives an idea of gloom. The photograph is taken from the height of the little hill in the foreground of one marked A B C. Looking S.W.

small clouds form in the mountains which coalesce & about 11. a.m. the upper parts of the island are generally covered by a parasol of clouds". This usually lightens off towards sunset. This parasol of cloud varies in height usually it is from 3-4000 feet thick & its lower surface extends from 2,500 to 3000 feet above sea level. its upper surface extends to the base of the cordillera) its sea margin is a mile & two from the land.
Naturally it varies in density & height, but the higher the cloud is it is less dense & its thickness also less. According to these conditions so does it temper more & less the direct rays of the ~~sun~~ heat of the sun lowering the temperature & causing less sunshine but its great effect is on the humidity which also varies according to the above conditions.
Being dependant on the northern winds it is naturally more continuously prevalent during the summer months when in addition the degree of humidity of the northern winds is as a general rule higher. On days of strong northern winds it is the most dense & is usually absent on days of southern winds.
Another feature of this part of the island & due to its position facing the north is that the sea is never even moderate. There is always

C

a photographic view of the western part of the valley of Oratava on a perfectly clear day. The perspective however gives a wrong impression of the distance. The perspective of A being the most natural. The view is taken from the grounds of the Tocoro Hotel Co. whose hotel stands at about the level of the gable end of the house in the left hand corner of photograph A, but more to the left

either a ground swell or else it is rough. and the surf from this is blown inwards by the wind & is in the form of a fine spray. This I think has a peculiar effect in some cases & will be alluded to in another section.

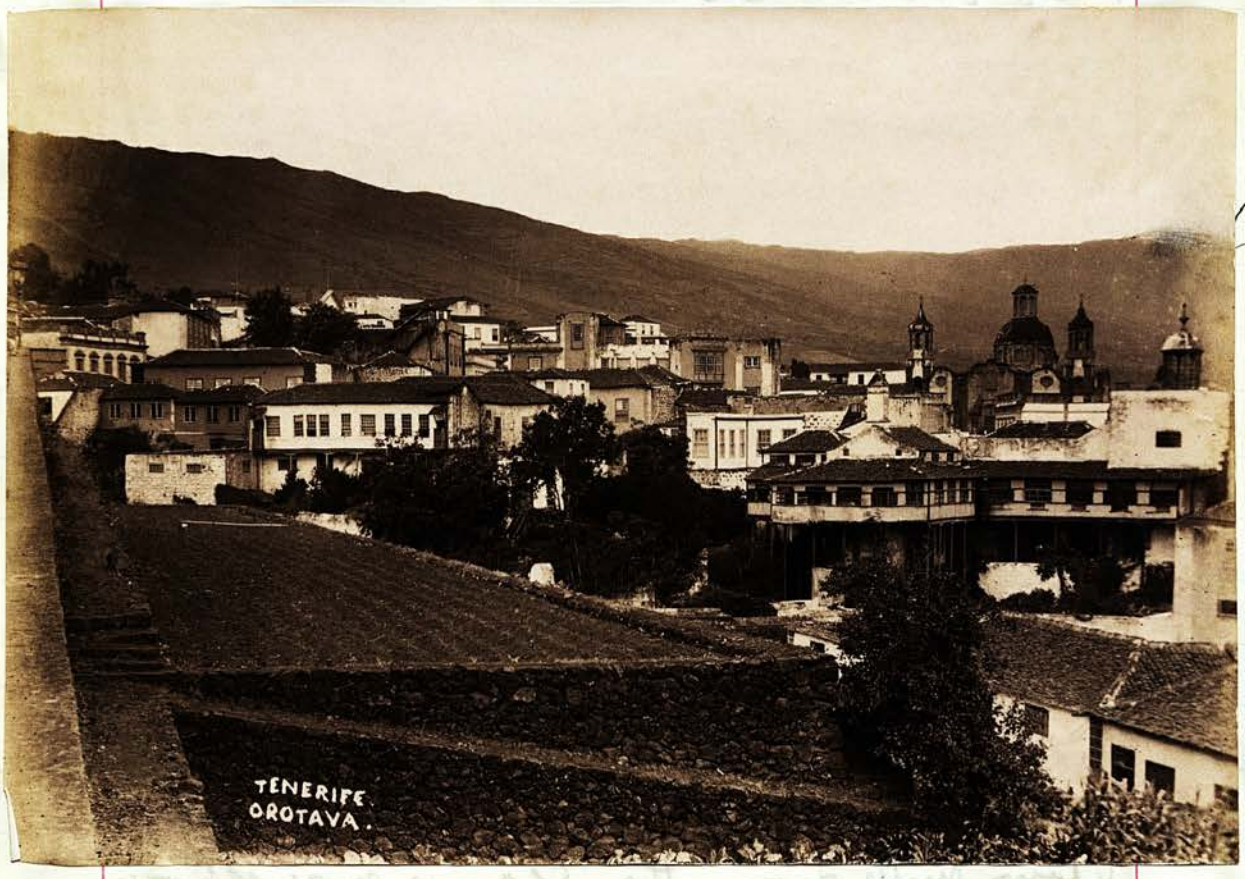
The two towns in this valley where accomodation exists are the Puerto Orotava & the Villa Orotava.

Puerto Orotava is on the sea coast & around it are the chief hotels & villas. accomodation is able to be obtained near the seacoast or at some distance inland & at some little elevation. The immediate surroundings are volcanic lava & cinders being predominant

Its climate has been indicated tho its temperature is ~~as~~ equable as are the other places but the humidity & rainfall are greater.

The meteorological observations do not extend over any length of time & therefore I give them in detail as then they can be compared with those I have given for Las. Palmas

The Villa Orotava 1300 feet high & three & four miles from the sea is more approximate to the parasol of cloud & is therefore more under its influence, there is less sunshine more rain & a higher degree of humidity, an account of its elevated position the temperature is naturally lower. In this town there are two Spanish hotels & one under English management.



Peak.

Villa Orotava looking S.West. This shews also the great part of the Cordillera of the Valley of Orotava

Meteorological Observations for Puerto Orotava

Shade Temperatures Degrees Fah.

Means		Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Maximum	1889	—	—	—	—	—	75.2	—	—	—	—	68.2	63.5
	1890	63.2	62.2	—	69.6	70.8	75.1	75.5	76.9	77.0	76.2	72.1	67.7
	1891	65.9	67.4	70.2	71.7	72.3	76.4	81.7	81.0	79.9	76.4	71.3	70.7
	1892	68.4	69.7	69.5	70.4	73.4	78.1	79.9	—	—	77.0		
Minimum.													
	1889	—	—	—	—	—	60.7	—	—	—	—	57.7	53.6
	1890	51.2	52.3	—	56.7	58.2	62.2	63.3	65.2	64.2	62.8	58.6	55.1
	1891	52.1	56.9	55.1	57.8	58.1	62.0	67.1	67.6	66.1	63.5	58.3	56.5
	1892	56.0	54.5	55.4	57.0	58.3	62.8	66.6	—		63.5	—	—
Mean Range		12.7	11.9	14.6	13.5	13.6	14.3	13.5	12.5	13.3	13.2	12.3	12.2
Mean of Max. & Min.		59.4	60.4	62.5	63.8	65.3	69.0	72.3	72.6	71.8	69.9	64.3	61.2
Absolute Max. Temperature	1889	—	—	—	—	—	77.8	—	—	—	—	77.0	68
	1890	70.0	67.5	—	73.4	77.3	77.9	78.7	79.7	79.4	78.	76.8	71.9
	1891	69.2	71.5	76.5	76.3	76.1	81.5	84.5	84.5	82	81.5	77.5	71.7
	1892	76.2	76.3	73.3	72.6	77.5	81.0	82.8	—	-	81.0	—	—
Absolute Minimum Temperature	1889	—	—	—	—	—	60.7	—	—	—	—	57.7	53.6
	1890	51.2	52.3	—	56.7	58.2	62.2	63.3	65.2	64.2	62.8	58.6	55.1
	1891	52.1	56.9	55.1	57.8	58.1	62.0	67.1	67.6	66.1	63.5	58.3	56.5
	1892	56.0	54.5	55.4	57.0	58.3	62.8	66.6	—		63.5		

		Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec.	
Sunshine Total amount in Hours.														
	1889	—	—	—	—	—	161	—	—	—	—	115	102	
	1890	189	119	—	126	132	149	130	167	139	189	163	132	
	1891	163	211	228	—	196	191	235	196	177	132	120	170	
	1892	132	133	125	172	247	226	118	—		162			
Total average		161	154	176	149	191	141	161	181	158	161	133	134.	Hours.
Daily average		H. M. 5.26	H. M. 5-57	6-18	4-48	6-23	6-14	5-44	5-57	5-16	516	4-32	4-22	Hours Min.
Rainfall Total amount in Inches.														
	1889	—	—	—	—	—	·23	—	—	—	—	1.713	4.50	
	1890	·717	1.555	—	·29	1.79	Nil	Nil	Nil	Nil	1.34	2.62	3.87	
	1891	1.85	2.160	·32	·45	1.31	Nil	Nil	Nil	·02	1.30	5.61	0.24.	
	1892	4.54	·420	·98	2.75	·32	Nil	Nil	—	—	1.53	—		
average		2.13	1.378	·60	1.163	1.140	·057	Nil	Nil	·004	1.39	3.314	2.87.	
Humidity Sat = 100. Means.														
9 a.m.	1889	—	—	—	—	—	68	—	—	—	—	80.0	77.	
	1890	76	76	—	73	72	73	73	73	76	78	77	77	
	1891	69	63	67	67	67	73	69	75	75	78	76	(64)	
	1892	75	72	72	68	67	68	69	—	—	69	—		
9 p.m.	1889	—	—	—	—	—	80	—	—	—	—	85	—	
	1890	76	76	—	85	85	83	85	84	86	84	82	80.7	
	1891	76	78	77	76	79	75	82	84	82	78	—	(67.6)	
	1892	78	79	79	77	75	73	76	—	—	79	—		

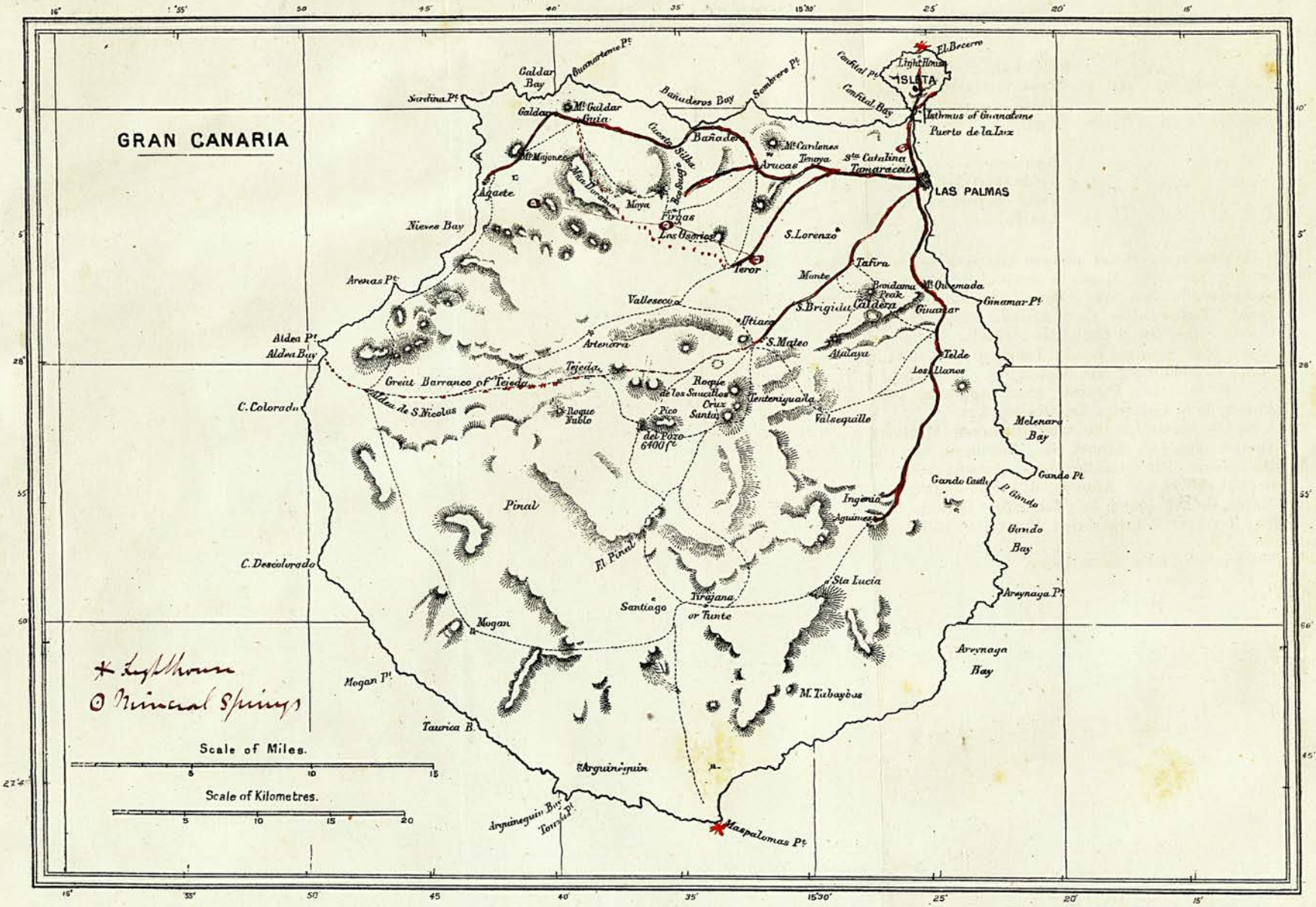
1888–1889	Observations made at 346 feet above sea level by Mr Barham						
Mean Temp	57.8	58.4	59.3	(1888	57.5	60.5	Degrees
9 obs Humidity	76	74	77		75	84	Sat=100
Sunshine	3-27	5-16	4-48		3-48	3-13	Hours Min.
Rainfall	2.203	1.430	1.174		.513	3.994	Inches
Many days	14	10	8		8	17	Days

La Laguna looking west. 2000 feet High

The only other town on the Northern slope where there is accomodation is at Icod de los Vinos commonly called Icod, this place is sixteen miles from the Puerto Oratava, about 1000 feet above sea level; it is situated due North of the peak & is on the direct slope of it. Situated on a convexity & not in valley & near the west coast of the island it is to some extent out of the influence of the parasol. From its elevation the temperature is lower & I think the humidity & rain are less than either in Oratava or Laguna, therefore the climate may be said to be more bracing The great drawback is that excepting the carriage road leading to Oratava, all the other roads are more or less bridle paths very steep & paved with little cobble stones walking therefore is under difficulties.

La Laguna the highest inhabited town in Teneriffe is on the main carriage road six miles from Santa Cruz & nineteen from Oratava. It is situated on a level plain nearly two thousand feet above sea level. During the winter months I suppose it may be said of this place that it is the most rainy cloudy & coldest of any of the health resorts For invalids during the winter it is out of the question, during the summer months the climate is cool though often cloudy.

Map of the island of
Grand Canary.


