SUNSHINE.

The following table gives the hours of sunshine and percentage of possible:

Stations.	Hours.	Per cent of possible.	Stations.	Hours.	Per cent of possible.
Eureka	81	27	Sacramento	150	50
Fresno	240	73	San Diego	201	64
Los Angeles	203	65	San Francisco	127	42
Mount Tamalpais	132	43	San Jose	204	67
Red Bluff	149	50	San Luis Obispo	165	53

EARTHQUAKES.

Earthquakes were recorded during November as follows:

Alameda.—November 15, 27.

Santa Clara.—The seismographs recorded disturbance No. 17, on November 5, beginning about 9:18:40 and ending 9:25:24 a. m.; No. 18, on November 6, beginning 12:34:06 and ending 1 p. m.; No. 19, November 8, beginning 10:36:10 a. m. and ending 10:41:30; No. 20, on November 25, beginning 9:04:24 p. m., ending 10:02 p. m.

It may be of interest to note that three well-equipped seismological observatories are now established in this district—namely, Santa Clara, the Lick Observatory, and the University of California at Berkeley. The instruments used are the Wiechert 80-kilogram astatic horizontal and vertical and the Bosch-Omori with recent improvements.

NOTES ON THE RIVERS OF THE SACRAMENTO AND SAN JOAQUIN WATERSHEDS FOR NOVEMBER, 1910.

By N. R. TAYLOR, Local Forecaster.

Sacramento watershed.—Owing to the shortage of rainfall, which was marked in the lower Sacramento Valley and the foothills thereof, low stages prevailed in all streams throughout this watershed, and the general average was only slightly above that of the preceding month. At most points in the Sacramento River and throughout the drainage basins of the American and Feather-Yuba territory the water was the lowest of any November of which there is a record.

San Joaquin watershed.—Showers were fairly well distributed over this watershed from the 8th to 28th, inclusive, and relatively heavy rains fell generally on the 25th, but there was little deviation from the prevailing low stages of water in any of the streams.

PEACHES AND CLIMATE.

By Prof. W. T. CLARKE, University of California.

This is a portion of a paper on choosing a proper location for peach orchards, and is published by the courtesy of the editor of the California Fruit Grower.

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The next item we wish to call attention to as of extreme importance in the matter of choice of location of the peach orchard is the climatic conditions prevalent where it is intended to make the plantings. In our survey of regions in California where peach orchards are successfully grown we have noted the fact that the Sierra foothills to the floor of the main valleys and from the smaller interior valleys to valleys opening upon the ocean, from the north to the south, these plantings are found.

In a geographical distribution so great as this, involving as it does very considerable differences in altitude, in ocean exposure, and in other modifying influences, it will be readily seen that the general climatic conditions will hardly be identical in all of the sections studied. In the orchard regions of the Sierra foothills we find that the peach plantings are in what may be termed a thermal belt. This means that great extremes, especially of cold, are not found prevalent in the section. Frosts are rare and indeed practically unknown at the critical period of the trees' development in the spring, the time of blossoming. Even in those Sierra sections where peaches are grown and where frosts do occur the orchards are placed on sloping ground on side hills, and the cold air drains away and thus damage from this cause is avoided. We will then emphasize this point of fairly mild conditions prevailing at blossoming time where successful work with the peach is done in this region.

Again, in the smaller valleys opening into the great Sacramento Valley we find the same fairly mild conditions to be the rule where the orchards are continuously successful. The summer temperatures in both the regions range from high to very high, while the spring temperatures are not excessively low. The same conditions, with perhaps here and there slight modifications, hold for those sections of the main valley where we have found the peach to be a good and paying crop. Of course in the main valley we may expect to and do find sharper changes than in the regions previously noted. This is due to the fact that the surroundings offer less in the way of protection than in these other regions. Nevertheless the rule of fairly mild conditions at the period of blossoming holds here as a general rule, as does that other rule of quite high and well-sustained summer temperatures.

