BULLARD (F. D.)

With compliments of the Author

CLIMATOLOGY

AND

Diseases of Southern California

BY

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Introduction.—The climate of a country has such an influence upon the prevalence of disease and upon the character of the prevailing affections, that, in order to understand the disorders to which any region is prone, it is necessary to be acquainted with its meteorology. Accordingly, the writer of this article will first consider briefly what constitutes climate, and then apply these general principles to Southern California; after which he will discuss the chief diseases, with a special reference to their season and virulency.

Factors of Climate.—Climate may be defined as habitual weather. The factors which go to make up this accustomary condition are not a few.

Temperature.—Temperature is doubtless the most important ingredient, as heat and cold of themselves are powerful agents, but it occupies the first place, not so much from a high or low thermometrical average as from evenness or variability. Rapidity and extent of variation, frequency of sudden changes, nycthemeral and yearly range are all important considerations under temperature.

Humidity.—The per cent of moisture in the atmosphere modifies to a great degree the effect of heat on the body, dryness rendering even an extreme heat tolerable. This mitigating property is the result of the evaporating power of the air —a quality which is increased by heat, wind, and light atmospheric weight, and diminished by moisture, low elevation, and increased air-pressure.

Relative Humidity.—Absolute humidity, the amount of

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moisture in the atmosphere, is exceeded in importance by relative humidity, that is, the degree of satisfaction of the vapor-containing capacity. A very hot air will hold more water than a moderately cool one. It may contain considerable moisture and yet be thirsty for more—at the same time absolutely moist and relatively dry. Clouds and fogs regulate the humidity, temperature and consequent drying power of the atmosphere by gauging the amount of direct sunlight.

Rain and Wind.—Rainfall, both as to amount and distribution, stands hardly second to temperature in the determination of climate. The winds, their frequency, direction, velocity and composition from over land or over sea, define in a great measure the character of the atmosphere.

Latitude and Elevation.—Latitude, and more especially elevation, modify the weather; *e. g.*, the height and direction of mountain chains, acting as a guard to fend off cold, condensing the hot, moist air-streams into rain, controlling the passage of wind currents, causing some slopes to face the sun and turning others from its rays, have a varied and great effect upon climate.

Miscellaneous Climatic Factors.—The proximity of land to lakes, desert or sea, the presence, direction and character of ocean currents, the slope of the country, the character of its soil—its porosity, vegetation, drainage and water supply, and lastly, the quality of the atmosphere itself—whether laden with dust and organic matter, or clear, bright and pure; all these are factors, which in no small degree determine the climate of a country.

Coast.—In defining California of the South, the western slope of the Sierras below Point Concepcion is usually meant. The coast extending thence to Lower California is some three hundred and thirty miles long, but in making this distance it measures two hundred and fifteen miles east and about as far south—forming, with the southeast diagonal, a bow, which throws the northern coast with a southerly exposure, and trends the southern shore toward the west.

Mountains.—Starting from the same point, a spur of the Coast Range turns east and meets the Sierras, forming a high wall between the northern and southern sections of the State; then the united ranges, hugging, at first, the shore in Santa Barbara and Ventura counties, diverge more and more from

the coast, and curving in San Bernardino county again point south, thus causing the land in the north to face the sun, and in the south to be turned west to the sea. The mountains do not, however, form an unbroken wall, but are let down in several low passes, which serve as channels both for trade and for the great air-rivers. The height of this chain is sufficient, nevertheless, to store, in the form of snow, water to irrigate the plains below, and to temper with its cool air the hot breath of the desert beyond.

Islands.—Quite parallel with the mountains on the land there seems to be a double range at sea, whose tops dot the waters as the islands off our banks; these, as well as the changed coast line, ward off from the land the cooled Japan stream and allow a return warm current to bathe the shore—a fact evidenced by the harsher climate of the outer and more exposed tier.

Effect of the Mountain Chains.—As these sea mountains turn aside ocean streams, so the land mountains have an important bearing on the air currents. During the summer the northeast trade-winds blow off shore, which, coming from the land, are, of course, dry, and make the warm season; but in winter the southwest counter-trades, laden with moisture from the sea, blow on shore and bank the clouds against the rocky wall of the Sierras, causing our wet season.

Rainfall and Winter Winds.—As these counter-trades follow the sun, it is noted that usually the rainfall is a few days later than in Central California. The general rule on the Pacific slope is, the further south the less the precipitation. The contour of the mountains in some sections causes an exception. The range when running an easterly course presents a square front to the on-coming south winds and acts as a better condenser; hence, in Los Angeles, there is nearly the same average, sixteen inches, as in Sacramento. When, however, the mountain chain bends south in San Bernardino county and runs askance to the moist wind current, the precipitation is somewhat less, and in San Diego, on account of combined lower latitude and parallelism of the mountains, the rainfall is diminished nearly one-half. As the trade-winds occur between October and May, the rainy weather is limited to this season, with but occasional showers at other times. The annual average varies greatly, even in a few miles, being greatest on

the coast and on the foothills. December and February have the heaviest records, it being cloudy or rainy one-fourth of the time during those months.

Summer Winds.—In the summer the daily to and fro land and sea breeze moderates the otherwise high temperature to a considerable degree. Back of the ridge the great heated desert warms the air, which of course rises and sucks in the cool sea-breeze daily from noon till sundown. The heated air makes its way to the ocean in the upper strata, dropping down at night to help the natural off-shore land-breeze perhaps, for often one feels amid the cool mountain evening winds the warm puffs of the hot trade but lately born on the desert.