GRAN CANARIA
ISLETA
El Brezero
Light House
Confital Pt
Confital Bay
Isthmus of Guanaleme
Puerto de la Luz
LAS PALMAS
Guanarteme Pt
Galdar Bay
Sardina Pt
Galdar
Mt Galdar
Guia
Banaderos Bay
Sombrero Pt
Bañadero
Mt Cardones
Tenoya
Arucas
Sta Catalina
Tamaraceite
Mt Majanicho
Agaete
Nieves Bay
Moya
Firgas
Los Osorios
S. Lorenzo
Teror
Tafira
Monte
Arenas Pt
Vallesecco
Bandama Peak
Mt Quemada
Caldera
Ginamar
Ginamar Pt
S. Brigida
Aldea Pt
Aldea Bay
Artenara
Utiaca
S. Mateo
Atalaya
Telde
Los Llanos
Great Barranco of Tejeda
Tejeda
Roque de los Saucillos
Teneriguada
C. Colorado
Aldea de S. Nicolas
Roque Pablo
Pico del Pozo 6400 f.
Cruz Santa
Valsequillo
Melenara Bay
Gando Castle
Gando Pt
P. Gindo
Ingenio
Aguimes
Gando Bay
Pinal
El Pinal
C. Descolorado
Sta Lucia
Arenaya Pt
Santiago
Tirajana or Tunte
Mogan
Arenaya Bay
Mogan Pt
M. Tabayesa
Taurica B.
Arguineguin
Arguineguin Bay
Tauro Pt
Maspalomas Pt
Hot Springs
Mineral Springs
Scale of Miles.
5 10 15
Scale of Kilometres.
5 10 15 20

Laguna is much used as a summer resort for the inhabitants of Santa Cruz or Puerto Orotava where the weather during these months is very hot & oppressive. In this place there are two spanish hotels rather indifferent & one, the Hotel Aguere, conducted on English principles.

The last island of which I have to speak is that of Grand Canary. In this island the mountains are lower than in either Palma or Teneriffe & instead of running up to a ridge with slopes on either side, they rise to the height of over 6000 feet in the centre of the island, some twenty miles from the sea border

Panoramic View of Northern portion of Grand Canary, from above the Port on the Isleta. Taken at about the letter E. of the word Isleta on the Map. Looking South

Photograph of the island of Grand Canary from the breakwater of the Harbour of Puerto de la Luz, shewing the mountain ranges in the distance
Looking West S.West.

This is high enough to attract a parcel of clouds & to a certain extent this strata of cloud does Extend over the Northern part of the island but it is at a much higher level & not so dense & may be often absent when present in Teneriffe. It no doubt diminishes the amount of sunshine as registered in Las Palmas as there the sun sinks into the west & so early in the afternoon it goes behind this cloud & is obscured whilst overhead, to the north, east & south there is bright blue sky. Naturally there are days when the weather generally is cloudy but it is not of these days I am speaking.
An inspection of the charts of sunshine recorded ~~here~~ in Las Palmas shew that generally there is, more sunshine in the morning than afternoon. From a study of this cloud in Grand Canary ~~at least~~ I am inclined to think that in addition to the rapid cooling of the air the formation is assisted by the coalescence of the small cumuli floating with the wind & becoming entangled in the mountains & in the cloud already formed. Because there are days when these clouds (which have been noted as commonly occurring) float at their highest level & perhaps cover the sky yet this island cloud does not form, ~~&~~ on these days. This entanglement may also account for the greater density on the north side of Teneriffe

The Town of Telde. Looking South

higher
when a much more complete barrier is
present. In Palma again the range of
mountains run North & South & keeps the
clouds have a tendency to roll along the
mountain sides.
The capital & town port- Las Palmas is situated
on the extreme north east & receives the
full benefit of the Northern set of winds
The country around for five & six miles is
quite barren the only cultivation being
in the immediate vicinity of the town
& due to irrigation with water conducted
in watercourses from a long distance.
Having gone so fully into the meteorological
conditions it is unnecessary to add anything
further.
In the town there are fairly good Spanish
hotels & one english hotel the oldest established
in the islands. on the outskirts of the town
there are two other hotels.
In the village of Telde ten miles to the South of
the Las Palmas there are two small Spanish
inns, this town being inland but not much
removed above sea level it has a climate very
similar to Las Palmas. The advantage of it
for many cases is that it is removed from
the immediate neighbourhood of the sea.
In the district of the Monte one thousand feet
above sea level, amidst the vineyards

Taken at a height of 3000 feet above San Mateo, looking East towards Las Palmas. The district in the back-ground is Tafira Monte.

an hotel has been opened by the proprietor of the English Hotel in Las Palmas. The country around is covered to a depth of six feet or more with fine particles of lava at this depth the soil commences in which the vine roots are planted

The mean temperature of this place taken thro one winter is as follows

	1888		1889					
Mean Temperature	Year	Nov	Dec	Jan	Feb	March	April	May (first 14 days only for May)
. .	Max	65.8	62.0	58.1	61.0	63.3	62.8	65.0
. .	Mean	57.8	52.5	50.2	52.6	52.9	51.8	54.8
. .	Range	8.0	9.5	8.1	8.4	10.4	10.2	10.2
. .	Mean	61.8	57.7	54.1	56.8	58.1	56.8	59.9.
Mean Temperature in Las Palmas		68.2	64.7	61.3	62.1	63.7	62.8	65.9.
Difference in Temperature between the two places		6.4	7.0	7.2	5.3	5.6	6.0	6.0

This difference is much greater than the usual average range of temperature for altitude. The usual average is 1° for every 300 feet; here it is nearly two degrees even with ~~the exception of~~ April when as can be seen the weather was very unsettled in both places the amount of cloudy weather being exceptional. But the degree of cold even thro the winter is slight during the summer months from May to October I should think that there would be a corresponding difference in the degree of temperature. ~~between this place & Las Palmas~~. Naturally this place

Town & District of Guia. Looking West

is much used as a Realthresort through the summer time.
On the north side of the island twenty two miles from Las Palmas is the small town of Guia. Its height above sea level is about five hundred feet it is three or four miles from the sea. The temperature of this place is lower than Las Palmas but the humidity I think will be greater.

In concluding this section I perhaps cannot do better (though at the risk of repitition) of giving a resumee of the meteorological data for the various seacoast towns of this group with it I have included meteorological observations of the island of Madeira which although beyond the scope of this thesis yet its proximity to these islands make its meteorological conditions specially interesting. The authority for Madeira is taken from Governments observations from 1865 to 1883 & are taken from Dr Langsians work on Madeira.
The Statistics for Orotava ~~are~~ were taken by Mr Perry at an elevation of 60 feet above sea level. Those for Santa Cruz de Tenerife by El Señor don Francisco Aguilar Those for Guimar by Dr Whitney, Those for Laguna by the Professor of the Instituto Colegio.

Thom for Vila Flor by Dr Kennedy. Thom of The Monte of grand Canary by Mr Chamberlain

Mean Shade Temperatures Mean of.

Degrees F.	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	
Madeira	60.4	60.1	60.3	62.3	64.3	67.8	70.7	72.3	71.7	68.9	65.2	61.6	
Santa Cruz de Palma													
Puerto Orotava	59.4	60.4	62.5	63.8	65.3	69.0	72.3	72.6	71.8	69.9	64.3	61.2	
Santa Cruz de Tenerife	63.5	62.8	64.8	66.5	69.0	73.0	76.2	76.2	74.7	73.0	68.8	65.5	
Las Palmas.	62.3	63.0	63.7	64.3	66.6	69.8	72.4	74.7	73.0	71.4	67.6	64.2	
Monte	altitude above sea 1000	54.1	56.8	58.1	56.8	59.9					61.8	57.7	1888-1889
Funchal	1200	57.8	59.9	57.4								57.6	1889-1890
Laguna	1800	60.6	57.2	59.3	63.5	65.7	67.1	68.5	72.1	69.6	66.6	61.5	57.5	mean doubtful 1882
Vila Flor	5000							74.0	76.9	67.3				ditto ditto
Monte Mallion	3000							65.7	67.0	67.4				1883
								71.0	71.6	72.0	Temperature in Funchal.			

Mean Daily Range of Temperature Degrees Fah.

Madeira	9.6	9.8	9.7	9.4	9.3	8.5	8.7	9.4	9.4	9.9	9.6	9.5
Santa Cruz de Palma												
Orotava	12.7	11.9	14.6	13.5	13.6	14.3	13.5	12.5	13.3	13.2	12.3	12.2
Santa Cruz de Ten.	10.0	11.4	10.6	10.0	11.3	14.0	15.3	16.6	12.6	13.8	13.6	14.4
Las Palmas.	9.0	10.2	9.4	9.0	7.7	7.5	7.2	9.0	9.3	9.1	8.7	9.1

Rainfall Inches

												Inches
Madeira	4.409	2.520	2.864	1.929	1.062	.551	.039	.078	.782	2.302	4.803	4.212	25.543
Santa Cruz de Palma												
Orotava	2.15	1.40	.912	1.16	1.14	.057	Nil	Nil	.02	1.39	2.61	3.113	14.26
Santa Cruz de Tenerife	2.314	1.86	1.69	1.13	.404	Nil	Nil	Nil	.102	1.273	1.984	2.114	13.00
Las Palmas.	1.681	.576	.832	.405	.427	.036	.033	Nil	.212	1.064	1.753	1.677	8.597

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	
Total Sunshine Hours													
Oratava	161	154	176	149	191	141	161	181	173	161	133	134	doubtful if recorded by anyone.
Las Palmas.	166	181	184	185	216	194	182	190	204	189	166	160	
Average daily amount of Sunshine Hours & Minutes													
Guimar	7-25	6.00	6.17	(1890 year 1889)								5.19	18
Oratava	3-27	5-16	4-48	(1889 year 1888)							3-48	3-13	
"	5-26	5-57	6-18	4-48	6-23	6-14	5-44	5-57	5-16	5-16	4-32	4-22	3 years
Las Palmas	5-26	6-31	6.07	6-12	6-35	6-24	5-59	6-08	6-49	6-12	5-23	5-12	5 "

The observations for Humidity cannot be so satisfactorily recorded as they depend so much upon the number of daily observations & the hours of observation. Where for here in detail they are all from de Langhans books on Madeira

											Funchal I give		the hours of observation
Madeira 1865-82	69	66	64	66	65	69	69	68	66	66	68	68	9 a.m. 3 p.m.
1848-49	70	60.5	52	69	64							70	9 a.m. 3 p.m.
1850-51	73	75	69	72	—	79	78	73	78	74	71	75	9 a.m. 3 p.m. 7 p.m.
" "	70	73	73	70								72	8 a.m. 2 p.m. 7 p.m.
1852-3	75.2	73.5	69.1	68.7	70.6					71.3	73.3		7 a.m. 2 p.m. 7 p.m.
1852	73.0	70.0	80.0	73.0	71.0	73						74	
Santa Cruz de Palma													
Oratava	75	73.2	73.0	74.1	75.0	74.0	76.0	79.0	80	78	80	78	9 a.m. 9 p.m.
Santa Cruz de Tenerife	66.5	66.0	63.0	57.0	58.0	61.0	56.0	55.0	62	65	66.0	67.0	9 a.m. 3 p.m.
Las Palmas													

It can be easily seen from the above, how the Humidity is dependant on the hours of observation as these have not been uniform I doubt very much the value of the above but I give it for what it is worth.
Both Santa Cruz & Madeira (first observations) are practically those of the daytime while those of Oratava omit the least Humid part of the twenty four hours

It is almost a necessity for me to take some notice of meteorological observations other than those taken within the past five years. This I have done on the necessary page the authorities are as follows

1 Observations made at Orotava according to Wild taken from Brit. Met. Journal March 28th 1887. quoted in Piazzi Smyths work on Teneriffe

2-3 Obs taken by Hornemyer - from B. M. Journal idem (3000 feet above sea level) quoted in Marcets Southern Stations Health Resorts

4 Obs taken from Orotava from B. M. Journal idem

5 Obs taken from Bescasle. from B. M. Journal idem

6 Obs. taken in Orotava in Buchan & found in the 19th Century 1889 / Teneriffe. Madeira Morell Mackenzie (346 feet above sea level)

7 Observation taken by Mr Perry already referred to

with the exception of No 7, all these observations do not / therefore represent more than one years data

8 Observations in Las Palmas by Mr Beechcroft & found in Teneriffe & Its Salubrity Stone.

9 Observations in Las Palmas by Dr Douglas quoted in his pamphlet (Macmillan & Co).

A Ten years rainfall for Orotava by Hornemyer, same authority as 2 & 3

B Rainfall of Orotava according to Perry from observations given in detail

C Rainfall of Santa Cruz de Teneriffe from private sources 5 years

D Rainfall of Las Palmas by Taylor details given

E Number of Rainy Days (?) for Orotava Same authority as A

F & G Number of - . .. by Mr Buchan. Perry same authority as Number 6 & for B

H Number of Rainy Days (?) for Las Palmas by Taylor details given

Temperature Means of Means.

	1	2	3	4	5	6	7	8	9	10
Jan	61.0	58.8	62.0	63.4	62.2	57.8	59.4		60.7	62.3
Feb	60.4	60.0	62.6	60.4	62.0	58.4	60.4		60.5	63.0
March	62.9	61.0	63.7	62.0	64.2	59.3	62.5	62.1	63.7	63.7
april	67.6	63.7	66.5	65.3	64.5		63.8	64.2	65.5	64.3
May	70.5	68.3	69.7	63.8	69.4		65.3	65.2	67.3	66.6
June	74.3	70.8	72.5		73.8		69.0	68.9		69.8
July	77.3	72.8	75.3		76.4		72.3	73.3		72.4
August	76.8	74.6	77.0		73.2		72.6	75.6		74.7
Septem.	77.0	74.0	74.5		71.7		71.8	74.6		73.0
October	74.0	68.9	71.9		69.2		69.9	70.7		71.4
Novemb	68.5	66.5	69.2		68.2	64.5	64.3	67.2	65.9	67.6
Decemb	66.0	61.7	65.3		66.7	60.5	61.2	64.7	62.3	64.2

1.0 Observations by Taylor, referred to in Admiralty

Rainfall	A Inches	B In	C In	D In	E	F	G	H	Temperature of Sea I	K	M
Jan	1.965	2.13	2.31	1.681	6.5	14	5	10.0	67.1	66.9	65.7
Feb	2.500	1.378	1.86	.576	6.3	10	10	5.2	65.3	65.1	65.1
March	2.082	.600	1.69	.832	8.4	8	16	7.2	64.4	64.6	65.4
april	.745	1.16	1.13	.405	5.0	7	3	4.2	65.3	64.4	65.5
May	.430	1.14	.404	.427	3.0	8	7	3.0	65.0	65.3	66.8
June	.002	.050	Nil	.006	.6	—	—	1.0	66.2	67.3	69.3
July	Nil	Nil	Nil	.033	.4	3	—	.3	68.0		71.6
Aug	.037	Nil	Nil	Nil	.2	—	—	Nil			73.5
Sept	.075	.004	.102	.212	1.4	2	—	1.3			73.4
Oct	1.375	1.39	1.292	1.064	5.7	17	—	6.2			72.4
Nov	1.722	3.31	1.984	1.753	7.1	8	10	11.0			70.2
Dec	2.120	2.87	2.244	1.577	7.2	17	13	12.0			67.5
Total	13.053	14.032	13.000	8.597	51.8			60.4			

L Admiral Bird Journal May 25 1887
K Bateman ... details given Lt. Palmer
M Taylor

Gratuaua

1.0 M are only the means of two or three observations for each month perhaps not

	1874-5	1875-6	1876-7	1877-8	1878-9	1879-80	1880-1	1881-2	1882-3	1883-4	1884-5	Reckoned from Aug to July
Gratuaua	Inches	In	In		In	In	In	In	In	In	In	
Rainfall	14.04	16.60	7.86		5.05	14.72	7.56	13.166	9.23	23.58	17.19	Honnesse
	Days	D	D		D	D	D	D	D	D	D	
Days on which Rain fell	56	50	41		23	50	46	45	47	83	78	Brit. Med. Journal

Section V

The climate in relation

A To Health

B To Desease

C The various localities in different deseases

D The future possibilities

Section V

A

The Climate

In Relation to Health.