Follow southward into the San Joaquin Valley peach sections and we find, as far as climatic conditions are concerned, that this same set of rules holds with a fair degree of regularity. The most constant variation from the regions we have before studied is perhaps in the matter of summer temperatures. In this last noted section we may perhaps find an average higher summer temperature in the San Joaquin Valley peach sections than in the more northern sections. Incidentally we may look upon this as an advantage, more especially if we are growing peaches for drying purposes. The point we wish to emphasize now, however, is this matter of the absence of killing frosts at the period of bloom and the general high temperatures through the summer.

Going across the range of mountains into the more southerly peach sections of the State, we find the mild spring conditions and the high to very high summer conditions of temperature repeated; and where these conditions do not prevail we can be fairly sure that peach growing is, comparatively speaking, an unremunerative business.

Again, in those valleys along the Pacific coast line where any notable degree of success in peach growing has been attained, we find that the observed rule of mild spring conditions holds with a very fair degree of regularity. The summer temperatures in these valleys may not be as high on the average as in the regions before studied, yet they are fairly high. We have also noted previously that, owing to the topography of these valleys, the sometimes harsh and moisture-laden sea breezes are deflected and do not exert any deleterious influence upon the orchards. Where this is not the case and the trees grow unprotected from the ocean breezes the growing of peaches is by no means the success that it undoubtedly is where nature is disposed to be more kindly in her actions. We thus see that in spite of the difficulties in altitude, in exposure, in northern or southern location, the peach-growing sections of California exhibit in their climatic conditions certain quite marked similarities.

The intending planter should, then, in making his decision as to whether or not he will plant a peach orchard see to it that he knows well just what the climatic conditions are in the region where he intends to do business. It is decidedly important, too, that his acquaintance is complete, covering not alone a single year in its entirety, but extending over a term of years. He can not afford to determine from a single year's record what the general conditions may be expected to be. This, of course, does not necessarily mean that one should live for a term of years in a region gathering data to determine whether or not he shall plant a peach orchard. In most parts of the State rather full and complete weather records have been kept for years past. These records are available and can be used by anyone who cares to look them up. Indeed, it is the experience of this writer that many of the reported failures in orchard work here in California can be traced to causes that might easily have been avoided had the planter only understood that sources of information in regard to previously existing climatic conditions are available and, understanding this, had intelligently used this information. The climatic conditions which the orchard will have to meet are prime factors in the problem, and if these factors are neglected the results may be disastrous.

A PECULIAR SQUALL.

By A. G. MCADIE.

On November 21, 1910, at 4:45 a. m., there was a marked disturbance in atmospheric pressure at San Francisco. The morning was comparatively quiet with light winds; suddenly and without any of the usual preliminary signs of air movement, the wind rose, and gusts, varying in velocity it is estimated from 20 to 30 miles, occurred. The barometer fell rapidly and then rose rapidly. From 4:52 a. m. to 5:12 a. m. 7 miles of wind were recorded. At Oakland, about 7 miles due east, the wind movement was 6 miles, from 4:57 to 5:15 a. m.

The character of the disturbance was so unusual that it attracted general attention. Prof. Charles Burckhalter, of

the Chabot Observatory, called attention to the disturbance as recorded in Oakland. Mr. F. Westdahl, in charge of the Coast and Geodetic Survey, discovered in examining the maregram for November that unusual markings appeared on November 21, beginning at 4:30 a. m. and ending at 12:30 p. m. It was at first thought that this record was evidence of some submarine disturbance, such as the dislocation of the sea bottom. The water rose more than a foot, falling again and fluctuating as shown on the record. It seems, however, more consistent with our present knowledge, to regard the disturbance as atmospheric rather than submarine, and to assume that the water simply responded to the sudden and violent change in air pressure. The records made upon the various barographs are indeed not unlike records made by typhoons, or baguios, only not so marked. The disturbance was described by one observer as a baby tornado, which however is not a fitting description. The following letter from Dr. W. W. Campbell, director of the Lick Observatory, gives a full and graphic description of the disturbance as noted at the observatory by various well-trained observers. The observatory is 57 miles in an air line southeast of San Francisco, at an elevation of 4,209 feet above sea level. It may be stated that for some years past the character of certain pressure fluctuations has been a subject of discussion and observation in connection with both astronomical and meteorological problems.