The Santa Ana.—Another wind, local in nature, and erratic in course, called the Santa Ana, from a pass of that name, blows strong, dry and hot from the north; though disagreeable at the time from the heat and driving sand, it nevertheless leaves a bright clear atmosphere.

Temperature, Yearly Range.—The temperature of Southern California is very equable; the more even the nearer the coast, presenting both a lower and a higher reading in the interior—from an annual variation of twelve degrees (from 54° to 66°) between winter and summer in San Diego to a yearly change of twenty-three degrees (from 50° to 73°) at Riverside. But as the relative humidity is in inverse ratio to the distance from the sea, the San Bernardino winters, while sharper, are less chilly than in places near the coast, and the summers, though hotter, are less sultry, for the air, capable of drinking in a large amount of moisture, assists greatly the insensible perspiration.

Daily Range.—This country is characterized by a large nycthemeral range, which also increases as the coast is left. In most localities this difference is greater in summer than in winter; in Los Angeles the daily change is one-fourth more in the dry season, in which city the difference between sunrise and noon in July is twice as great as that between an average August and December day.

Fogs.—In the summer, on the shore-line, to a short distance both on land and sea, fogs occur, but as here the sea air derives its coolness from a warmer current than the Japan stream, they lack the penetrating chill of the northern fogs.

Sunshine.—The amount of sunshine enjoyed in this region

is unequaled, perhaps, in the civilized world. There will hardly average fifty days in the year, but what the sun shines part of the day. Fully half of the time the heavens are entirely clear.

Atmosphere.—The atmosphere, as one might suppose, is quite pure, free from the smoke and dust of manufacturing regions, usually clear, bright and diathermic; sometimes filled with fine dust from the baked and pulverized soil, or in the fall, by the smoke of mountain fires.

Soil.—The soil is of two chief varieties—one porous, sandy, and by its capillarity ever drawing moisture from the underlying water-beds; the other clayey, cracking under the hot rays of the sun into hard masses entirely non-retentive of moisture.

Respiratory Affections.—As Southern California has a reputation as a sanitarium for respiratory affections, an investigation of the justice of this claim will be first in order.

Phthisis.—Phthisis, according to the Los Angeles County Hospital records, stands first in the number of cases, making one-seventh of the grand total, and by far the highest mortality, causing two-fifths of all the deaths. This showing alone would indicate an enormous amount of consumption in Los Angeles, but on examining the health reports of the city, which include the deaths from the hospital as well, it was found that the death-rate from phthisis is a little less than one-fourth, or exactly 23 9-10 per cent. The reason for this difference is plain: many people suffering from tuberculosis come to this country for their health, and some of them, having spent all their money, are compelled to fall on the county for medical aid and sustenance; consequently, there being but one free institution, it receives an undue proportion of hopeless cases. The author of this paper, from a year's residence as interne, knows that the consumptives who enter this hospital are nearly all in the last stages; but very few of those dying having been inmates over six months. Then, again, it is to be expected that a hospital will show a higher relative percentage in the more serious troubles, for, as the accommodations, especially in such a growing section as this, are inadequate, many applicants have in the past been rejected, simply to make room for those who were more seriously ill; and if two persons equally deserving wished to enter the already over-

flowing hospital, preference was given to him who had been the longer in the State. This factor in a measure offsets the tendency to fill the phthisical wards with new-comers.

Percentage of Phthisis to other diseases.—Referring to the monthly summary of cases (Table I), it will be seen that of the inmates 43 1-2 per cent were Americans, exclusive of natives of this State, 52 1-10 per cent foreigners, and 4 1-10 per cent Californians, mostly Mexicans. Among those afflicted with phthisis, the ratio of Americans falls off 2 per cent, that of foreigners raises a like amount, while that of Californians remains about the same. As, however, the population of this section is so very largely from those born in other States and countries, it is not so much a question of nativity as length of residence whether a certain case is domestic or imported.

Length of Residence a Criterion for Responsibility.—While all sons of the golden west presumably contracted the disease here, natives of other regions may or may not have done so—a question that can only be settled positively by individual investigation, but can be answered approximately by learning how long the patients have been residents of this State.

Proportion of Cases of Foreign and Domestic Origin.—The hospital records, as to length of residence prior to May, 1889, are meager, but from all sources of information, including the author's private memoranda, it is practically correct to say that 47 per cent of those admitted for phthisis have been in the State less than one year, and, with the exception of dissipated men who died in a few months, all those suffering with the disease gave a history, on their admission, of about two years' sickness. Now, if, in addition to the 47 per cent, nine out of ten of the 20 per cent who have had a residence between one and two years, be supposed to have come to California with the disease firmly settled upon them, two-thirds of all cases of consumption are of foreign origin. Of the other third, about one-eighth have dwelt here between two and three years, and the remaining one-fifth over three years, one-fourth only of the latter being native Californians. Reducing these per cents and fractions to figures, we have on a two-year basis, of the 568 cases, 378 imported and 190 of home production.

Mortality.—17 per cent of those entering the hospital from all causes die, and 47 per cent of the consumptives. Of the survivors, some are sent East at the county's expense, a few raise the necessary funds to go back to die at home, others are taken away by friends that they may spend their last days outside of a public hospital, some are bettered, while still others improved or grown worse leave for parts unknown. Since December, 1888, very many, on improvement, go to the county poor-farm and there get the benefit of a country out-door life. Since the separation of the alms-house from the hospital, a smaller number of deaths—only one-third—from phthisis has been reported; one-tenth have left in as bad or worse condition than when admitted, while the remaining half have apparently received some benefit.