From the meteorological records the climate of the Canary Islands must be considered a subtropical one, in fact the group is situated five degrees north of the northern limit of the torrid zone & the annual isothermal line of 70° Fah runs thro this region. Although there is, this high mean temperature yet the amount of moisture is comparatively small & it is these two conditions that make these islands suitable as Healthresorts. A continuous excess of moisture above a certain degree, is a great guide in deciding whether any climate is healthy or unhealthy, more especially in tropical regions, for here, an excessive degree of humidity from whatever cause is detrimental to health & is associated with a state of debility & lassitude, whilst dysentery Malarial & other tropical deseases are much more likely to be endemic.

In fact there are few places on the sea coast or at sea level in or near the tropics which possess a sufficently low degree of humidity; even in South africa, Cape Town, Port-Elizabeth & Durban cannot be used as Healthresorts, & there are no rivers or marshes near them; the same is seen in the coast towns of most parts of Australia especially towards the North;

nor can the coast towns of South america
& also of North america below the 30th parallel
be used for purposes of health, all on account
of the debilitating effects of an excess of humidity,
due to various causes, & associated with a
high mean of temperature. In all these
regions the main healthresorts are inland, & at
some elevation above sealevel, & where the
amount of moisture is less.
In the Canary Islands the degree of humidity
varies, yet it is never so excessive as to interfere
with health & never sufficient to prevent
continuous residence. In this, the Canary
Islands offer many advantages unknown
to other healthresorts; in Las Palmas residence
thro the Summer & autumn is continually
practiced, the heat is tempered by the continuous
North east trades. In Teneriffe, Santa Cruz
& Orotava do not receive the full ~~effect~~
benefit of the trades & the temperature is
somewhat higher, but there are at some
elevation the resorts of Icod ~~Santa Cruz~~
Villa Orotava & Laguna where the hottest
season may be passed. The splendid
condition of the roads enables moving
from one place to another to be very easily
& satisfactorily performed.
Another great advantage is the proximity
of the group to England & the Continent

with which there is constant communication by means of good passenger steamships lines. To those however who wish the gaiety & ~~life~~ variety that may be found at many of the Mediterrean Health resorts, life in the Canary Islands will be found disappointing. whether in the future this will be changed remains to be seen, the chief thing that militates against it, is, that the affairs of this life do not move very fast on Spanish territory; for grass can grow under foot whilst we wait till the fugitive 'mañana' is overtaken

The birthrate amongst British Subjects is certainly above the average & children born of British parents thrive very well provided they obtain plenty of open air Exercise.

It is perhaps necessary to take more care over diet as in warm climates the main diseases are those of the digestive organs. I think that less food is required; the Teneriffa Spanish plan of two solid meals a day I find by far the most satisfactory & it is a matter of regret that the hotel proprietors have followed in the wake of Madeira in keeping to English customs. Less alcoholic stimulants are wanted & they are not so easily assimilated; malt liquors are more apt to disagree especially the heavier varieties

Section V B

The Climate in Relation to Desease.

In considering this question I do not intend entering into the relative merits of the climates of the Canary Islands & other Health resorts whether warm & cold, dry & moist, high & low, as one climate may suit one case & be prejudicial to another similar case, each case should be considered by itself

In considering this subject it is necessary to approach it on very broad general principles of necessity there must be included in it some consideration of the main factors relating to the application of climate as a therapeutic agent in desease.

Perhaps the most advantageous method will be to classify climates into those that are warm & cold. By the latter I means those that have as their main characteristics cold & dryness whether it is found at high elevations as Davos or at low levels as in Labrador. By warm climates those that have a high minimum of temperature thro the winter months whether marine or inland, that posses no excess of humidity; the main factor in the degree of temperature being the proximity to the Equator.

And in the next place those who go abroad for change of air, (especially during the winter) may be roughly divided into four groups.

(1) Those who go abroad to kill ennui.
(2) Those who go abroad to escape the winter's cold but are otherwise healthy.
(3) Those who suffer from ill-health & disease that do not in themselves cause death & even shortening of life (so called functional diseases)
4 Those who suffer from structural diseases & diseases that in time produce structural changes (so called organic diseases)

I know the above distinctions (3 & 4) are hardly correct as year by year No 3 grows smaller & No 4 larger but the distinction is convenient though not fundamental.

The first-class can be dismissed with the remark that they usually have a pleasant time & vote the change delightful. To them warmth & cold dryness & moisture are nothing as long as it does not interfere with their pleasure.

The second class are very different, for them a warm climate is essential, ~~usually~~ the warmer the more enjoyable is the climate to them. Usually they are people who have spent the whole & greater part of their lives in warm climates & by reason of pensions etc. are able to be in England through the warm weather but during the colder months, they seek like swallows a warmer climate

The majority of this class having lived in warm climates, usually understand & are accustomed

to life out of the British Islands & often prefer foreign modes of living. so that to them the any discomforts are at a discount & the increase in warmth is part of their very existence. Year by year this class appears to increase in numbers & no doubt it adds very much to the prolongation of such lives, & also of that of the pensions, but nowadays the prolongation of life is first & foremost. At the present time there is an old Indian judge returning to the islands every winter who although eighty three, yet comes "to stave off death a little while longer." & a wonderful active vigorous life he has, which must have lapsed ere this if he had wintered in England.

In considering the other two classes the individuals differ from those of the former classes in being more or less, in ill health & of these two groups those of No 4 are in a more or less hopeless condition. To those suffering from the so called functional diseases, change of scene is often by far the best medicine that can be described only these cases must be able to stand the wear & tear of travelling, the altered conditions of foreign life, often hotel life & hotel food, & above all to be away from their home & friends. These cases may be divided according as a cold dry climate or a warm.

climate is suitable. (It cannot be said that a warm climate is bracing, & then in the same breath speak of a cold bracing climate; all warm climates are more & less enervating, some much more than others: the physiological ~~actions~~ functions being performed under very different circumstances in a warm climate & that of a cold climate. Take for instance the question of diet- the colder the climate the more nitrogenous & fatty food is wanted, this requisite; whilst the nearer the equator not only is less nitrogenous & fatty food ~~found~~ wanted, but the quantity & quality is not found)

Amongst this class of invalids there are some who in cold weather cannot move out of the house on account of neuralgias or sluggish circulation causing the extremities to become cold perhaps livid; again there are others who ~~have~~ much better health in cold weather than warm the cold bracing them up, whilst warmth depresses them. The question of diet ~~also~~ & the state of the digestive system also enters very considerably into any decision.

The great point in deciding on a warm climate similar to the one under consideration is, that patients are able to be out of doors at least part if not the whole of every day during the winter, breathing perfectly fresh

fresh air, naturally warmed up to the high mean of 64°7 & not only is this fresh air available thro day but even at nighttime the mean minimum temperature does not reach 55°7. In addition to this the high average of sunshine has a very beneficial effect in doing away with gloomy depressing weather that has such a baneful influence on the majority of these cases. By these means a warm climate like the Canaries has a tonic stimulating effect; promoting appetite, producing sleep, & strength if well, but not producing to so great an extent; time change, as does a cold invigorating climate, & for this reason in many of these cases a cold climate may be more beneficial if it can be borne.

In those cases where there are structural changes usually of a progressive & degenerative character (so called organic diseases); the value of climatic change is in inverse proportion to the extent & acuteness of the alterations. In any case it can only be palliative with structural changes still present; though the organs work under more favourable conditions the most that can be hoped for, is, that the disease may become quiescent

Naturally this class is best divided into acute & chronic cases; for the former where changes are progressing quickly, climate can be of little avail & usually any attempt to move such cases to a foreign climate, with the fatigue attending such a procedure, the necessary change of life often the cutting off of certain essential comforts, all tend to bring a hopeless case to a more speedy termination. There are no doubt exceptions but they do not prove the rule.

In subacute & chronic cases the applicability, or any beneficial effect from change of climate, entirely depends on the extent of damage & duration of the disease; the more acute the disease & the greater the extent, the result will be less favourable. But for these cases though there may be no hope, yet residence in a warm climate; tends to prolong life & to make the wheels of life run more pleasantly & smoothly; while an outdoor life can be enjoyed even to the very end. And naturally the conditions being more favourable, there may be some chance of a subacute passing into a chronic stage & this in turn into a quiescent & thus perhaps enabling the patient to live a fairly, active, healthful life. But for this good result there should not be any great extent of disease, nor any rapid progress & even then time is a great factor.

To many, time & expense are no object & to these health is the first consideration, but there are others to whom the question of occupation & livelihood have of necessity to come before health is a most serious consideration. In the early stages of disease health & occupation may often be advantageously combined but where the majority of these cases fail is that everything else is tried first, & then when sooner or later everything else fails, change of climate becomes the dominant idea & if carried out at this late period usually ends in disappointment; this cannot be wondered at as the giving up of a certain occupation for usually an uncertain one is not a thing to be undertaken lightly. For such cases the Canary Islands offer few advantages the majority of the work even in English houses is done by Spaniards; Spanish ways & a knowledge of the Spanish language are essential to any business. Agriculture cannot at present be made profitable by foreigners & usually leads to disappointment. Captain Hanford in his last consular report seems to think that capital might be employed in dairy farms but as all English people are looked upon as lawful prey; a knowledge of Spanish customs & language would be very necessary. This question of living abroad permanently is intimately associated with the fact that

a short residence of a few short months is not of much avail towards the quiescence of structural mischief or perhaps towards any improvement. However quickly degenerative changes have occurred & whatever the extent yet the reparation, if any, must be slow when completed, the part will for a long time be very sensitive to any adverse influence, quite as sensitive as in the case of a newly healed varicose ulcer of the leg that breaks down again from a slight blow or even from general ill health. Change of climate even at its cheapest is an expensive prescription & from many points of view it is more advisable for the class of patients under consideration never to venture to a warm climate, if they are not able to remain till there is some chance of warm weather at home. Over & over again have I seen most disastrous results from returning Rome early in the year perhaps to the severest winter weather. To take a typical example a clergyman came out here one November suffering from a husky condition of voice. The rest here the absence of cold had a most beneficial effect the voice became clear & resonant; coming to see me one day he told me he was going home. In spite of my remonstrances, in the middle of January he returned to active duty almost

on the first occasion his voice became more husky than ever it was before & very much to the sorrow of his charge he had to resign his appointment. In all human probability if that patient had remained till the summer & then undertaken light work (as his congregation desired) he would probably have now been leading an active useful life. Living for any length of time in a warm climate produces in those that are delicate a certain amount of susceptibility to cold damp weather as in the case of the Canaries ^ the majority of invalids are not able to journey home in short easy stages. In these days of rapid steamship travelling within forty eight hours an invalid may be plunged into cold wintry weather out of which there is no escape

Naturally where financial conditions do not enter into the case this question need not be considered; but nowadays with steam ship competition change of climate is being opened up to a much wider circle & those by to take advantage of it, to whom a few years ago it would have been entirely beyond their reach.

Section V
C

The various localities in Relation to Disease

— 11 —

In considering the different forms of disease in relation to change of climate more particularly as regards the various localities in this groups of islands the most concise method will be to arrange the diseases under the various systems & briefly to indicate the various advantages and disadvantages that each places possesses. Beginning with that class of disease included under the head of specific infectious diseases; the majority of them are outside the ~~pla~~ pale of climatic treatment

Malarial cases are usually those sent from the west Coast of africa. The effect of better food accomodation & general hygienic surroundings are marvellous. Such cases are often on the coast carried from their beds & put on board steamer as a forlorn hope. After a few weeks residence, like the Mythological phoenix, a new man rises on the ashes of the old. For such cases the towns at the lower levels are to be preferred. Though during the summer, residence could be made at higher levels Grand Canary is the great depot for the west Coast & perhaps more of these

are seen there Mason in Teneriffe.
The only cases of <u>syphilis</u> likely to be benefitted by a warm climate are the laryngeal cases, these will be considered later on under laryngeal cases.

<u>Tubercular & Strumous tendencies</u> particularly in children are often diminished after a short residence fresh vigour & life seems to be infused into such cases but this is where there is no acutual disease only a strong tendency to drift into tubercular deposit or rather for tubercular deposit to drift into them. In such cases the higher parts of the valley of Orotava Teneriffe
+ Icod in ~~Santa Cruz~~. Las Palmas - the Monte in Grand Canary are to be preferred whilst during the summer months sea bathing has a wonderful invigorating effect. This can be done all the year round but the beneficial effect rather wears off; from May to November when the average temperature of the water is high, appears to be the most suitable time. From its long stretches of sandy beach Las Palmas is particularly well adapted for bathing though it must be borne in mind that the currents run very strong round these islands. Particular attention should be paid to the diet of these cases all the more if in Poleo

In <u>Diseases of the Nervous system</u> the acute forms are naturally contraindicated. In the chronic forms due to structural changes little hope can be expected from residence in a warm climate, the benefit lies in the open air life available all the year round; For these cases the more sedative calm climate of the lower part of the valley of Orotava is to be preferred. Santa Cruz - Guimar in a minor degree Cases of Nervous irritability, loss of nervous ~~Exceptional~~ energy mental depression, sleeplessness &c due to non structural changes generally improve the most at higher levels - at some distance from the sea Localities like Icod Villa Orotava - Laguna in Tenerife & the Monte in Grand Canary will be found the most suitable. The various forms of neuralgias are due to so many causes that it is necessary to take them into consideration. If digestive disorder are the cause the higher elevations should be selected; if of Rheumatic origin Santa Cruz Guimar or the town of Las Palmas would be preferable or if due to nervous debility (a rather vague term) then the higher elevations should be sought In all these perversions of the nervous functions the main good of the climate of the Canary Islands is in allowing outdoor exercise day after day throughout the whole of the winter months.