MOUNT HAMILTON, CAL., *December 9, 1910.*

DEAR PROFESSOR MCADIE: Your inquiry of December 6, for evidences of a barometric disturbance on the morning of the 21st is here. We can supply much information, which may be of some value. I inclose a tracing from the barograph of the Lick Observatory, from which it appears that there was a sudden fall in pressure at about 5:10 a. m., and that the minimum of pressure occurred about 6:20 a. m.

A most remarkable wind squall occurred, undoubtedly in this connection, about 6:20 a. m. of that day. Essentially every member of our staff noted it as a remarkable phenomenon. Here is Doctor Curtis's report:

"The sudden powerful gust of wind about which Doctor McAdie requests information was unlike anything I had before experienced on Mount Hamilton. I made, however, no notes of the phenomenon at the time. It occurred between 6 and 6:30 a. m., and I was awake at the time. It could be heard approaching over the hills for a few seconds before it struck the house, and apparently came from about northwest by north. My recollection is that it did not last much longer than half a minute in its full intensity. It perceptibly shook the house (brick; bedroom is on second story), and I would estimate its velocity at 50 or 60 miles per hour. It died out almost as quickly as it came."

I was asleep at the time, but was suddenly wakened by the vibration of our brick house, which was even communicated to my bed on the second floor. The roar which the wind made in approaching did not waken me, but I was suddenly awakened by the noise around the house, and by the vibrations referred to. I should estimate the wind at 60 miles per hour. The wind when blowing did not strike me as remarkable, because I had not noticed its beginning, but the short duration of the violent wind, with sudden slowing down to a calm, did strike me as remarkable. I should estimate that the severe wind lasted two minutes, and that it came from the northwest.

The testimony of other members of our staff is to the effect that the roar of the approaching wind was distinctly heard by those who were awake at the time; that the squall struck us suddenly; that it lasted two or three minutes at the extreme, and that the dead calm was quickly substituted for the high velocity. The remainder of the morning was quite calm, as you will see from the anemometer data ticked off on the lower margin of the barograph copy. From 5:30 to 7 a. m. we had but 5 miles of wind, and probably 2 miles of this occurred inside of two minutes, leaving the remaining 3 miles to have occurred in one hour and 28 minutes.

I shall be interested to know what you make out of the very remarkable phenomenon.

Very sincerely yours, W. W. CAMPBELL.

P. S.—Below is Professor Wright's written report of the phenomenon:

"I am unable to state the date, nor with certainty the hour of occurrence of the phenomenon, but my impression is that it happened at about sunrise. I was lying in bed at the time, and had noted the calmness of the atmosphere, when suddenly I heard the roar of the wind in the heavy brush on the north side of the mountain. Almost immediately the squall was about us, with the accompaniment of considerable noise and a lively slashing of the curtain of an open east window. There was no other window or door open in the room. In another room the wind blew violently in through a window facing the northeast. The blow was short-lived. My impression is that it lasted a few minutes, but I can not state with certainty at this late date that it was longer than a minute."

Records were also obtained from Santa Clara College, San Jose, Mount Tamalpais, Point Reyes Light, Sacramento, Eureka, and Fresno. The report from the last-named station follows and is given prominence because attention is called to further peculiar pressure oscillations during the month of December, 1910. Somewhat similar perturbations have been found in the pressure record at San Francisco and are also shown on the markings of the tide gage. Reference will be made to these in the December issue.