Residence of the Decedents from Consumption.—The deaths, as to time, appear to be quite evenly divided, one-third of the decedents having had respectively a residence of under one year, between one and two years and over two years in the country. From this it appears that not only two-thirds of those suffering from phthisis, but two-thirds of those dying from that cause were of those who had lived here less than two years; figures which seem to substantiate the moderate claim that two out of every three phthisical patients in Southern California contracted the disease elsewhere. As this disease is no respecter of persons, attacking the rich and the poor alike, and as the wealthy have the means to come here, it is reasonable to infer that the proportion of consumptives to other diseases is nearly as high outside of the hospital as within its walls, but the death-rate is very much less, because the rich are able to return East to their friends.

Seasonal Mortality from Phthisis.—On recalling the seasonal divisions in this country into a wet period from November to April inclusive, and a warm dry one the other six months, the monthly aggregates (Tables I and III) disclose the interesting fact that while the total number of cases of consumption in the winter months exceeds that of the summer by only 4 per cent, the deaths are 14 per cent more numerous. Deaths, it is true, from all causes, occur more frequently in winter than in summer, November beginning the winter change, reading abruptly a half-increase, followed by a gradual slide till July scores the minimum; phthisis, how-

ever, runs somewhat ahead of the winter rate for other diseases. The lower temperature, increased relative humidity and greater variability of the winter weather in opposition to the higher temperature, desiccating atmosphere and daily general similarity of the summer climate, must account for the variance between the death and the case records. No other factor than dissimilarity of weather exists; accordingly, if that season of the year in California, which most nearly approaches the spring climate of the Atlantic slope, is the most unfavorble for phthisis, both in number of cases and fatality, we must conclude that patients suffering from this disease would get along better here than they possibly could in the East; and we would also infer that California is as much a summer resort as a winter sanitarium.

Comparison with City Death-rate.—While only one-seventh of the city's mortality takes place at the County Hospital, some years one-ninth, others one-half, on the average one-fourth of the fatal results from phthisis occur in this institution.

Pneumonia.—One of the respiratory affections, pneumonia, that scourge of humanity beyond the mountains, is very rare, showing a decided preference for the counter-trade wind months. It must be remembered that these statistics comprehend those who, in the East, would readily succumb to this disease—the poorly-housed, the badly-nourished and dissipated. Yet, in spite of this fact, this disease (which, according to life insurance statistics, accounts for 7.68 per cent of the deaths) here occasioned but 2.41 per cent of 664 fatal terminations, less than one-third the mean for the entire country. Exactly two-thirds of the attacks took place between November and April, ten of the sixteen deaths occurring at the same time, giving a mortality about the average among such classes in other regions.

Pneumonia and the Influenza.—In another investigation of pneumonia and the late influenza in Los Angeles, the writer found that, after a climatic freak of the rainiest month ever known and during the wettest and coldest January for years, a combination of these two diseases caused eighteen deaths—a monthly average just equal to the ratio during one *la grippe* week in Brooklyn, a figure attained by this city ordinarily only in half a year.

Nationality of Pneumonia Decedents. — From personal observation of this institution for several years the writer thinks it is frequented more especially by the improvident foreigner and the dissipated American—the latter class outnumbering the former in two kinds of trouble: in the acutely severe, such as typhoid fever and pneumonia, by 50 per cent, and in those maladies resultant on dissipation—alcoholism and venereal diseases — by 25 per cent. From this state of affairs doubtless arises the fact that while two-sevenths of the Americans and one-third of the Californians attacked with pneumonia die, only one-seventh of the foreigners succumb.

Epidemics.—By consulting the yearly table (No. II) one can see that the pneumonia cases are chiefly in two groups; twelve in 1881 and thirty-two in 1887 and 1888, one dying in the former and nine in the latter years.

Pleurisy.—Pleurisy is quite uncommon, showing a double maxima, following the spring advent to dry and the fall change to wet weather; nearly half of the cases occurring during the height of pneumonia in 1888.

Other Inflammatory Diseases of Air-passages.—Other inflammatory diseases of the air-passages show a marked predilection for the damp weather—the five driest months reading less than one-fourth of the cases. Other investigators have chronicled the fact that hay-fever never originates in this section. The dry warm air, being both aseptic and desiccating, tends to keep down all inflammations to which it has access. Three-fifths of the bronchial cases occur in the rainy months. Asthma, too, is more of a winter disease—the hottest month showing the fewest cases—a natural sequence if respiratory inflammations are fewer in the dry seasons.

Conclusions about Respiratory Affections.—These tables show in reference to this class of diseases, in brief, the following: phthisis, present as the most common and fatal disease, two-thirds imported, prevailing to an increasing extent and virulency among the Spanish-Americans; pneumonia most conspicuous by its rarity; bronchitis, asthma and pleurisy not frequent, and together with pneumonia to a large extent hyemal. Of all respiratory affections, including consumption, the death-rate amounts to one-fifth of the total for the city.

Rheumatism.—Rheumatism stands a good second to phthisis and makes the unusual showing, that while two-thirds of

the cases are during the on-shore wet winds, one-eighth more deaths occur in the dry season. Acute rheumatic arthritis occurred seven times with two deaths from heart complications —this number being one-eighth of the fatal results attributable to rheumatism. As acute rheumatic fevers, though very rare, come usually in the warm weather, more especially at the change from the wet spring to the dry summer, the excess of deaths from this disease in the hot season is accounted for; however, as the fatal outcome is so rare (even though the proportion of deaths to patients is still too high), a change of only two deaths from summer to winter would make the ratios even, so the discrepancy is not remarkable.