Deseases of the digestive organs & alimentary tract are not as a general rule benefited by a warm climate particularly when the liver function is at fault. Perhaps, in those cases of dyspepsia due to overwork confinement in an office & irregular hours; the complete absence from business, from a daily postal arangement, combined with regular hours & plenty of outdoor exercise often cause considerable improvement but the general hygienic surroundings play the greatest part. Cases of Catarh & ulceration of the stomach & intestine are contraindicated & these conditions occuring in the course of other deseases makes them also unsuitable The same thing applies to cases where the liver function is at fault. To all these cases the coast towns are more prejudicial than those of some elevation such as Icod in Tenerife & the Monte in Grand Canary. Laguna & Villa Orotava being more humid are not so beneficial as the two places mentioned In any tendency to digestive disorders greater attention should be paid to diet than even when at home. This in Hotels is always more difficult than in a private house. Care should be exercised over stimulants particularly the native wines, it does not follow that the native wines are the best that can be taken

Cases with <u>nephritic changes</u> whether primary or secondary are naturally more suited for a warm climate than a cold one & a humid climate is more beneficial than a dry one, as a general rule these cases should to begin with reside near the sealevel & in some locality sheltered from the full force of the wind comparatively moist situations like the Puerto Orotava & Orimar at a higher level produce a better result than Santa Cruz or Las Palmas. In the region of Telde there are many beautifully sheltered situations but the accomodation is for the present very meagre. In such cases are complicated with cardiac mischief the lower part of the Puerto Orotava & the town of Las Palmas are preferable as there the level roads can be obtained where is the maximum of shelter. If in addition there is hepatic or digestive troubles then these cases would be contraindicated

For <u>cardiac diseases</u> a warm climate can effect little or no direct benefit its effect is more prophylatic preventing & rendering less liable bronchial attacks which cause increased mischief. Preventive measures succeed very well but steep localities like Icod Villa Orotava & some parts the Puerto Orotava site surroundings are contraindicated. Levels walks are

are obtainable in Santa Cruz de Tenerife, in Guimar + Las Palmas; at higher levels in Laguna + the Monte. The most suitable locality depends very much on the condition of the bronchial mucous membrane. If a lower temperature can be borne the higher elevations are more to be preferred.

Diseases of the Respiratory organs

without going into the relative merits of warm or cold climates there are for these cases, in the Canary Islands, a choice of climates at different altitudes. acute cases can be altogether omitted as they entirely contraindicated, the most suitable locality for these cases is where their home is situated.

Laryngeal cases are contraindicated where there is much dust or wind, for these cases, the sheltered parts round the Puerta Orotava are in many ways the most suitable, in a some degree Santa Cruz + at a higher elevation Guimar The outskirts of Las Palmas are contraindicated though a certain amount of shelter can be obtain within the town. During the summer months I cool in ~~Grand~~ Tenerife + the Monte in Grand Canary provide an agreeable + beneficial change. In cases of asthmatic tendency the majority of

have to discover for themselves the best most suitable climate; the best results have been obtained in Santa Cruz de Tenerife, that, many cases can breathe freely & easily that in other places are almost choked. For other cases that can bear a lower temperature I have seen good results from Icod in Tenerife & the mouth in Grand Canary. The upper part of the valley of Orotava is much preferable to the lower. But about these cases, there is the usual uncertain result only it with the exception of Santa Cruz they appear all to do better at some little distance from the sea & at some little elevation. This may be due to the spray of the sea blown inland having an irritating effect on the mucus membrane & reflexly causing the spasmodic condition it may be for this reason that the low lying parts of the Puerta Orotava & the outskirts of Las Palmas are in particular contraindicated

Similarly in cases of Bronchitis very much depends on the irritability of the mucus membrane, those cases do which do not require much shelter from the wind will find the outskirts of Las Palmas the most preferable locality with in a minor degree Santa Cruz, & Guimar at a higher level, if a more humid climate is desired than the Puerta Orotava. But with the majority of these

cases a dry more stimulating atmosphere is to be preferred. During the warmer weather I send the upper part of the valley of Orotava + Laguna in the island of Teneriffe with the Mountain in Grand Canary + these resorts can often be used instead of returning to the uncertain weather during a British Summer

In cases where the pleural surfaces are chiefly affected Santa Cruz or Las Palmas in the beginning + then the higher levels of Orotava or the Mountain but for these latter the pleurisy should not even be in a subacute stage nor liable to become so

For cases where the lung substance itself is affected very much depends on the diathesis of the individual + on the extent + progress of the disease The more acute forms are contraindicated; the more advanced + more feeble these cases are the more sheltered parts of the Peaks Orotava Santa Cruz Grimosa + Las Palmas are indicated. No doubt the twenty four miles drive to Orotava, the want of good accomodation in Santa Cruz, + the shelter in Las Palmas is afforded only in the town are all things that militate against the places

The earlier cases, in stronger + more robust health, with perhaps no loss of lung substance + also not of a strumous diathesis, such

cases are more suitable for the upper parts of the valley of Orotava & Icod in Teneriffe. The surroundings of Las Palmas & the Monte in Grand Canary. Naturally if the weather generally is colder & damper than usual then these inland places might become unsuitable but in the course of one & two hours anyone can remove down to the lower & warmer situations

In cases of Pulmonary disease in which the chief feature is a hæmorhagic tendency the result is rather uncertain some do well others do not improve. If there is any hereditary disposition to a hæmorhagic diathesis these are nearly always unaffected. If there is a tendency for the disease to be progressive here again the prognosis is not good. In such hæmorhagic cases aconite appears to be of great service diminishing the force of the heart's action In these cases low barometric pressure has a predisposing ~~cause~~ effect. The barometer is not as a rule low for a long space of time but if it is I have noticed a perfect epidemic of hæmorhages even in cases not liable to it. These cases are not amenable for the higher levels, The lower levels seem to agree the best with them & I do not know that one locality is more suitable than another beyond the more exposed situations are undesirable

In <u>Diseases of the Blood</u> Pernicious anaemia leukaemia Hodgkinson's disease are more of them likely to benefit by change in climate In cases of anaemia or chlorosis due to no disease it should be remembered that anaemia is more common among British subjects in tropical than in temperate climates. If full advantage is taken of the possibilities of outdoor life this tendency may be counteracted. If a lower temperature can be stood Iced in Teneriffe the Montâ in Grand Canary will be found more beneficial than the warmer seaside towns.

In cases of <u>Diabetes</u> I have seen very good results in one case when the sugar disappeared the amount of urine lessened the Specific Gravity fell to normal & in the end the diet was able to be relaxed For these cases the warmer situations are to be choosen but they should arrange for their special diet of gluten bread to be sent from England as otherwise it is unobtainable.

In <u>Genito Urinary Diseases</u> In cases of cystis. The main point is that in a warm climate through perspiration more in diet is the urine may have a tendency to become scanty & too rich in acidity. This has to be guarded against. The benefit of change of climate even in these cases is of a very problematic nature

In <u>uterine diseases</u> there are cases that enjoy better health in a warm climate than in a cold chiefly I think those of an inflammatory & catarrhal nature certainly some of the cases have been benefited whilst out here. In new growths & hemorrhages no benefit can be expected, on the contrary the condition would probably become aggravated.

In <u>Diseases of the Bones & Joints</u> actual tubercular disease can be little affected though the continuous outdoor life probably will have a beneficial effect. In these cases if there is no general disease the higher levels should be preferred.

In cases of rheumatism, of course of the chronic forms the more humid climate is less to be preferred than the drier. Situations like Santa Cruz & Las Palmas are to be preferred to Oratava. To begin with these cases should remain at the lower parts throughout the summer months. When the weather becomes too hot either Icod & the Monte Laguna would only be available thro August & September the early part of October.

But in all these cases thick flannel underclothing should be worn & changed twice a day

In chronic rheumatic arthritis in its early stages before permanent articular changes have set in residence in the drier warmer situations

may have a most beneficial effect particularly
when occuring in young persons.
In cases of Gout a gouty tendency strict attention to diet
will be necessary in the avoidance of acid wines
malt liquors & oranges even in healthy persons
these things are very apt to disagree.
In cases of Rickets in Children a continuous
residence allowing a maximum of outdoor
life is the main factor. For this the disease
the upper part of the valley of Orotava &
the outskirts of Las Palmas. In mountain air
through the warmer months there are the higher
parts. Only it is through this time that
seabathing is most indulged in, & for these cases
it is often of great service.

Section V
D

The future Possibilities of the Islands

The future of the islands cannot at present be confidently predicted. The only stable element is the climate & up to the present, of the best of the climates, ~~the best~~, have not been utilized

The most sheltered, driest & sunniest climates are those of the east-coasts towards the south of the islands ~~& that~~ entirely away from the ports of entrance & Exit. Roads are now being made into these regions as Grand Canary, Teneriffe, La Palma, & in time they may be opened up though in these regions, particularly in Grand Canary & Teneriffe, springs of water are scarce & this may effectually prevent any development. Neither the two eastern nor three western islands will ever be extensively used as Health resorts until their ports are made the centres for steamers, of which at present there is not the slightest possibility. From a climatic point of view the two eastern islands are the only two that would be worth developing & here again the scarcity of water is a most serious obstacle.

In the case of Grand Canary the Hotel Companies have built hotels to the North of the town of Las Palmas in most exposed places, although they may be very pleasant yet from a medical point of view they would be much more preferable with more shelter from the winds

& do be at some distance from the Sea.
There is shelter to be obtained in the town
but visitors are somewhat prejudiced against
living there on account of the closeness of its atmosphere
& supposed unhealthiness.
Santa Cruz de Tenerife possesses only two
small hotels in the town & visitors usually
rush through direct for Orotava. A Large
hotel built outside the town on the road
to Laguna would obviate this & allow one
of the best ~~sh~~ winter climates of the group
to be utilized. Healthresorts as a general rule
~~Not~~ never develope to any extent unless in
addition to hotels there are private houses
villas or flats. ~~to~~ to suit the requirements of
a very numerous class of winter travellers
who will not ~~not~~ reside in hotels; & the want
of private houses are a most serious obstacle
to the development of these two places.
In Orotava on the contrary speculators have
been wise in their generation & have opened up
hotels & villas at all levels, at some distance
from the Sea; from this wise forethought
this place bids fair to become the principal
Healthresort of the group notwithstanding, the long
drive of twenty four miles from Santa Cruz &
that other places possess better climates.
In other localities, the Governmental & municipal ~~auth~~ authorities have
taken in hand the improvements & year after year complete. respect them
In Spain although she has several

beautiful & sheltered climates that would make perfect Riviera & at the same time be a great source of wealth yet after a certain point never anything more is heard of them. & this point is often reached only by foreign energy & industry. In the case of the Ionian islands the whole movement is entirely due to competition & enterprise on the part of the steamship companies ~~if~~ in the first place, for if it were not for these the islands would soon be left in their original Solitude. The inhabitants do not & never will possess any idea of 'pensions' & furnished apartments similar to other British & Continental healthresorts for although they appreciate money yet their pride & indolence prevents them from grasping the wealth that lies within their reach. With increase of shipping & number of visitors the price of food has risen to more than twice what it was three & four years ago. There is always variety in fruit & vegetables but little in meat. Servants will always be plentiful & wages low for if their language is understood they are not difficult to work, only great supervision is necessary. The absence of customs duties & all restrictions are a great boon to visitors but notwithstanding the climate, the sea passage will always militate against any large annual emigration of people at least until the earthly millennium of British rule comes & with this the possibilities of the place would be boundless.

Section VII

Public Health of the Islands —

Section XII

The Public Health of the Islands —

It may truthfully be stated that in no country is the science of sanitation & hygiene so well understood & carried out as in the British Islands. & it follows that the public health of the Canary Islands compared with England naturally falls very far short. Yet there are several natural conditions, that to a great degree, counterbalance & mitigate the effects of a general want of sanitation: due to ignorance of the principles of hygienic conditions not only of the people but also on that of the authorities.

In the first place the constant movement of the atmosphere; circulating pure air from the atlantic ocean. In the second place the large average of sunshine & the low degree of Humidity. In the third place the population is fairly well scattered over the islands; the two largest towns not exceeding 20 000 & 30 000 inhabitants These conditions no doubt allow for a much greater laxity in sanitary conditions. Statistics are not very easily obtained & may not be very reliable, yet I will give those I have been able to obtain Commencing with the island of Grand Canary & with its capital Las Palmas The central population is given at 22,000 but probably the real figure is

somewhat higher. All the statistics I have obtained for Las Palmas are as follows

	Births	Deaths	Excess of Births over Deaths
1887	948	614	334
1888	901	695	206
1889	1000	569	431
1890	905	653	252
1891	658	608	42

The figures for 1891 are only up to august. The heavy mortality was due to an epidemic of smallpox.
As typical of a country district I have obtained the following statistics from a work by Dr Federico Leon of Las Palmas entitled the Vega of San Mateo. The district of San Mateo is towards the centre of the island & from two to four thousand feet above sea level, & has a population of nearly 5.524 persons. Of these 2.500 were men 2,824 women, 2,981 were unmarried & 2.030 were married 253 widowers or widows & 60 without classification.

Ages	Number of persons	Professions etc	
Less than one year	310	Agricultural Labourers	4.211
Between 1 & 10 years	422	Scientific Professions	2
.. 10 & 25 ..	1.296	Skilled artizans	333
.. 25 & 40 ..	1.931	Servants	92
.. 40 & 70 ..	1.005	Without classification	686.
.. 70 & 100 ..	360		

978 know how to read & write 334 know how to read & 4.012 know neither how to read or write.

Births

1872–1886	Total Male	Total Female	Total	average per Month
Months of Jan.	113	97	210	14·0
Feb	89	95	184	12·2
March	95	129	224	15·2
April	97	89	186	12·4
May	65	74	139	9·2
June	67	71	138	9·2
July	75	53	128	8·6
Aug	55	56	111	7·4
Sept.	65	50	115	7·7
Oct	73	80	153	10·3
Nov.	87	69	156	10·4
Dec	106	91	197	13·1
Total Births	977	946	1923	
yearly average of Births	65	63	128	

Deaths

1872–1886	Total Male	Total Female	Total	average deaths per month
Months of Jan.	21	38	59	4·0
Feb	28	39	67	4·4
March	35	42	77	5·1
April	24	31	55	3·6
May	27	37	64	4·2
June	29	33	62	4·1
July	57	63	120	8·0
Aug	81	70	151	10·0
Sept.	45	56	101	6·7
Oct.	42	36	78	5·2
Nov	27	42	69	4·6
Dec	33	40	73	4·9
Total Deaths	447	527	974	
yearly average	29·8	35·1	64·9	

Years	1881	1882	1883	1884	1885	1886	Total deaths	16	16	16	17	16	20	121
							and diseases of Respiratory organs	8	7	18	8	13	6	60
							Gastro Enteritis . Catarrhal Diarrhoea	8	2	6	10	6	10	42
							Inanition	7	2	1	4	6	6	26
							Tuberculosis Heriditary . acquired of lungs brain + bowels	5	4	1	7	4	3	24
							Croup + Diphtheria	2	3	1	4	6	5	23
							Typhoid Fever	5	4	5	2	0	1	23
							Cerebral apoplexy	3		4	2		1	18
							Bronchial } asthma Emphysema Cardiac }	2		5	4	7	3	21
							Tetanus hysteria Eclampsia Chorea		2	5	4	5	3	19
							Infantile Diarrhoea	5	3		2	1	6	16
							Cardio vascular Diseases	4	3	2	3	2	5	18
							Coqueluche (!!)	2	2		5	5	3	12
							Meningitis	2	2	2		3	4	11
							Mental Degeneration	1	1	2	3		2	10
							General cardio vascular Degeneration (Senile)	1	1	3			3	8
							Puerperal diseases Diseases of Uterus	2	1		2	1		6
							Alcoholism	3	1	1				5
							Dysentery				2	1		3
							Scrofula	1	1			1		3
							Septicemia Uraemia		1	1			2	4
							Cancerous New Growths	1			1	2		4
							Senile Gangrene	1			1			2
							Dropsy		1	1				2
							Measles		1	1				2
							Scorbutus	1			1			2
							Eczema General					1	1	2
							Leprosy					1	1	2
							Smallpox	1						1
							Gota ?			1			1	2
							Strangulated Hernia						1	1

The births & deaths are calculated for 15 years; in the first table are given the births arranged according to the months from which it will be seen that the winter months have a higher birth the males by in a slight preponderance. Out of 1923 births, eight were returned as illegitimate seven males & one female.