Fresno.—I forward a copy of our barograph trace for November 21. Being twice removed from the original it is more or less inaccurate, but shows the beginning of an unsettled pressure condition at about the time you mention, although in our case it continued throughout the day. I notice a feature in the barograph record here that is not common to the records of other stations with which I am familiar. Of course you are familiar with pressure records during thunderstorms, but here are oscillations of small amplitudes and short periods lasting more than a day.—*W. E. Bonnett, Local Forecaster.*

Mount Tamalpais.—The official in charge, Mr. H. Legler, states that the same disturbance noted at San Francisco occurred at his station, and furnishes the following hourly wind movement from midnight to noon:

Time.	Velocity.	Direction.	Time.	Velocity.	Direction.	Time.	Velocity.	Direction.
	Miles.			*Miles.*			*Miles.*	
12–1 a. m.	10	nw.	4–5 a. m.	17	se.	8–9 a. m.	8	w.
1–2 a. m.	9	nw.	5–6 a. m.	34	nw.	9–10 a. m.	10	w.
2–3 a. m.	12	nw.	6–7 a. m.	26	nw.	10–11 a. m.	7	nw.
3–4 a. m.	8	nw.	7–8 a. m.	10	nw.	11–12 a. m.	4	sw.

The maximum wind velocity was 44 miles per hour from the northwest at 5:10 a. m.

Point Reyes Light.—The official in charge, Mr. James Jones, states that about 3:45 a. m. the barometer began to fall rapidly, and within fifteen minutes dropped 0.15 of an inch. At the same time the wind which had veered around from north to northeast suddenly changed to southeast and increased from 2 miles to 32 miles per hour. The squall passed as suddenly as it came. The pressure increased at the same rate that it had decreased, the wind changed to the west and became gentle, and by 4:15 a. m. the entire disturbance had passed.

San Jose.—The official in charge, Mr. Maurice Connell, states that there was an unusually rapid fall and rise in the barometer between the hours of 4 and 6 a. m. The rise was in the nature of a sudden jump of 0.09 inch. The pressure then remained steady. When the sudden rise occurred, the wind as suddenly changed from southeast to west with a squall of two minutes' duration from the west at 6:22 a. m. The maximum velocity was 18 miles per hour.

Eureka.—The official in charge, Mr. Aaron H. Bell, states that the wind was from the south and southeast on the morning of November 21, the highest velocity being 20 miles from the south at 2:15 a. m. It is quite probable that the wind blew with greater violence at sea. The barograph shows an unsettled pressure condition, the most marked disturbance being from 1 a. m. to 4 a. m.

While the disturbance may have been and probably was essentially atmospheric and due to causes akin to those operating in the development of any low pressure, there is one possible cause of origin which should not be overlooked. It is well known that volcanic disturbances in the Aleutian Islands, Alaska, and in the Bering Sea are not infrequent. A