Myalgia.—It is possible that under the loose designation rheumatism, myalgia is frequently meant—a disease especially liable to be present in changeable weather, or whenever there is a great difference between the day and night atmospherical conditions. It has been brought to the author's notice, and also felt by personal experience, that the pains of so-called rheumatism seem to be brought about by two classes of weather —the damp, changeable variety and the sudden transition from a cool night or period to an unusually hot day or spell. Therefore some patients complain more during the shifting climate of winter, others now and then in the summer at any marked alteration in the temperature, and still others seem to suffer continually when the nycthemeral range is greatest.

Pains of Rheumatism vary with the Weather.—It is a well known fact that rheumatic patients are good weather prophets, sometimes regular barometers, in the East, telling by their aches and pains if it is going to rain. Here they have the same feelings with the varying relative humidity of the atmosphere, but no rain comes.

The Author's Suggested Explanation.—As a falling barometer recording meteorological disturbances foretells a storm, as the hot, eager air drinks from the tissues the insensible perspiration to a much greater degree during the warmest days of summer, and as at other times the fogs and rains weigh heavily upon the body, is it not possible that the disturbance of nerve-pressure from the wonted condition—together, doubtless, with the sudden alteration in temperature—is one of the causes for the so-called rheumatic pains? The author does not dispute other and various reasons assigned

for them, but he has often noticed that, while apparently in the best of health, a sudden change, as stepping from a cool room into the blazing noon-day sun, or going from a house that had been warmed, quickly into the night fog, has caused instantly darting or continuous pains in various joints or muscles. But just as this climate is more even than that on the Atlantic slope, the writer personally has found he is by far more comfortable here, and though subject to rheumatic fevers, has been entirely free from them in six years' residence on the coast.

Neuralgia.—Turning to neuralgia for light on the above question, of the half-hundred cases reported, nearly one-third occurred in the transitional months of May and November. Along the coast, in the fog-line, both rheumatism and neuralgia are reported frequent.

Erysipelas.—Erysipelas comes but rarely, and two-thirds of the instances are during the on-shore winds, lower temperature and greater moisture of winter, the period of greatest heat having no cases at all. It is only about half as frequent as the average for the United States and shows a very low mortality, having one death in eleven years. As meat, if exposed to the dry winds of summer, will not spoil but cure, it must needs be that such an air is quite free from germs, consequently if, as has sometimes been supposed, this disease is, in any way, dependent upon atmospherical conditions, we would naturally expect in California a small amount of erysipelas, especially in summer. Be that as it may, the clinical experience, as shown by this record and inquiries among those practicing here, makes this disease rare and decidedly a winter malady.

Reasons why Renal Patients should do well here.—Theoretically the climatic conditions of Southern California are favorable to sufferers from kidney troubles. The skin is freely active, the greater part of the year, in supplying the copious insensible perspiration which the thirsty air demands. Then the equability and evenness of the weather prevent those sudden chills which every now and then in harsher climates throw double eliminative work on these already wearied organs. Still another factor of great value in treating kidney or other troubles must not be overlooked; viz., the uniformly cool nights which render refreshing sleep possible. A proof

to the author's mind of the salubrity of the evenings is the fact that he, a sufferer from rheumatism, while covered with only a pair of heavy blankets, was able, most any clear night, winter or summer, to bivouac with comfort and perfect rest, without ache or pain — a thing he has frequently done on camping excursions.

Explanation of what the Author includes under Kidney Diseases.—Under the head of kidney diseases, for simplicity's sake, the writer has classified, along with various forms of Bright's disease, three cases of diabetes and fifteen patients against whom, in the earlier records, the word "dropsy" was written. Although it is by no means certain that all or any of these were suffering from renal lesions, if we grant for argument's sake that they were, the percent from such diseases is still under that which insurance companies expect. The figures are compared with insurance statistics, because the age and sex are about the same among policy-holders and the persons mentioned in this report.

Effect of Season.—On account, doubtless, of the inclemency of the winter weather, those afflicted with kidney troubles seek the hospital in the rainy rather than the dry season in the proportion of six to five; and as changeableness is especially detrimental to such people, we find that fully one-fourth of the deaths occur in the two most uncertain months, November and March.

View of the President of State Board of Health.—The president of the State Board of Health, in an investigation made in 1884–85, found that acute kidney troubles were rare, apparently forming a descending curve from the sea-shore—occasional on the coast to rare or wanting in the interior.

Summer Diseases.—Passing from the winter to the summer diseases, one finds malaria, fevers, diarrheal disorders and eye troubles on the list. These maladies, however, are not (as one might suppose on account of the long dry season in this region) excessively prevalent; indeed all, perhaps, but eye troubles are under the mean for the rest of the country.

Typhoid Fever.— According to the hospital records typhoid fever occasions 3.44 per cent of the deaths against the general average in America of 5.99 per cent; its mortality, however, is almost 18 per cent—very near the mean for that disease. By consulting the yearly table (No. II) it will be

seen that there was an epidemic in 1881, with no death out of 29 cases. In 1887 another typhoid wave, followed by a still higher crest in 1888, and a lesser surge in 1889, scored 97 cases with a mortality of 1 in 3, 1 in 5, and 1 in 6 respectively in the three years. Reference to the monthly summaries (Table I) shows the curve of typhoid fever reaches its high tide in the latter part of the hot season, with 27 cases in September, and its low ebb in February and March, with but 1 case. Two-thirds of the instances of the disease occurred in the dry season.

Fever.—Fever, the indefinite term which accounts for 3 per cent of the sickness and 2 per cent of the deaths, has a mortality of 11 1-5 per cent and occurs in 55 per cent of the instances in the summer; it is a disease, which under the better diagnoses of the last three years, is well-nigh eliminated. On the books it was sometimes called bilious fever, quite likely of malarial origin, often perhaps a misnomer for typhoid or the typho-malarial fever of many authors.