In the second table the deaths are given in the same manner from which it will be seen that July & August have the highest death rate. The ~~deaths~~ females have a higher death rate than the males. For this district also a classification of cause of death has been made out for six years 1881 - 1886. The nomenclature differs slightly from our insular & there are some rather curious grouping of diseases. But it shews that diseases of the bowels & diseases of the lungs are by far the commonest causes of death.

Turning from the island of Grand Canary & taking a similar country district in the island of Teneriffe, that of Vila Flor The statistics are only for the village which stands at a height of 5000 feet & has a population of about 1000

There are no statistics similar to those for San Matteo; in ten years 1877 - 1886 There were 138 deaths of these

63 were returned as dying under the age of ten years
47 under one year
16 above " " & under ten years.

11 deaths were returned as being between 60 & 70 years
16 .. .. .. 78 & 80 ..
19 .. .. .. 80 & 100..
Leaving 29 people who died between the ages of ten & sixty or an average of 2·9 for every year

I have no statistics of classification but in these island districts the conditions of life are so similar that what applies to one district may be made to apply to another similar district. The statistics for the valley of Orotava are taken from Dr Zerolo's book Tuberculosis & Climatherapeutics & I have arranged them in table with the statistics of other parts

Name of district & Town	altitude	Population	No of years of statistics	Birthrate per 1000	Deathrate per 1000
Santa Cruz de Tenerife	Sea level	18,000	—	—	—
Las Palmas Gr. Canary	Sea level	22,000(?)	5 years	43·0	28·0
The valley of Orotava: Puerto Orotava	Sea level	4295	11 ..	35·8	18·7
The valley of Orotava: Realejo Bajo	1050 feet	3673	11 ..	28·7	15·0
The valley of Orotava: Villa Orotava	1100 feet	8,300	11 ..	41·6	25·1
The valley of Orotava: Realejo Alto	1200 feet	2,700	11 ..	55·5	27·2
San Matteo Grand Canary	3,500 feet	5.000	15 ..	24·0	13·0
Villa Flor Tenerife	4310 feet	1,000	10 ..	32·0	13·8

omitting the district of Realejo Alto where the birthrate & deathrate are very high it may be noted that the greater the population the birthrate & deathrate are greater. & that as the altitude increases so do they tend to decline

The death rate in towns is no doubt increased by sick persons coming in for medical aid & also the women often go from the town to their old homes in the country for the period of labour especially for the first labour.
Concerning the frequency of Phthisis amongst the inhabitants. It has been considered from time immemorial a most infectious disease much more so than small-pox measles typhoid fever diphtheria & leprosy & the laws concerning it, if properly carried out are most stringent. Taking into consideration that the inhabitants of the Canary Islands are not of pure Spanish blood but a mixture of more than one race & that owing to difficulties of communication intermarrying between allied families is very common a predisposition to Phthisis might be expected. The type of Phthisis is of a very rapid variety especially at sea level. In the hospital here I have seen cases apparently in the earlier stages that in the course of two or three weeks present all the symptoms of an advanced stage & I think it is more marked & also it is more common among the females than males.
The statistics I have been able to obtain, bring out the fact that I have noticed in Las Palmas that Phthisis is more common at sea level than at a higher level & also it runs a

5 years 1880 – 1884

Table of Mortality of various provinces in Spain shewing also the mortality from Phthisis.

Province	Description	Latitude ° ′	Population	Deaths per 1000	Deaths from Phthisis per 1000
Canary	Islands atlantic	28. 24	289 673	19·26	0·76
Balearic	.. Mediter.	39 33	295 170	20. 32	0·98
Malaga	Coast ..	36 43	509 171	34·12	1.11
Almeria	.. ..	37 11	354 619	22·40	0. 69
Granada	Inland	37 11	482 245	27. 55	0·76
Cadiz	Coast atlantic	37 23	430 536	32·90	1·97
Seville	Inland	37 59	512 973	30·04	2·47
Huelva	Coast atlantic	37 59	213 580	24·15	0·90
Murcia	.. Mediter.	37 59	457 765	30. 54	1·25
Alicante	.. ..	38 28	415 077	29·86	0·80
Badajoz	Inland	38 54	441 303	30·62	1·69
Valencia	Coast Mediter.	39 28	688 768	25·45	1·10
Madrid	Inland	40 24	593 370	38·20	3·03
Barcelona	Coast Mediter.	41 29	843 498	28·86	1·91
Bilbao	Coast Bay of Biscay	43 15	193 233	28·70	2·66
San Sebastian	.. .. ..	43 19	171 170	29·90	2·26
Corunna	Coast (North west point)	43 22	602 582	24·10	1·70
Santander	Coast Bay of Biscay	43 29	236 993	23·12	1·84

Table of Mortality from Phthisis of various countries & Towns.

	per 1000		per 1000		per 1000		from Hirsch & others
England Northern Counties	2·6	Hesse	2·73	Malta	3·3	Boston	3·8
Southern ..	2·4	Switzerland. Canton of Grison	2·50	algiers	2·9	New York	4·
Yorkshire	2·8	Schaffhausen	2·10	St Helena	2·2	London	3·
Wales	3·2	Zurich	1·96	Jamaica	6·20	Edinburgh	3·
Norway	2·37	Bern	1·90	Lesser antilles	9·80	Brussels	4·
Sweden	3·5	Belgium	3·5	Sierra Leone	7·74	Copenhagen	3·
Denmark	2·5	Italy Lombardy	3·34	Rio Janeiro	5·0	Paris	4·
Saxony	2·4	Piedmont	2·86	Monte video	4·0	Vienna	3·
Bavaria	3·14.	Sardinia	1·78	Melbourne	2·2	Berlin	3·8
Baaden	2·78	Sicily	1·48	San Francisco	2·8	Rome	3·4

more rapid course. Spaniards afflicted with Phthisis always try to arrange to live some distance from the sea & at some elevation as it seems to prolong their lives

The only detail statistics I can get with regard to Phthisis in Cuba as follows.

	Villa Cratava		Puerto Cratava	
Years	Number of deaths	No of deaths from Phthisis	Number of deaths	No of deaths from Phthisis
1873	205	7	82	1
1874	198	2	78	5
1875	184	6	96	4
1876	163	13	61	5
1877	213	3	94	4
1878	208	5	82	10
1879	181	4	75	5
1880	219	10	78	2
1881	281	3	102	2
1882	183	11	43	5
1883	261	6	96	10
Total	2.296	70	887	53
	32.8	1	16.8	1

The above gives the Mortality from Phthisis as follows, with them I have combined ~~the~~ some Statistics for Santa Cruz & Laguna only I can give no authority for these latter

	altitude	Mortality from Phthisis per 1000	
Santa Cruz	Sea level	2.61	
Cratava Puerto	"	1.10	2.81 is the amount given for Puerto by the same person as for Santa Cruz & Laguna
Villa Cratava	2000	.67	
Laguna	2000	.65	

Notwithstanding the foregoing remarks on Phthisis in the Canary Islands, it is less prevalent there than in other provinces of Spain much less than in other parts of Europe etc
The statistics on the preceding page show this although too much reliance should not be placed upon them. Those for Spain are collated from ~~Mossy~~ Dr Zerlo's work already referred to; & those for the other countries are from Hirsch's Geographical & Historical Pathology (New Sydenham Society) with the exception of those for Jamaca Sierra Leone & Lesser antilles for which I cannot give the exact authority.
The infantile mortality of the islands is accounted for by diseases of the respiratory & digestive organs vis very much increased by want of care, food, & clothing. In times of epidemics the mortality is considerably augmented as there is no attempt at isolation nor are any preventive measures taken unless these be taken into account the ecclesiastical procession accompanied by ~~the~~ images of Saints Etc that is marched thro the town to frighten the epidemic away, but the time chosen for this is usually when the epidemic is abating of its own accord. Vaccination is practised but it is allowed to elapse till a general epidemic occurs & then there is vaccination on a large scale. In the last epidemic this exemplified very clearly the looking of the stable door after

the Rose was stolen

Leprosy is found the here there over the islands, by law lepers are segregated, chiefly in the asylum off Las Palmas, but similar to any other law in these regions this one is more honored in the breach than in the observance

It is said to affect certain districts more than others but so far I have failed to obtain any statistics. according to Misch the first lepers house was opened in 1542; & in 1860 ~~that~~ there were 600 lepers but I think this is very much overstated.

Drainage etc.

It may be stated with perfect truthfulness that there is no system of drainage in the islands. In Las Palmas except with a very heavy outlay it would be impossible to devise workable system as part of the town is perfectly level not much raised above sea level & the other part is perched on the face of cliffs; an insufficiency of water also would make any system still more difficult. The volumne of sewage is no doubt small for the size of the town compared with an english town of the same size, as the inhabitants are not in the habit of using much water for domestic purposes. The rainfall being small there is not much storm water ~~more~~ that there is, is carried away by covered sewers that run under the pavement of the principal streets & ~~that~~ into this nothing but

~~such~~ ~~there is nothing but~~ storm water is able to enter
for house purposes in towns the cesspool
system is the one in vogue. In many houses
there are two deposits, one for the storm + slops
water that may or may not have an overflow
into the cesspool but the soil is so porous
that it usually disappears by filtration
the cesspool proper being used with little + no
water may go for years without being cleaned
Such is the case with the Spanish, but when an
Englishman enters such a house, there is another
story to tell. In the case of Las Palmas where
the town is level the ground at no very distant
time was an open beach + even now if a well +
cesspool is sunk, at no great depth cobbles +
sand are entered upon, + at about 20 feet
brackish if not salt water; that in the houses
near the sea level ebbs + flows with the tide.
This cesspool system is characteristic of all
the towns + in country places even there
sanitary conditions are absent or if present are
of the most primitive kind.
The character of the houses no doubt greatly
assists in mitigating any evil effects of this
system of disposal of sewage; they are built
round one often two courtyards (patios)
+ the sanitary(?) arrangements are placed in
one corner far away from the living rooms
so that being entirely unsuited for an English

of house yet for a Spanish Style it may be made to work very well

Water Supply.

The water supply of the towns is of two kinds both at their fountain head supplied from Springs of pure water & both conducted in water courses made of cement & stone. The one kind is used entirely for purposes of irigation, irigating the estates thro which the water-course passes. By this means tracts of land are cultivated that otherwise would be barren for seven or eight months of the year. ~~when water~~ In winter time when water is plentiful this water has no market value but during summer around Las Palmas (where the distance from the fountain head is great) as much as 8/ an hour is paid for it & the stream dwindles as the dry season advances. The price of any estate is always estimated by the amount of irigation necessary, & the quantity of proprietary water, usually reckoned by the number of hours every fourteen days. In the more eastern islands the more water an estate possesses the more valuable it is. It is no uncommon thing for the water to be bought & sold independant of the estate or any estate The water courses of this class of water are usually uncovered & the inhabitants have the right to wash clothes in it, but this water-course has no connection with that, that supplies the towns with water for domestic purposes

The supply of water for domestic purposes in the larger towns is conducted from the source in stone + cement watercourses but covered over by slabs of stone (In Las Palmas this is being replaced by iron pipes) within the towns there are two ways of service one (the usual) is that the occupiers have to go to the public stands for all their water, + ~~the to~~ in some cases the house may have a proprietary right to water always flowing within the house or in some cases it may be laid on to the house + stored in an underground cemented tank which is filled as occasion requires. The water supply both for Las Palmas + Orotava is abundant even through dry seasons. That of Santa Cruz de Tenerife is scanty though steps are being taken to augment the supply. Strictly speaking the water for all these places should be good as the fountains are pure but the fountain head is usually some distance away + the distribution of water is limited by the barrancos down which the watercourses are conducted. The real danger of the water supply is in the distribution.

In the county districts + villages where the population is ~~scarce~~ more sparse + where the springs are remote there is usually only the one supply of water used for irrigation washing of clothes + domestic purposes No washing is allowed before eight a.m. when all the inhabitants in the vicinity are supposed to have obtained their days supply of water. If the spring is near the village usually the water is drawn at a higher part near the spring + all washing is done below

Section VII

Natural Mineral Waters

Section VII

Natural Mineral Waters

In the Canary Islands there are several springs of mineralized water, with one exception, they are all found at the surface of the ground in the bottom of ravines (barrancos) far away from the centres of population.

There are three springs found in different islands that possess Chloride of Sodium as the main constituent. They are Zabinosa in the island of Hierro

Barco verde .. .. .. La Palma

& Santa Catalina .. .. .. Grand Canary

An analysis of the Zabinosa water, made by the Institute of Chemical Technology & analytical Laboratory of Liverpool, gives the following Result.

Chloride of Soda	340.55	grains to gallon
.. of Potash	.87	..
Carbonate of Lime	20.82	..
.. of Magnesia	57.47	..
.. of Soda	Nil	..
Sulphate of Potash	8.22	..
.. of Magnesia	33.04	..
.. of Soda	14.45	..
Sulphide of Soda	.273	..
Silica alumina etc	1.250	..
Free Ammonia	.028	per million
Albuminoid Ammonia	.012	.. ..

The analysis of the Chanco verde water from the island of La Palma made for me, also by the same firm is as follows

Chloride of	Sodium	176.08 grains	½ gallon
..	Potash	.256	..
..	Calcium	Nil	..
..	Magnesium	Nil	
Carbonate ..	Lime	2.47	..
..	Magnesium	61.23	..
..	Soda	21.14	..
Sulphate ..	Lime	3.08	..
..	Magnesia	26.94	..
..	Soda	40.41	..
Silica alumena		Nil	
Water of hydration			
& nitrogenous organic matter		11.58.	..

although these two analyses do not show any sulphur properties yet these two waters at the springs possess a taste & smell of rotten eggs (sulphuretted hydrogen); even when these waters reached me in Las Palmas on their way to England for analysis in neither of the bottles I opened could any taste & smell of sulphuretted hydrogen be detected. To estimate this an analysis at the springs would be necessary. Probably the nitrogenous matter in Chanco verde is due to the decomposition of unstable sulphur compounds, the substance

barégine & glairine produced, similar to what occurs in other sulphur springs on Exposure of the water to light etc.