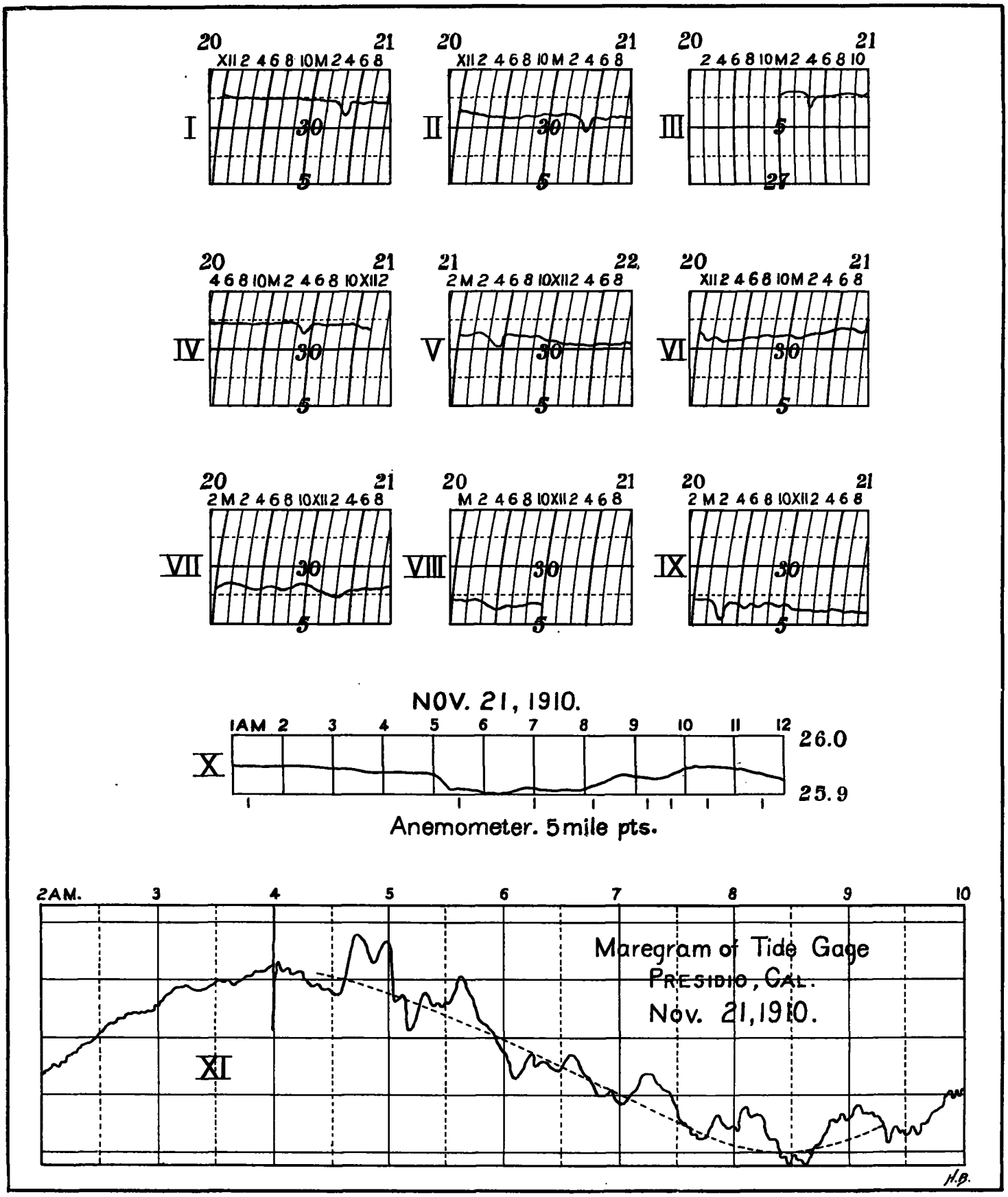
press dispatch states that Capt. E. E. Hofman, of the power schooner *P. J. Abler*, the last vessel to leave Bering Sea, reports that Mounts Pavloff and Shishaldin were in eruption on October 17, when the *Abler* was 40 miles out to sea, and flames could be observed rising from the crater of Pavloff. H. Benson, a Swedish trapper, whose camp is on a sandspit of Unimak Island, near the outlet of False Bay, told Capt. Hofman of much damage on Unimak Island by recent volcanic disturbances around Mount Shishaldin.

While the evidence thus far available can not be said to directly connect the atmospheric disturbance of November 21 with any known eruption or volcanic disturbance, it would be unwise to ignore the fact that the region to the northwest of our Pacific coast is one in which violent and sudden atmospheric pressure changes might be originated by volcanic action.

List of barograph traces.

I. Chabot Observatory, Oakland, Cal., elevation 36 feet.
II. San Francisco, elevation 200 feet.
III. Mount Tamalpais, elevation 2,375 feet.
IV. Santa Clara College, elevation 90 feet.
V. San Jose, elevation 95 feet.
VI. Eureka, elevation 64 feet.
VII. Fresno, elevation 293 feet.
VIII. Sacramento, elevation 71 feet.
IX. Point Reyes Light, elevation 490 feet.
X. Lick Observatory, elevation 4,209 feet.
XI. Maregram of tide gage at San Francisco, sea level.

Note the sudden rise in the level of the water in the Golden Gate at 4:35 a. m., amounting approximately to 15 inches, and the marked fall after 5 a. m., and subsequent fluctuations. Compare with the change in pressure at San Francisco, amounting to 0.15 of an inch.



No. XI. By courtesy of the U. S. Coast and Geodetic Survey.