Malaria.—Malaria stands next to typhoid in number of cases, occurring in 56 per cent of instances in the summer, and giving a mortality of 4 per cent. If the total number of cases be divided into two equal portions, keeping as far as possible the years intact, the first half, covering eight years, will contain half again as many cases as the last half, including three years. This fact indicates that malaria is dying out, on account, doubtless, of the increased acreage in orchards and vineyards, improved methods of irrigation, better drainage and full utilization of the former waste water. It is practically unknown on the coast, found in limited sections in the interior, where heat, soil and stagnant water can become nurseries of the miasmatic poison. It is below the average for the country at large, and is decreasing in frequency.

Intestinal Disorders.—The troubles affecting the digestive tract are not well represented in the hospital; they cause but five per cent of the deaths, which is only one-third as high as the rate for the entire city. Diarrheal disorders are quite marked as to season, two-thirds of the cases occurring in summer. The authorities all agree that in infants intestinal troubles are especially rare; cholera infantum never occurred among the children (about forty) who have been inmates of this institution.

Dyspepsia.—Derangement of the stomach is a very infrequent cause for admission into this hospital. Dyspepsia, in a climate capable of bearing so great a variety of fruits, is not a common disease, and a sojourn here is apt to benefit cases of indigestion. Yet, at certain seasons, intestinal troubles are likely to be produced by the eating of unripe fruits.

Liver Complaints.—Liver troubles show a high mortality, but a low percentage, and seem, in the earlier records, to fluctuate with the changes in malaria, but in the later years appear less frequently and quite uniformly as to number of cases. According to the author's observation chronic alcoholism is the most frequent cause of hepatic disease in this hospital.

Diseases of the Eye.—Classified as eye troubles are syphilitic iritis and corneal ulcers, but the vast majority are cases of conjunctivitis. Beyond doubt the continuous sunshine of this section is hard on the eyes, for while there are one-ninth more patients from all causes in winter, in eye diseases, three-fifths of the cases occur in summer. The dry hot air, the fine sand driven by the occasional Santa Ana, and in this city the large amount of glaring pavements, are conditions particularly trying to the eyes.

Other Diseases.—The other diseases mentioned in this report have no dependence apparently upon climate or season.

Heart Troubles.—Diseases of the heart bear a small ratio to the total number of cases, but register a very high death-rate—next to consumption.

Cancer.—It has been reported that cancer is particularly prevalent in Southern California. The facts for the county hospital are these: it forms only two-thirds of 1 per cent of the cases, but as it is a fatal disease and very difficult to treat in a private house, a large number of its victims remain in the wards until death — a fact which gives cancer a larger mortality (65 1-10 per cent) than any other disease, and a percentage of 2 1-2 on the total number of deaths. Referring to the combined death-rate for the city and hospital, we find that this disease accounts for little over 1 per cent—a little more than half the average for the entire country.

Alcoholism.—Chronic alcoholism shows an unduly high proportion, but as this is a moral rather than a climatic disease, it has but little bearing on these figures.

General Debility. — Under the head of general debility doubtless were classed many hospital malingerers, but as it had so high a mortality (over 12 per cent), and expressed the run-down condition so apt to be present in the indigent sick, the author retains it in the report.

Ulcers.— Ulcers were mostly of the chronic form, with which, in hospitals, one becomes so familiar. Many of them were of syphilitic origin, others the results of varicose veins; a large proportion of them were the cards of admittance to their possessors. The one death attributed to this cause is, doubtless, properly due to syphilis.

Miscellaneous.— The miscellaneous diseases include 29 cases of measles, 20 of skin diseases, 12 of poisoning, 7 each of aneurism and chorea, 6 each of coxalgia and peritonitis, and 5 of cerebral meningitis, the other third being scattering instances of various complaints. The higher rate of mortality attained by this subdivision is due to the fact that all the deaths, from unknown causes, of which there were about 20, were assigned to this class.

Comparison of the City's and Hospital's Mortality.— The death reports (Tables III and IV), in comparison with the city's record, show two great differences, a proper allowance for which must be made for a just appreciation of their relation to the diseases of Southern California; the hospital rate is 10 per cent too high in respiratory affections and 10 per cent too low in diseases of the digestive system; a minor divergence also exists in the disorders of the genito-urinary tract and the eruptive fevers, the hospital showing an increase of some 3 per cent in the former and a deficiency of the same amount in the latter class of troubles. The reasons are plain; the long continuation of cases of phthisis and nephritis compel the poor to ask for public aid, the rich are more apt to suffer from troubles of the digestive system, and the eruptive fevers, save measles, have not been admitted to this institution. Diphtheria also appears in the city's report as accounting for 2 1-2 per cent of the deaths.

Conclusion.—In conclusion the author observes that a comparison of these and other statistics shows that the same diseases are prevalent in a greater or less degree, the world over, that some regions are better adapted for treating certain troubles than others, and that no one climate contains quali-

ties which are the best for all diseases; so it is with Southern California. The cool reaction every night from the heat of the day gives refreshing sleep and invigorates the body worn by wasting diseases, but this great daily change may give rise to rheumatic and neuralgiac pains. The air, so bright, so dry, so clear, allowing the life-giving rays of the sun to shine through day after day, is delightful for the sick man to breathe, but its constant brightness may be too dazzling for his eyes. He who is marked by some dread disease may come too late to these genial shores to find in its days of spring coolness and summer heat too great a change for a weakened body to endure; while, on the other hand, he, whom the changeful climate of the East has warned by cough or wasting flesh to flee in time, may here escape the blight entirely and live in health to ripe old age.