The Santa Catalina spring near Las Palmas Grand Canary has also Chloride of Sod as its chief constituent but it has no sulphur properties An analysis by Dr C Méhu Pharmacien de l'hopital Necker à Paris (1859) gives the following as its composition

Chloride of	Soda	424·11 grains	to gallon
"	Potash	7·57	"
"	Calcium	29·62	"
Carbonate "	Lime	10·31	"
"	Magnesia	81·198	"
Sulphate "	Magnesia	61·028	"
Silica		7·54	"

Free Carbonic acid Gas & in a state of loose combination 70·41 "

The temperature of this spring is 80°7 & does not vary during the year The temperature of the other springs is near 90°7 all these springs are near the sea coast at some little altitude. The Spaniards use these springs internally & in the form of baths only during the warm months (July - September). The reason given is that they are the most active during these months. The real reason probably is that it is their custom to take baths at this time of the year & also

Comparison of Mineral Waters —

Chemical Constituents	Woodhall Wy.	Kronsbrunn	Kreuznach	Wildbaden	Nelsonian Lyppat.	Sanitis Caldbrunn	Chaudes Eaux	Salvinos	Aix la Chapelle	Barege	Bonnie	Nelsonian.	grains to gallon
Chloride of Soda	1330.0	791.5	723.8	524.97	277.7	424.11	176.08	320.32	202.71	3.07	17.59	226.6	..
.. .. Potash	—						.25	.87		2.	2.40		..
.. .. Calcium	111.0		133.8	37.17	11.39	29.62						12.15	..
.. .. Magnesia	91.0	77.9	40.7	15.66	219.72							124.83	..
Carbonate of Lime	—	109.9	16.9	32.10	87.20	10.31	2.47	20.82	12.17	.22		55.53	..
.. Magnesia	-	20.1	1.06			81.19	61.23	57.47	3.96	.26			..
.. Soda							21.14		49.96	.39			..
.. Iron		4.6	1.50	.43					.73				..
Sulphate of Soda					49.78		40.41	14.45	21.71	3.84	2.86		..
.. Potash								8.24	11.86				..
.. Magnesia					76.13	61.02	3.08	33.04					..
.. Lime					1.48						11.14	9.45	..
Sulphide of Soda								.273	.730	3.60			..
Silica }					.855	7.542	Traces	.875	5.08	5.19	6.30		..
Alumena }					30.20								..
Organic Matter					2.337		11.58		5.77			1.05	..
Gases		CO_2		CO_2	CO_2	CO_2			CO_2			CO_2	
				n					n	n		n	
							SH_2	SH_2	SH_2		SH_2	SH_2	

during the hot weather may feel the necessity not only for change of air & scene but the benefit of the aperient action of the waters The number of baths that it is necessary to take is stated to be nine if a second series is begun it must be concluded. The bath accomodation is poor & primitive the accomodation in the case of Zabinosa & chaves Verde is practically nil.

Instead of entering into the various applications of these waters I have compared them with other well known Springs of a similar class

In the district of Tirgas Grand Canary about four hours from Las Palmas there is a Spring that is called after the locality in which it is found. This water may be taken as a type of a number of mineral Springs found along the sides of the mountains between the districts of Tenor & Guia some few of them however contain iron in the form of ferrous carbonate, all of them surcharged with Carbonic acid gas & all being capable of use as table waters

An analysis of this Tirgas water made by Dr Franklyn & Pelham Ogle of London shews that it belongs to the earthy & Calcareous group of waters

analysis of Figas water

	Carbonate of Lime	12.6 grains to gallon	
	.. . Magnesia	11.7	.. ..
	.. . Soda	1.5	.. ..
	Chloride . Soda	5.0	.. ..
	Sulphate . Soda	1.2	.. ..
Gas	Carbonic acid gas	111.0	.. ..

Free ammonia .28 per million

Albumenoid Ammonia .02 . .

This water is much used as a table water but its use should be in moderation as an excess may have an aperient action + also cause a phosphatic deposit in the urine. The bathing season here is through the warm months, but the mountain air, mineral exercise combined with the aperient action may account for all the benefit that occurs.

In order to give an idea of its indications I have contrasted it also, with other similar springs

Constituents	Figas	Bethesda U.S.	Contrexville France	Saint Gannica Nord	Wildungen	grains to gallon
Carbonate of Lime	12.6	20.4	28.0	46.90	49.84	..
.. . Magnesia	11.7	14.8	2.46	25.55	37.45	..
.. . Soda	1.5	1.5		21.00	4.48	..
Chloride . Soda	5.0	1.3	.38	4.6	.49	..
Sulphate . Soda	1.2	.5	16.52	8.4	4.76	..
Sulphate . Lime			81.55	4.97		..
Sulphate Magnesia			2.10			..
Gases	CO_2 110.0		CO_2 5.6	CO_2	CO_2 175.5	..

another spring found at the head of the valley of Agaete from which it derives its name possesses as its chief constituent iron in the form of Ferrous Carbonate. From an analysis made at the same time as the previous one its composition is as follows.

Chloride of Soda	4·5 grains to gallon
Sulphate of Soda	2·5 ..
Carbonate of Lime	3·0 ..
.. Magnesia	33·5 ..
.. Iron (Ferrous)	10·0 ..
Silica	8·8 ..

at the source the water is clear sparkling with a chalybeate taste & surcharged with carbonic acid gas. Bathing in it produces a feeling of exhilaration & taken internally in large quantities it acts as an aperient. Compared with others

Constituents	Agaete	Pyrmont	Orezza	San Moritz	Spa	Schwalbach	
Ferrous Carbonate	10·0	5·77	8·96	3·7	3·75	5·14	grains to gallon
Carbonate of Magnesia	33·5	1·72	5·18	16·8	11·23	13·04	..
Sulphate of Soda	2·5			24·36	·38	·48	..
Carbonate of Lime	3·0	104·7	42·14	89·82	9·86	13·60	..
Chloride of Soda	4·5	5·15		2·82	4·50	·41	..

In the case of the two latter springs the bathing accomodation is primitive & accomodation for visitors at Firgas is poor & at Agaete nil.

In the district of Aguimes & the South of Grand Canary there is a history of a spring containing arsenic but on account of its dangerous properties the source was blocked up & the spring disappeared.

In the district of Isla Flor Tenerife there is a spring with a bitter taste (Aqua agria) but I cannot obtain any analysis.

Section VIII

Comparison with other Healthresorts by means of meteorological data.

Edinburgh
Dublin
Cork
Liverpool
London
Southampton
Plymouth
Hamburg
Bremen
HOLLAND
Amsterdam
Antwerp
Belgium
GERMANY
Frankfort
Havre
Paris
Ushant
FRANCE
AUSTRIA
Tyrol
Lucerne
SWITZERLAND
Geneva
Venice
Turin
Bordeaux
Biarritz
Pau
Riviera
Genoa
ITALY
Marseilles
Corunna
Bilbao
Vigo
Oporto
Madrid
Barcelona
Balearic Islands
Valencia
Gjacia
Corsica
Sardinia
Naples
PORTUGAL
SPAIN
Lisbon
Seville
Malaga
Palermo
Sicily
Messina
Cadiz
Gibraltar
Tangiers
Algiers
Tunis
Malta
Oran
Biskra
ALGIERIA
TUNIS
Mazagan
Madeira
Mogador
MOROCCO
Canaries
Cape Juby
TRIPOLI

Section VIII

Comparison with other Health resorts.

In comparing climates of different health Resorts, the most usual method is by means of meteorological statistics & although the inferences deduced from such data may be of doubtful value yet an approximate idea may be obtained which is quite sufficient for all ordinary purposes.

I have compiled data for various places of the means monthly temperature rainfall sunshine & humidity. Those of the barometer, depending so much on the class & accuracy of the instrument, I have omitted. The general plan followed is, under each class of observations, to give data of (1st) those places under the influence of the gulf Stream, (2nd) of those on the Mediterranean seaboard (3rd) those that are inland, but at no great altitude & (4th) a few data of places in other parts of the world. Some of these data may be rather [illegible] many years old, & others recent but for a few years only. They may however give at least some approximate idea of meteorological conditions. Being so far from all sources of references they are not so perfect as I should have wished

Temperatures in Shade Means of Mean

Atlantic Ocean

Place	Latitude	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Range between Summer & Winter
Torquay	50 – 30	41.6°	41.6°	42.5°	46.3°	52.1°	57.7°	60.4°	60.1°	56.9°	50.5°	46.6°	41.8°	18
Ventnor	50 – 40	41.6	41.9	43.1	47.4	53.3	58.3	61.2	61.8	59.1	52.1	47.8	42.3	20
Falmouth	50 – 8	43.6	44.1	44.2	47.2	51.7	57.2	60.1	60.3	56.8	51.8	47.5	44.3	16
Guernsey	49 – 30	43.4	43.2	44.6	47.9	53.4	57.6	60.8	61.4	59.4	53.0	49.3	44.2	18
Biarritz	43 – 00	44.2	43.9	61.8	54.3	60.1						50.2	46.1	
Lisbon	38 – 00	50.8	52.9	54.1	59.0	62.0	68.5	69.8	70.5	68.11	62.4	56.4	51.7	20
Gibraltar	36 – 6	55.0	55.3	56.3	61.0	65.9	71.7	75.0	74.7	71.0	64.5	60.2	55.7	20
Tangiers	35 – 47	50.1	50.0	52.1	55.2	58.5	63.4	65.6	66.3	65.5	60.8	56.0	48.9	15
Mogador	31 – 3	61.2	61.5				70.8	71.1	71.2				61.4	10
Madeira	32 – 40	60.4	60.1	60.3	62.3	64.3	67.8	70.7	72.3	71.7	68.9	65.2	61.6	12
Orotava	28 – 25	59.4	60.4	62.5	63.8	65.3	69.0	72.3	72.6	71.8	69.9	64.3	61.2	13
Santa Cruz	28 – 28	63.5	62.8	64.8	66.5	69.0	73.0	76.2	76.2	76.1	73.0	68.8	65.5	13
Las Palmas	28 – 17	62.3	63.0	63.7	64.3	66.6	69.8	72.4	74.7	73.0	71.4	67.6	64.2	12

Mediterranean Sea

Nice	43° – 42′	47.1	46.2	51.8	58.1	64.2	71.1	75.0	74.8	69.1	62.6	53.8	48.6	28
Mentone	43 – 45	49.9	50.0	52.5	58.0	64.2					63.7	55.4	50.6	
Marseilles	43 – 17	47.0	45.4	48.1	54.0	60.3	66.9	72.9	74.8	67.5	62.2	50.4	44.3	29
San Remo	43 – 48	47.2	50.1	52.0	57.0	62.9	69.41	74.3	73.8	70.5	61.8	53.6	49.2	27
Genoa	44 – 25	43.3	50.0	51.8	59.0	66.4	72.1	77.0	76.1	72.8	62.8	53.0	47.5	33
Valencia	38 – 28	50.5	51.6	55.8	61.2	66.7	74.3	79.3	80.8	73.9	66.9	58.3	50.8	30
Mahon	39 – 53	53.9	50.8	50.3	56.3	61.8	69.6	70.7	74.8	69.7	60.6	54.7	50.3	24
Ajaccio	41 – 52	50.4	33.1	54.5	58.3	64.6	73.2	76.8	78.2	73.6	67.0	57.5	53.1	27
Naples	41 – 10	46.4	47.5	50.2	56.5	64.0	70.5	75.2	75.0	69.0	57.6	54.0	48.7	26
Palermo	38 – 18	51.6	52.0	54.5	58.8	65.5	72.1	76.8	77.6	73.4	66.7	59.9	54.1	26
Malta	35 – 53	55.9	54.7	57.3	60.3	67.0	72.3	77.7	78.8	75.5	70.2	62.6	57.8	24
Algiers	36 – 46	56.0	55.5	57.2	61.3	65.9	72.6	75.7	78.7	74.1	68.7	61.7	56.1	23
Tunis	36 – 47	52.0	51.0	52.8	58.2	65.2	72.0		81.2	71.4	63.2	55.2	49.8	30
Mauritius	31 – 11	58.1	58.6	61.6	66.0	70.0	75.0	77.6	79.0	77.4	74.6	68.2	62.0	20

Shade Temperatures continued.

Inland Towns.	Jan	Feb	March	April	May	June	July	Aug.	Sept.	Oct.	Nov	Dec	
Pau	41.0°	43.3°	48.1°	53.9°	59.8°	°	°	°	°	°	46.7°	43.0°	°
Florence	41.4	44.0	48.2	55.0	64.2	72.3	76.6	74.9	66.9	59.4	49.9	42.5	35.2
Rome	46.7	48.2	52.2	58.4	65.7	73.2	77.7	77.1	70.4	64.0	54.6	48.4	29.0
~~Biskra~~ Seville	52.3	56.1	56.7	65.7	69.4	78.1	83.1	83.8	79.2	68.5	60.4	51.8	32.0
Cairo	53.6	57.0	62.8	70.4	75.2	82.6	83.8	82.2	77.8	74.3	64.4	58.4	30.2
Biskra	50.9	51.5	55.0	63.4	72.3	82.0	89.7	90.2	77.9	69.5	58.1	49.5	40.7
Wynberg (Cape)	71.0	69.8	67.7	62.7	59.3	55.9	55.3	56.0	57.9	60.7	64.0	69.0	14.7
Durban (Natal)	75.3	72.7	74.0	70.0	67.5	63.1	61.7	64.2	64.8	66.8	70.8	74.2	13.6
Bermuda 32°.30	63.3	64.6	63.1	64.8	70.3	74.5	78.3	79.6	77.3	72.5	68.0	63.8	15.0
Bahamas 25°.10	70.0	72.2	72.3	74.7	77.6	80.0	83.3	83.7	81.9	78.8	74.4	72.8	13.7
Barbadoes 12°.25	73.6	73.4	73.5	76.2	76.2	76.9	76.7	76.7	76.7	76.9	76.1	75.0	??!
Hyeres	47.3	50.5	52.5	56.0	~~Stet~~						53.6	49.0	
Alassio	47.3	48.2	52.3	56.4	64.3					61.9	54.3	49.7	

Mean Daily Range of Temperature Means

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Mean January Temperature	Mean July Temperature
Torquay	8.8	9.3	11.7	12.7	13.4	14.4	14.1	14.3	12.8	9.9	9.5	8.3		
Ventnor	8.3	8.4	11.0	12.2	12.5	13.0	11.7	12.1	11.9	10.2	8.2	8.0	41.6	61.2
Falmouth	6.6	6.4	7.4	8.7	10.7	10.3	10.3	9.6	8.4	7.6	6.9	6.6	~~43.6~~	59.9
Guernsey	7.3	6.7	8.8	9.6	11.4	11.3	9.4	11.3	10.0	8.6	7.1	7.0	43.4	60.8
Lisbon	9.5	11.3	12.1	13.1	13.9	14.7	16.2	16.4	14.0	11.9	10.9	9.5	50.8	69.8
Gibraltar	10.8	12.8	15.4	13.0	13.2	16.4	17.5	19.5	17.0	14.9	11.8	10.8	55.0	75.0
Tangiers	5.3	7.8	7.2	7.9	7.7	8.9	8.3	7.6	8.5	7.2	5.6	6.2	52.8	70.1
San Remo	6.3	5.8	6.4	4.4						5.3	6.9		47.2	74.3
Ramleh	9.8	10.2	12.0	12.4	9.8	8.4	6.4	6.3	6.9	8.6	9.4	10.8	58.1	77.6
Cairo	14.8	16.5	20.2	21.3	23.4	24.5	20.8	21.5	19.5	18.2	17.4	17.3	53.6	83.8
Gratava	12.7	11.9	14.6	13.5	13.6	14.3	13.5	12.5	13.3	13.2	12.3	12.2	59.4	72.3
Las Palmas	9.0	10.2	9.4	9.0	7.7	7.5	7.2	9.0	9.3	9.1	8.7	9.1	62.3	72.4

Rainfall measured by Inches.