Explanation of the Tables.—These tables were compiled for this article by the author from hitherto uncollated data; the classification is general rather than specific, on account of the character of the records consulted. Table I gives the dieases, the number of instances per month, the percentage which each disease bears to the total and the relative standing of Americans, Foreigners and Native Californians. Table II is quite similar, but furnishes a yearly summary of cases, and records the annual relative frequency of nationalities alone. Tables III and IV are respectively monthly and yearly summaries of deaths. In Table III the figures after mortality, in the hoizontal line from left to right, give the ratio of total deaths to the entire number of patients for each month, while the numbers in the vertical column under mortality mark the proportion that the deaths from any disease bear to the whole number of instances of the same The horizontal percentage distributes the deaths between the months, on the scale of one hundred, and the vertical percentage gives the percent of the fatal results from any cause on the total number of deaths. Thus, phthisis is fatal in 47 cases out of a hundred; but causes only 40 per cent of the deaths. The mortality for January is 15.34 per cent, while only 9.34 per cent of the deaths occur in that month.

TABLE I.—Monthly Summary of Cases

	DISEASES.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	Percent.	American.	Percent.	Foreign.	Percent.	Californian.	Percent.
Respiratory Affections.	Phthisis	71	37	40	46	33	44	52	37	50	55	57	46	508	14.58	229	40.32	312	54.93	27	4.75
	Bronchitis	13	8	14	2	4	4	19	4	6	7	10	10	110	2.82	45	40.90	62	56.38	3	2.72
	Asthma	9	6	6	7	7	5	6	6	4	7	8	8	79	2.03	32	40.51	47	59.49		
	Pneumonia	9	7	4	9	4	4	4	4	1	6	9	8	69	1.75	35	50.73	28	40.58	6	8.69
	Pleurisy	1		2	6	5	5	2		1	1	5	5	33	.85	15	45.46	17	51.52	1	3.03
	Inflammatory Diseases of the Air-passages	3	2	4	4	7	2	1		3	1	3	2	32	.84	8	25.00	22	68.75	2	6.25
Gen Dis	Rheumatism	57	42	57	59	28	40	31	41	24	45	52	43	519	13.82	221	42.58	284	54.72	14	2.70
	Malaria	7	3	8	5	8	6	12	13	10	21	22	9	124	3.18	59	47.59	64	51.61	1	.80
Nervous Affections.	Neuralgia	3	4	5	3	10	4	5	4	2	2	6	4	52	1.33	16	30.77	33	63.46	3	5.77
	Insanity	5	1	3	5	11	6	6		4	2	5	2	50	1.28	22	44.00	22	44.00	6	12.00
	Epilepsy	5	3	4	2	2	1		2		2	3	2	26	.67	11	42.31	15	57.69		
	Paralysis	8	10	4	7	5	9	7	7	2	5	25	5	94	2.41	43	45.75	47	50.00	4	4.25
	Alcoholism	1	7	3	3	10	7	7	12	11	7	6	5	79	2.03	44	53.70	33	41.77	2	2.53
	Morphinomania	1	1				3	3	3		1	2		14	.36	7	50.00	07	50.00		
Acute Fev's	Typhoid Fever	6	1	1	7	6	11	5	21	18	27	20	11	134	3.44	86	64.18	44	32.83	4	2.99
	Fever	11	4	13	5	3	7	6	17	16	13	12	9	116	2.99	53	45.69	60	51.72	3	2.59
	Erysipelas	3	5	1	2	1	4	4	2			2	2	26	.67	12	46.15	12	46.15	2	7.70
Local Affections.	Diseases of Heart	7	4	9	3	3	1	7	6		1	2	6	49	1.26	25	51.02	23	46.94	1	2.04
	Diseases of Liver	2	4	1	2	4	3	2	6	5	2	7	7	45	1.15	21	46.67	23	51.11	1	2.22
	Diseases of Kidney	9	6	5	8	1	11	3	8	3	5	5	9	73	1.88	29	39.72	40	54.80	4	5.48
	Diseases of Stomach	4	1	3	2	1	1	6	1	2	1	2	1	25	.64	9	36.00	13	52.00	3	12.00
	Diseases of Rectum	2	5	3	1	3	5	1				3		23	.59	17	73.91	5	21.74	1	4.35
	Diarrhea	4	3	3	6	9	7	13	12	11	2	7	1	78	2.00	26	33.33	46	58.97	6	7.70
	Diseases of Eye	3	6	4	2	5	3	4	7	2	3	5	1	45	1.15	27	60.00	17	38.33	1	1.67
Unclassified.	Diseases of Women	2	3		1		1	1			1	3	2	14	.36	4	28.57	9	64.28	1	7.15
	Confinement			6	6	7	2	2	7	1	2	1	1	35	.88	8	22.86	23	65 71	4	11.43
	Cancer	2	2		1	6	2	4	2		1	4	2	26	.67	13	50.00	13	50.00		
	Ulcer	29	10	22	24	14	17	23	16	24	20	11	11	221	5.67	83	37.55	130	58.82	8	3.62
	Syphilis	20	15	20	8	8	9	15	20	7	16	12	13	163	4.18	84	51.53	64	39.27	15	9.20
	Gonorrhea	18	8	9	6	2	4	7	8	7	9	6	13	97	2.49	47	48.44	44	45.36	6	6.20
	Injuries	45	40	45	46	47	50	40	40	52	47	41	44	537	13.78	220	40.96	296	55.12	21	3.92
	Senility	6	2	1	2	2	4		5	2	4	3	6	37	.95	11	29.73	24	64.84	2	5.43
	General Debility	20	12	3	9	14	8	15	8	7	16	23	15	150	3.85	61	40.66	88	58.67	1	.67
	Miscellaneous	28	12	16	11	5	13	8	10	10	14	15	12	154	3.95	71	46.10	64	41.56	19	12.34
	Total	404	274	319	310	275	303	321	329	285	346	397	324	3897	100.	1694	43.50	2031	52.10	172	4.40

TABLE II.—Yearly Summary of Cases.