Locality	Jan.	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Torquay	3.26	2.75	2.79	2.37	2.22	1.87	2.95	2.26	2.36	3.65	4.03	3.41	33.89
Falmouth	4.09	3.61	3.21	2.55	2.41	2.25	3.48	2.92	3.77	4.72	5.60	4.95	43.56
Ventnor	2.60	2.00	1.78	1.71	1.83	1.66	2.41	1.72	2.58	3.56	3.48	2.80	28.13
Guernsey	2.99	2.50	2.04	1.96	1.98	1.88	2.12	2.17	2.67	4.06	4.82	3.34	32.53
Bianitz	6.11	2.40	3.88	.94	5.29						6.39	4.24	
Gibraltar	6.85	2.50	2.00	3.00	1.50	.50	.00	.50	1.00	2.50	5.00	4.50	29.92
Tangiers	3.71	2.94	5.52	5.93	2.95	.47	.00	.01	2.39	3.28	1.89	6.39	33.64
Madeira	4.40	2.52	2.86	1.92	1.06	.55	.03	.07	.78	2.30	4.80	4.21	25.54
Bratava	1.96	2.50	2.08	.74	.43	.002	.00	.03,	.075	1.37	1.72	2.12	13.05
Las Palmas	1.68	.576	.832	.40	.42	.03	.03	.00	.212	1.06	1.75	1.57	8.597
Nice	.305	2.27	10.91	7.48	6.94	- 00	.51	.00	3.62	.39	1.01	1.78	35.25
Mentone	1.87	2.19	5.23										
Valencia	1.10	1.12	.95	1.33	1.33	.93	.63	.33	2.86	2.52	1.99	1.60	16.79
Ajaccio	2.79	1.97	2.26	1.44	1.94	.87	.05	.55	1.39	3.80	4.40	3.36	24.86
Naples	3.61	3.88	2.96	2.38	1.59	1.19	.53	2.20	3.04	3.85	3.76	4.00	32.98
Palermo	2.29	2.36	2.65	1.55	1.03	.71	.06	.49	1.22	3.90	3.26	3.52	23.04
Malta	2.60	1.57	1.82	.81	.16	.07	.00	.18	1.17	3.02	3.34	3.27	17.95
Mauleh	2.33	1.43	.78	.12	.03	.00	.00	.00	.11	.33	1.32	1.79	8.24
Pau	2.59	8.64	6.92	5.50	1.27	1.05	1.07	3.40	2.14	4.62	5.40	4.98	48.19
Florence	2.52	2.82	2.75	3.50	3.17	1.68	1.42	1.85	3.56	4.04	5.23	2.23	34.70
Grenada	3.06	1.31	1.76	1.77	1.79	.76	.02	.17	1.19	1.37	2.55	2.26	18.01
Rome	4.54	2.91	3.94	1.72	2.38	1.16	0.41	1.70	2.73	7.48	5.49	4.44	38.90
Cairo	.19	.24	.03	.12	.22	.02	.00	.00	.00	.00	.21	.19	1.22
Cape Town	.28	.87	.86	1.71	2.84	4.74	3.82	2.36	1.58	2.72	.78	.28	22.80
Durban	4.66	4.54	3.16	3.55	2.38	.37	.85	1.32	3.21	3.03	2.97	3.12	33.16
Bloemfontein	2.30	3.50	3.83	2.97	1.39	.27	.41	1.10	.91	2.36	1.54	3.20	23.28
Bermuda	2.12	3.96	5.04	4.95	6.69	7.18	5.32	7.65	6.61	9.17	4.63	2.40	68.02

Rainfall measured by Inches continued

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Barbadoes	3.62	3.21	3.58	1.53	1.45	11.43	7.85	7.62	3.43	10.16	11.99	3.63	66.30
Bahamas	1.30	1.42	1.17	3.64	5.05	6.36	4.57	7.11	8.71	4.59	2.87	1.11	
Marseilles	1.62	1.62	1.32	1.40	1.86	.80	.34	.88	2.45	3.60	2.74	1.70	20.33
Hyères	3.41	1.43	2.13	3.10							2.62	2.22	27.00
Alassio	2.35	2.78	1.99	4.50	1.82.					3.~~36~~	6.42	1.70	
San Remo	2.68	1.65	1.19	2.14							5.29	1.13	28.78
~~Gibraltar~~	~~6.85~~	~~2.50~~	~~2.00~~	~~3.00~~	~~1.50~~	~~.50~~	~~.00~~	~~.50~~	~~1.00~~	~~2.50~~	~~5.00~~	~~4.50~~	~~29.92~~
Seville	1.18	.79	1.67	1.07	1.16	.74	.06	.08	.87	1.02	2.02	1.03	
Madrid	1.30	.91	1.46	1.22	1.97	1.34	.20	.39	1.50	1.66	1.62	1.54.	

Number of Rainy Days

Torquay	17	14	16	14	13	13	16	14	15	18	21	18	189
Falmouth	21	15	17	14	14	12	17	15	16	20	22	21	204
Ventnor	16	13	13	12	12	10	14	13	13	15	18	15	164
Guernsey	17	16	14	13	11	10	13	12	14	19	22	18	176
Tangiers	10	12.5	15.5	14	10.6	2.5	0	.5	3.2	11	7.5	14	100
Madeira													88
Orotava	14	10	8	7	8	—	3	—	2	17	8	17	85 ?
Las Palmas	10.0	5.2	7.2	4.2	3.0	1.0	.3	Nil	1.3	6.2	11.0	12.0	60.4
Hyères	7.0	7.8	5.4	8.0							4.2	4.~~2~~5	63.0
Alassio	4.3	4.8	6.6	10.8	5.0					7.0	8.6	5.6	~~4.8~~.0
San Remo	5.0	4.3	3.6	7.0							5.6	3.6	48.0
Cairo													
Bermudas	15.5	13.0	17.0	12.0	12.0	14.5	14.0	14.5	12.0	15.0	17.5	13.5	170.5
Bahamas	6	8	5	6	8	19	10	14	17	13	7	9	122
Barbadoes	14.2	12.7	3.5	9.9	11.0	13.5	18.6	18.3	11.4	21.0	19.0	11.55	165

Sunshine in Hours

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	
Penzance	26	54	73	68	158	185	182	141	153	82	216	34	1204½
Southsea	49	71	116	149	213	200	202	200	131	107	60	49	1546
Penzance	66	63	97	115	179	203	229	167	171	119	49	38	1501
Torquay	68	87	149	187	243	233	230	242	175	124	65	57	1870
Torquay	65	68	101	165							57	77	
Falmouth	164	163	176	149	203	196	183	182	158	162	142	152	2030
Las Palmas	168	181	184	185	216	194	161	190	204	189	165	161	2198
San Remo	177	209	261	267.							186	205	
Falmouth	46.6	71.3	130.8	174	223	238	215	206	145	112	70	57.8	1693
Teshall on Sea	64	77	116	152	242	292	249	245	230	139	82	83	1979

Amount of Clouds 0 — 10 10 = overcast

Guernsey	7.3	7.3	6.6	5.3	5.7	6.2	6.2	5.5	6.3	6.6	7.5	7.5	6.6
Falmouth	7.9	7.2	6.8	6.8	6.3	6.4	6.9	6.9	6.7	6.9	7.2	7.2	6.9
Babbacombe	7.9	7.8	6.7	7.0	6.7	6.4	6.6	6.3	6.5	6.9	7.3	7.4	7.0
Penzance	6.8	6.6	5.9	5.8	5.5	5.7	6.1	5.4	5.8	6.0	6.7	6.7	6.1
Cairo	4.1	4.2	3.4	3.4	2.3	1.0	1.2	1.6	1.8	2.5	3.0	3.7	2.6
Mentone	4	4	3	2	2	1	1	1	2	2	3	4	2.4
Las Palmas	4.9	4.3	4.9	5.2	4.9	5.5	5.8	5.5	4.4	4.7	4.8	5.0	4.7

Temperature of the Sea Degrees Fah

Falmouth		48°										
Torquay		46										
Yarmouth		39										
San Remo	55.0	54.3	55.7	58.0							61.2	57.2	
Gratavan	66.9	65.1	64.6	64.4	65.3	67.3	68.0						
Las Palmas	65.7	65.1	65.4	65.5	66.8	69.3	71.6	73.5	73.4	72.4	70.2	67.5	
Firth of Forth		37.0											

In comparing the difference in Humidity. The result is not so satisfactory, as so much depends on the hours of observation. I have in the following observations taken, when possible, 9 a.m. as the hour of observation.

Humidity 100 = Saturation

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Mean
Funchal	85	82	79	76	73	75	76	76	79	80	82	83	79
Brighton	87	85	82	74	71	74	77	70	80	80	86	85	80
Penzance	88	86	81	79	77	78	79	76	80	80	85	86	81
Torquay	89	86	80	78	76	75	76	75	82	82	87	88	81
Falmouth	88	86	80	78	77	77	79	79	82	82	85	87	82
Guernsey	89	88	84	82	83	83	83	82	84	84	86	87	85
Tangier	83	83	80	80	74	65	59	75	76	83	86	89	74
San Remo	71	69	71	69							74.6	66.4	
Algiers	69	68	65	66	65	63	65	66	66	63	60	65	65.4 *
Mentone	67	65	65	66	70	72	75	73	69	68	67	67	68.6 *
Cairo	69	66	56	47	48	44	49	55	62	65	67	69	58 *
Madeira	69	66	64	66	65	69	69	68	66	66	68	68	???
Gratava	75	73	73	74	75	74	76	79	80	78	80	78	77 *
Las Palmas	69	68	67	67	67	67	70	85	70	70	69	67	68
Cape Town	62	65	68	73	77	80	80	78	74	73	68	64	72 *
Bermudas	77	79	76	75	78	81	79	76	74	75	78	73	76.8 *
Bahamas	66	70	61	59	64	70	65	66	71	68	69	72	67.8 *
Barbadoes	78	77	78	76	77	82	82	82	81	82	84	82	80.0 *

\+ Mean of more than one observation

Appendix

Resumen of the History of the original inhabitants of the Canary Islands.

Appendix

Resumen of the history of the original inhabitants of the Canary Islands.

/ / /

As has been indicated the first authentic mention of these islands is by Pliny who relates how Statius Sebosus a Roman navigator recorded the distance from Cadiz to one of the islands as being 750,000 paces & also named the islands as follows

Derivation	Ancient Name	Modern Name	Derivation
Name of Phonecian nation	Junonia Menor	Hierro	
"	Junonia Major	Gomera	
Rainy Cloudy	Ombrion or Pluvialis	Palma	Santa Cruz de la Palma Balearic Islands
Snow (on peak)	Nivaria	Tenerife	Chinerfe name of Guanche chief
Dogs seal & Juba	Canaria	Grand Canary	
Goats found in large numbers	Capraria	Fuerteventura	Bienventura a Aportuna
Orchilla weed used for a dye	Purpurarias.	Lanzarote.	Lancelot name of navigator.

Pliny also records the existence of a temple on one of the islands (Hierro) thus indicating inhabitants.

When the Spaniards first made expeditions to the islands they found them inhabited. In this respect they differed from Madeira which was uninhabited when discovered. When the islands were finally conquered about 1500 AD the Spanish conquerors

are supposed to have exterminated this race though probably many survived especially of the females.

By the time of the earlier historical navigators the Guanches as a race were more or less obliterated & what little remains of their history language customs etc are gathered from the writings of these travellers. As no discoveries have been made of any writings etc, the Guanches are supposed not to have understood this art & therefore any attempt to peer into their history is still more difficult.

The name Guanche was originally used only for the inhabitants of the island of Teneriffe but now it Embraces the original inhabitants of the whole group.

The colour of their skin was described as swarthy (trigueño) the men more so than the women. The inhabitants of the North of Teneriffe were however fairer & more ruddy than those of the South & had also "pretty hair" (i.e. light coloured).

There is a tradition however of a Dutch settlement (about 1000 BC) in the north of this island.

The Guanches were essentially a tribal race, each island had its own tribes, councils, & kings,

& in some measure their own customs.
The office of king was usually hereditary, though not always so, in default of male issue the daughters might succeed to the throne. The rank of nobility was generally hereditary but not necessarily so, each aspirant was judged on his own merits & a noble could be disposed if unworthy.
At the opening of assemblies the coronation of kings wrestling was the great amusement. even to this day it is practiced; the men of one district wrestling with those of another district or island.

War was decided upon by a meeting of the king & council & the weapons used were slings, spears made of wood, sharp stones, which were hurled by the hand, the king & members of council carried rough shields.
The Guanches were not idolaters but are supposed to have been deists believing in a supreme being; and they possessed a sacerdotal class but the religious rites differed in different islands
Their feasts & holy days were associated with the gathering in of the grain.
Property seems to have been held more or less in common & to have

the produce divided Equally (?)
In abundant years the excess was handed over to the 'Faican' who stored it in caves for years of scarcity.
The ground was worked by means of a pick or hoe made of goats horn fastened to a piece of wood for a handle. The chief crops were barley indian corn which was ground to a meal by means of a stone pestle & mortar which formed a staple diet of food similar to the 'gofio' of the present day. Fish was caught by line & hook & also by directly spearing them Butchers were looked upon with aversion & were of the lowest caste; this feeling remains somewhat to the present day
Their habitations were caves Excavated in the hillsides or else formed out of natural caves. Houses built of stone appear to have been unknown & there has not been discovered, with one doubtful exception, any traces of temples or buildings.
Their clothes were made from the skins of goats & from matting made from reeds & palm leaves; in some islands (eastern) very little clothing was worn especially by the men. The hair of the goat was not put to any use

They were a monogamous race offences against chastity & concubinage were severely punished sometimes with death. The commonest forms of execution were death from, buried alive, being drawn asunder a from the application of a heavy weight. The institution of divorce was practiced & the guilty one punished.
The woman had some choice in her future husband & thirty days prior to marriage she rested from all work & took nourishing food
The Guanches had apparently no knowledge of metals such things as pistol knives needles were made from bone & the horn of goats, knives from stones sharpened & a wedge shaped various forms of pottery have been found the best specimens are from Tenerife.
They are ornamented by various markings usually in the form of parallel lines but without inscriptions or hieroglyphics.
They were made without the use of a potters wheel (as the native pottery is still manufactured) & have some resemblance to old Etruscan ware. Some tablets of stone with hieroglyphics have been discovered but are usually supposed to date to the early Phenician explorers. There being no remains of any written language attempts to trace the race by means of it have no lead to much result as all the sources of information are the earlier explorers who naturally.