	DISEASES.	1879	1880	1881	1882	1883	1884	1885	1887	1887	1888	1889	Total
Respiratory Affections.	Phthisis	33	21	33	43	40	42	63	40	63	91	99	568
	Bronchitis				16	3	6	2	6	16	48	13	110
	Asthma	3	8	2	6	13	7	4	6	8	12	10	79
	Pneumonia	3		12	4	2		3	6	12	20	7	69
	Pleurisy	2			2	2			1	3	15	8	33
	Inflam. Dis. Air-pas'g's		5			1		2	1	5	5	13	32
Gen'l Dis	Rheumatism	55	20	18	27	39	27	63	26	63	109	72	519
	Malaria	1	7	3	15	11	1	15	18	15	31	7	124
Nervous Affections.	Neuralgia	3	2	11	3	3	2	2	5	3	7	11	52
	Insanity	2	1	3	4	4		5	3	6	7	15	50
	Epilepsy			4			2	4	2	4	7	3	26
	Paralysis	26	5	9	14		3	10	2	2	11	12	94
	Alcoholism		1	1	1	5	1	3	4	12	29	22	79
	Morphinomania	1	3	1								9	14
Acute Fev's	Typhoid Fever	3		29					5	30	42	25	134
	Fever	8	9	14	14	12	17	25	5	8	1	3	116
	Erysipelas			4	3	3	3	1	1	2	5	4	26
Local Diseases.	Diseases of Heart	7	3	7	2	8	1	7		6	5	3	49
	Diseases of Liver	4			6	10		3	1	7	7	7	45
	Diseases of Kidney	5	3	4	6	7	3	2	9	16	14	4	73
	Diseases of Stomach	1	1	2	1	4			2		5	9	25
	Diseases of Rectum		2	1			5	1		5	5	4	23
	Diarrhea	3	6		5	3	7	9	10	12	20	3	78
	Diseases of Eye	2	6	1	2	6	4	3	2		9	10	45
Unclassified.	Diseases of Women	4		1						2	1	6	14
	Confinements		2	5		3	2	4	6		3	10	35
	Cancer	5			2			1	1	10		7	26
	Ulcer	12	2	15	7	9	13	22	23	32	48	38	221
	Syphilis	10	6	2		4	1	16	15	42	43	24	163
	Gonorrhea		1		4	4	1	2	17	9	31	28	97
	Injuries	24	11	12	18	36	33	59	56	77	111	100	537
	Senility			1	1	7	3	5	6	8	5	1	37
	General Debility		3	4	5	6	8	25	11	22	56	10	150
	Miscellaneous	5	6	4		5	6	8	13	27	49	31	154
	Total	222	134	203	211	250	198	369	303	527	852	628	3897
	Percentage on Total	5 70	3.44	5.21	5.41	6.42	5.08	9.47	7.78	13.52	21.86	16.11	100.
	American Born	91	49	116	84	113	89	170	131	229	362	261	1694
	Percentage on Year	40.99	36.57	57.14	39.81	45.20	44.95	46.07	43.23	43.46	42.49	41.56	43.50
	Foreign Born	115	72	80	123	135	106	189	160	260	461	329	2031
	Percentage on Year	51.80	53.73	39.41	58.29	54.00	53.54	51.22	52.81	49.34	54.11	52.39	52.10
	Californians	16	13	7	4	2	3	'10	12	38	29	38	172
	Percentage on Year	7.21	9.70	3.45	1.90	.80	1.51	2.71	3.96	7.20	3.40	6.05	4.40

TABLE III.—Monthly Summary of Deaths.