Spell the words of the Guanche language + dialect according as their ears caught the sound + according to their own particular dialect + language. The language of each island seems to have differed in some degree although it must have had a common root. The lastest investigators the Marquis of Bute + Mr Cyrey de Brick of the British Museum were struck with its aryan element + state that the theory of the Teutonic origin of the Guanche language has been widely discussed + maintained. Another theory is that it is somewhat similar to that of the Moores of Barbary (The Berber theory). The historian Glas maintained that the language of Teneriffe differed from that of the other islands having more affinities to an American than african source Specimans of this particular were lately submitted to the authorities at the British Museum + were pronounced by them (not knowing the sources) to be allied to the original american languages. It is beyond the scope of this resumen to enter further into this question, + it appears to me, to be more or less one of speculation.

Of more interest + of more value is the method of the disposal of their

dead as it has allowed a large number of osteological specimens to be preserved two methods were practiced burial in cairns & caves & embalming.
In burial in cairns the bed of a stream of lava was choosen Men amongst the blocks of lava an oblong space was formed this was lined with flat stones; in this the body was laid, & over it were placed large masses of lava in the form of an arch built over the whole was the cairn also composed of blocks of lava.
The embalming was generally very roughly done the incisions were made with a peice of flint the bodies were embalmed with dragons blood & then sewn up in goat skins. The needle used were sharpened peices of bone & the threads were strings of leather & made from goat skins The mummy care was placed in a cave & each family seems to have had its particular pantheon as caves have been found in which were series of mummies regularly ranged & all enveloped in an equal number of skins.
There mummies have been found in all the islands except Lanzarote & Fuerteventura.

From these sources a large number of osteological specimens have been obtained which Dr Gregorio Chil y Naranjo has carefully examined & his results are published in his "Estudios Históricos de las Islas Canarias". The following measurements & information are taken from his work

"The most distinctive feature is in the ~~lambdoidal~~ lambdoidal region (Capecis de Welcker) this caused by reason of the development of the parietal eminences thus forming a depression sufficiently noticeable, that commences at a line two centimetres in front of the obelion & terminates in the lambdoidal suture causing an apparent depression of the tabular (escama) portion of the occipital bone a depression more evident when there exists wormian bones"

In the frontal & occipital regions the ridges are vigorous & prominent & the external occipital protuberance specially so. The frontal ~~& occipital~~ suture appears to be frequently manifest especially in the lower part

Measurements of Skulls. Means.

	Cranium			Nasal		Orbital		Facial Angle according to Broca's measurements		
Grand Canary	Max. Longit.	Max Trans	Vertical	Length	Breadth	Height	Breadth		Number of Skulls	
Centimetres	18·61	13·92	13·45	5·23	2·43	3·75	3·29	74·87	8 male	10 skulls
..	17·40	13·50	12·80	4·95	2·25	3·60	3·15	78·50	2 female	
..	18·60	14·37	13·29	5·10	2·45	3·80	3·20	75·00	7 male	10 skulls
..	17·83	13·30	12·63	4·73	2·40	3·60	3·26	78·66	3 female	
..	18·65	14·10	13·58	5·13	2·60	3·83	3·20	75·83	6 male	10 skulls
..	17·62	13·45	12·81	4·72	2·50	3·60	3·12	78·50	4 female	
..	18·25	13·38	13·71	5·12	2·61	3·78	3·11	75·50	7 men	10 skulls
..	17·90	13·50	13·03	4·89	2·60	3·73	2·96	74·00	3 women	
..	18·30	13·72	13·72	5·04	2·26	3·72	3·10	76·75	4 men	10 skulls
..	17·81	13·53	13·48	4·93	2·21	3·76	3·26	76·16	6 women	
Teneriffe										
Centimetres	18·50	14·92	13·34	5·10	2·34	3·72	3·20	75·40	5 males	10 skulls
..	18·30	13·82	12·94	5·36	2·30	3·50	3·08	73·2	5 females	
..	18·32	14·10	13·06	4·97	2·30	3·72	3·05	75·5	4 male	10 skulls
..	17·51	13·86	12·67	4·65	2·45	3·43	3·23	76·0	6 female	
.	18·95	14·71	13·27	5·14	2·35	3·86	3·30	79·0	7 male	10 skulls
..	18·03	14·13	12·80	4·93	2·23	3·73	3·30	75·3	3 female	
..	18·86	14·74	13·30	5·12	2·38	3·85	3·32	78·8	5 male	10 skulls
..	18·00	14·00	12·43	4·98	2·14	3·80	3·18	74·0	5 female	
..	18·25	14·14	13·25	5·15	2·40	3·74	3·41	78·4	8 male	9 skulls
..	17·50	13·90	12·30	4·50	2·40	3·40	3·00	75·0	1 female	

Measurements of Skulls Means

	Cranium			Nasal		Orbital		Facial angle	Number of Skulls	
	Max. Longit	Max Breadth	Vertical	Length	Breadth	Height	Breadth	Broca's Measure		
Gomera.	18.40	13.75	13.40	4.97	2.34	3.76	3.23	74.1	7 male	10 Skulls
Centimetres	17.30	13.36	12.60	4.70	2.50	3.80	3.20	75.6	3 female	
..	18.40	14.08	13.50	4.90	2.48	3.80	3.10	76.2	5 male	10 Skulls
..	17.80	13.46	12.80	4.76	2.20	3.68	3.12	78.0	5 female	
..	18.28	14.10	13.20	5.30	2.46	3.80	3.14	76.0	6 male	10 Skulls
..	17.45	13.42	12.30	4.53	2.10	3.62	3.10	73.7	4 female	
..	17.70	13.94	12.77	5.00	2.44	3.66	3.10	75.4	6 male	10 Skulls
..	17.00	13.36	12.30	4.38	2.10	3.46	3.00	78.8	5 female	
..	17.85	14.10	13.23	4.82	2.26	3.61	3.03	76.2	7 male	10 Skulls
..	17.30	13.60	12.22	4.95	2.20	3.60	3.03	76.0	3 female	
Hierro.	—	—	—	—	—	—	—	—		
centimetres	18.10	14.25	12.96	4.72	2.17	3.90	3.19	73.7	4 male	10 Skulls
..	17.75	13.30	12.98	4.63	2.26	3.58	3.12	74.0	6 female	
..	18.17	13.40	12.85	5.00	2.17	3.90	3.12	75.3	4 male	9 Skulls
..	18.12	12.94	12.24	4.56	2.28	3.58	3.04	74.6	5 female	
Male Skulls	Average of Means									
Grand Canary	18.48	13.55	13.90	5.12	2.47	3.77	3.18	75.6	32	Skulls
Teneriffe	18.57	14.52	13.24	5.09	2.35	3.78	3.26	77.4	29	..
Gomera	18.12	14.00	13.22	5.00	2.40	3.73	3.12	75.6	30	..
Hierro	18.13	13.82	12.90	4.86	2.17	3.90	3.19	74.5	8	..
Female Skulls										
Grand Canary	17.72	12.96	13.44	4.84	2.39	3.66	3.15	77.1	18	..
Teneriffe	17.87	13.94	12.63	4.72	2.30	3.37	3.10	74.7	20	..
Gomera	17.37	13.44	12.64	4.66	2.22	3.63	3.09	75.4	20	..
Hierro	17.93	13.84	12.61	4.29	2.29	3.58	3.08	73.3	11	..
								Total	168	

There is nothing distinctive in the coronal. In the sagital the parietal foramena are noted in 50 crania belonging to Grand Canary viz- twenty two they were well developed in twelve fairly well & in 16 they were absent The skulls from Teneriffe seem to be more marked in the above characisteics & they are less prominent in those from Hierro.

The measurement of the skulls are recorded in centimetres & I have classified & arranged them according to the islands & sex & from these measurements I have calculated the various indices

The Cephalic or Breadth Index

Skulls	Skulls		Male	Female
32 male &	18 female from	Grand Canary	73.3	72.0
29 " "	20 " "	Teneriffe	78.2	78.0
30 " "	20 " "	Gomera	77.3	77.3
8 " "	11 " "	Hierro	76.2	77.2
99 " "	69 "	averaged	76.2	76.1

The Index of Height Height Index.

Skulls	Skulls		Male	Female
32 male &	18 female from	Grand Canary	73.3	73.6
29 " "	20 " "	Teneriffe	71.3	70.6
30 " "	20 " "	Gomera	73.0	72.7
8 " "	11 " "	Hierro	71.0	70.3
99 " "	69 "	averaged	72.6	72.7

The Nasal Index

Skulls	Skulls		Male	female
32 male +	18 female	from Grand Canary	46.3	49.5
29	20	Teneriffe	46.4	49.2
30	20	Gomera	48 0	47.6
8	11	Hierro	44.8	53.1??
99	69	averaged	46.3	49.8

The orbital Index

Skulls	Skulls		Male	female
32 male +	18 female	from Grand Canary	84.6	83.3
29	20	Teneriffe	86.2	88.5
30 ..	20	Gomera	83.7	82.3
8 ..	11	Hierro	81.6	86.0?!
99 ..	69	averaged	84.0	85.0

The facial angle according to Broca's measurement

Skulls	Skulls		Male	female
32 Male +	18 female	from Grand Canary	75.6.	77.1
29	20	Teneriffe	77.4	74.7
30	20	Gomera	75.6	75.4
8 ..	11 ..	Hierro	74.6	73.3
99 ..	69 ..	averaged	75.8	75.1

With regard to the skeleton there is nothing of any importance except the various crests + tubercles are well developed
In the forearm the sigmoid cavity forms a great curve the distance between the beak

of the olecranon the coronoid process is little often so little that the olecranon fossa & the corresponding coronoid fossa is traversed by a foramen; out of 630 humeri 130 were perforated when not-perforated the septum between the two fossa was very fine. This is rare in the races of today but was frequent in prehistoric races. The facets of the tibiæ are very oblique especially in the cuneiform bones thus giving a special curve to the plantar arch."

This race of people ignorant of metals, of a written language, of the use of a potters wheel of the art of weaving, of building with stone & wood, troglodytes, possessing a knowledge of & practicing embalming, burying also their dead in caves & cairns; were the descendants of a primitive race that owing to their isolated position preserved some of the advances in civilization that were to be found even in the fourteenth & fifteenth centuries.

The perforation of the olecranon fossa was a common character in ancient races. Thus Darwin in his Descent of Man Ed. II pp 22 says "that it is remarkable that this perforation seems to have been present in man much more frequently during ancient times than recently." Topinard in his work on Anthropology

(Chapman - Hall) p 298 states that "the perforation of the humerus as a common character dates from the polished stone period & that it was frequent at that period; that it has continued among peoples placed in conditions favourable to the resistance of interbreeding, & it has diminished in frequency since the commencement of our era." The following tables shews its frequency.

Number of Humeri	Origin & Locality	Percentage observed
630	Guanche	20.6
66 from	Caverne de l'Homme Mort	10.6
368 "	Dolmens of La Lozere	10.6
128 "	Stations of Vaucal Ozroudy & Chamans (Polished Stone Period)	21.7
~~44~~ "		
44 "	Pregallic Station of Campans	12.5
200 Parisians ~~of~~ from 2d - 10th century		5.5
218 "	of Middle ages	4.1
150 "	before 17th century	4.6

The figures from the Guanches are calculated from 82 skulls only the others are from Topinard.
There is ~~is~~ platycnemia of the tibia; the muscular ridges are as rule abnormally developed, in the case of the femur the linea aspera tends to form a pilum à colonnes. which also stamps as ancient the origin of this race, in the fibula also the ridges are abnormally developed
The craniology indicates that they were a dolichocephalic orthognathic leptorhinic & microsemic race.
A dolichocephalic orthognathic race of people originally inhabited Belgium France Spain & were

identical with the long barrow people of Britain who were contemporaneous with the polished stone or neolithic period. The remains of this Iberian race are found not only in these countries but also in Corsica Sardinia Southern Italy & Sicily. Old writers like Seneca, Italicus that Corsica was peopled by the Ligurians & Iberians Pausanias says that the Sardinians were Libyans a people whose existing representatives are the Berbers we learn from Thucydides from Ephorus that the oldest inhabitants of Sicily were Iberians.
Remains of this ancient dolicocephalic orthognathic race have been found in the excavations of Hissarlik by Dr Schliemann, it probably formed a prehellenic race & was overwhelmed by a brachycephalic race. Broca considers that their resemblance to the Berbers shew that they immigrated into Europe from africa whilst the resemblance of the Guanche & Berber skulls to those of the ancient Egyptians allies them to the great Kamitic stock
A comparison of the various indices shews their common relations. The cranial capacity is not given by Dr Hull but Topinard. op cit p 229 Sexes as follows

			Male	Female	
20	skulls	Guanches	1557	1353	Cub. cent.
146	ancient	Britons	1524		"
28	Skulls	Corsicans	1552	1367	"
69	"	Gauls	1599	1426	"
18	"	Caverne del Monte	1606	1507	"
60	"	Spaniards (Basques)	1574	1356	"
85		Negroes of western africa	1430	1251	"

The various Indices from Topinards work are as follows.

Type of Skull	Number	Cephalic	Height	Nasal	Orbital	Gnathic	Indices
Long Barrow Skulls of Britain		71.25				ortho-	
Caverne de l'Homme Mort		73.22	73.0	45.46	81.9	ortho-	
32 Guanches	Grand Canary	73.00	73.0	46.00	84.6	..	
19 Troglodytes of La Lozere		73.22				..	
11 Berbers		74.63		44.28		..	
54 Dolmens of North of Paris		75.01				..	
9 Ancient Egyptians		75.58				..	
12 Modern Egyptians Copts		76.39				..	
60 Spanish Basques		77.62		44.71	83.9	..	
29 Guanches	Teneriffe	78.00	71.0	46.	86.2	..	
44 Troglodytes	of the Marne	78.09				..	
16 Troglodytes	of Lozere	79.50				..	
95 Round Barrow Skulls		81.00				Prog-	
Ligurian	Disentis Type	86.5				Prog-	

There is to be noted a certain difference in the measurements of the skulls from Grand Canary & Teneriffe especially in the cephalic index the latter being more brachycephalic. There are also evidences that the Guanches of this latter island were more advanced & more intelligent than those of Grand Canary. The colour of the people was lighter especially in the north which adds to this distinction is that the language of the people differed from that of the eastern islands. as I have said the Marquis of Rute considers that there are decided aryan elements in it although the work of the Language points in the direction of it

coinciding with the Berber theory as least as regards a Coptic & Hamitic origin.
There are ancient traditions of settlements of fair haired tall people both at Tagamaana & Icod on the north side of Tenerife &c - is more than probable that if this were so they were a brachycephalic proto aryan race speaking an aryan dialect & that these invaders impressed both their physical & linguistic peculiarities on the original dolicocephalic race.
Emigration from the mainland could be easily accomplished by open boats first to the eastern islands & then to the western But if sailing under with the prevailing winds by far the most striking object in these latitudes would be the Peak of Tenerife towering up 12000 feet high covered with snow, perhaps also one of the many craters in eruption & being the great landmark exploring parties would naturally sail towards it & thus there would be more chance of the ancient mariners landing & colonizing there & from there passing to Gomera & Hierro & Palma being further away there have been fewer remains found there than in the other islands of the western group

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