	DISEASES.	January.	February.	March.	April.	May.	June.	July.	August.	September	October.	November	December.	Total.	Percent.	Americans	Percent.	Foreign	Percent.	Californ'ns	Percent.	Mortality.
	Mortality	15.34	18.98	18.81	14.20	17.82	16.17	12.46	16.11	18.59	13.29	20.15	23.45	17.04								
Respiratory Affect's	Phthisis	30	15	24	22	23	16	16	17	21	22	29	32	267	40.21	107	40.07	143	53.56	17	6.37	47.30
	Bronchitis		1	2	2	1	1		1	1	1			10	1.51	2	20.00	8	80.00			9.99
	Asthma	3		1		1	1			1	1	2	1	11	1.66	2	18.18	9	81.82			18.40
	Pneumonia	3	2	1		1	2	1	1		1	2	2	16	2.41	10	62.05	4	25.00	2	12.50	23.19
	Total of Respiratory	36	18	28	24	26	20	17	19	23	25	33	35	304		121	39.80	164	53.95	19	6.25	
	Percentage	11.84	5.92	9.21	7.89	8.55	6.58	5.59	6.25	7.57	8.24	10.85	11.51	100								
Gen Dis.	Rheumatism	1	2			3	2	2	1	1		1	3	16	2.41	5	31.25	11	68.75			3.07
	Malaria					2	1	1	1			1		6	.90	3	50.00	2	33.33	1	16.67	4.84
Nervous Affect'ns.	Nervous Diseases	1		1		1		1		1		1	1	7	1.05	3	42.86	4	57.14			8.84
	Insanity						1					1		2	.30			2	100.			4.00
	Paralysis	3	2	2	2		1	4	4		1	7	5	31	4.67	11	35.48	15	48.39	5	16.13	33.00
	Alcoholism			1					2		1	1	1	6	.91	3	50.	3	50.			7.00
	Morphinomania	1											1	2	.30	2	100.					14.28
Acute Fevrs	Typhoid Fever		1	2		2	3	2	4		3	4	4	25	3.77	14	56.00	11	44.00			18.73
	Fever	2	1	2					1	2	4		1	13	1.96	4	30.77	8	61.54	1	7.69	11.20
	Erysipelas									1				1	.15			1	100.			3.86
Local Affections.	Diseases of Heart	3	5	1		2		3	2	2		1	3	22	3.32	10	45.45	10	45.45	2	9.10	45.10
	Diseases of Liver						1	1		3	4	1	2	12	1.81	3	25.00	8	66.67	1	8.33	26.67
	Diseases of Kidney	1	1	5	2	1	5	2	3	6		7	3	36	5.40	15	41.67	19	52.78	2	5.55	49.31
	Diseases of Stomach		2					1						3	.45	1	33.33	2	66.67			12.00
	Diarrhea	2				1	2		3	3	2	4	2	19	2.86	11	57.90	7	36.84	1	5.26	24.35
Unclassified.	Diseases of Women					1								1	.15					1	100.	7.14
	Cancer		1	3	1	1	1	1	3	1			5	17	2.56	10	58.82	7	41.18			65.38
	Ulcer				1									1	.15	1	100.					.45
	Syphilis	1	3	2	1	1					1		1	9	1.36	3	33.33	2	22.22	4	44.45	5.21
	Injuries	1	3	3	4	4		2		1	1	2		20	3.01	10	50.	9	45.00	1	5.00	3.72
	Senility	2	2	2	2		4	1	1		2	3	2	21	3.16	10	47.62	11	52.38			50.76
	General Debility	3		2	2	1			2	1			3	19	2.86	10	52.63	8	42.11	1	5.26	12.66
	Miscellaneous	6	11	9	4	4	5	3	7	8	2	8	4	71	10.70	19	26.76	44	61.97	8	11.27	46.10
	Total	62	52	60	44	49	49	40	53	53	46	80	76	664	100.	269	40.51	348	52.41	47	7.08	
	Percentage	9.34	7.83	9.04	6.63	7.38	7.37	6.02	7.99	7.98	6.93	12.05	11.04	100								
	Americans	27	17	27	18	14	16	12	25	24	21	30	38	269								
	Percentage	43.55	32.70	45.00	40.91	28.56	32.66	30.00	47.17	45.29	45.65	37.50	50.00									
	Foreigners	30	30	31	22	31	28	27	25	26	20	43	35	348								
	Percentage	48.39	57.69	51.67	50.00	63.27	57.14	67.50	47.17	49.05	43.48	53.75	46.05									
	Californians	5	5	2	4	4	5	1	3	3	5	7	3	47								
	Percentage	8.06	9.61	3.33	9.09	8.17	10.20	2.50	5.66	5.66	10.87	8.75	3.95									

TABLE IV.—Yearly Summary of Deaths.

	DISEASES.	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	Total
Resp'y Affect's	Phthisis.	24	9	10	21	11	12	32	24	45	50	29	267
	Bronchitis.				1	1			1	6	1		10
	Asthma.	2	2		2	4	1						11
	Pneumonia.			1				1	2	4	5	3	16
Gen Dis	Rheumatism			2	1	2	1	2		4	1	3	16
	Malaria			1	1	2		1		1			6
Nervous Affect'ns	Nervous Diseases		1		1	1			1	2	1		7
	Insanity.							1			1		2
	Paralysis.	5	3	3	1	1		6		3	5	4	31
	Alcoholism			1					2		2	1	6
	Morphinomania.			1	1								2
Acute Fev's	Typhoid Fever								2	11	8	4	25
	Fever		1	3	2		1	3	3				13
	Erysipelas								1				1
Local Diseases.	Diseases of Heart.	2		2	1	1			2	2	3	9	22
	Diseases of Liver.				2					2	4	4	12
	Diseases of Kidney	3	3	1	2	7	2	3	7	3	4	1	36
	Diseases of Stomach			2								1	3
	Diarrhea	3			2	1	4	3	4	1		1	19
Unclassified.	Diseases of Women									1			1
	Cancer	1	1	1	1			1		6	2	4	17
	Ulcer							1					1
	Syphilis.		1							2	2	4	9
	Injuries				1	1	3		1	4	9	1	20
	Senility	4		1	2	4	2	1	2	2	2	1	21
	General Debility		1			2	3	3	2		5	3	19
	Miscellaneous.	8	7	1	5	2	8	5	9	8	13	5	71
	Total	52	29	30	47	40	37	63	63	107	118	78	664
	Percentage.	7.83	4.37	4.52	7.08	6.02	5.57	9.49	9.49	16.11	17.62	11.75	100.
	Americans	24	12	14	22	13	14	30	25	45	44	25	269
	Percentage	46.15	41.38	46.67	46.81	35.00	37.85	47.62	39.69	42.06	37.29	32.05	40.51
	Foreigners	18	14	15	24	25	22	31	35	56	66	43	348
	Percentage	34.62	48.28	50.00	51.07	60.00	59.45	49.20	55.55	52.35	55.93	55.13	52.41
	Californians	10	3	1	1	2	1	2	3	6	8	10	47
	Percentage.	19.23	10.34	3.35	2.12	5.00	2.70	3.18	4.76	5.61	6.78	12.82	7.08
	Mortality	23.42	21.64	14.77	22.27	16.00	18.69	17.07	20.79	20.30	13.85	12.42	17.04

107 N. Spring street, Los Angeles.