Ans Sept 29th
Ans Octo 6th

New York September 25th 1854

Dr George Engelman.

Dear Sir

I am in receipt of your favor of 17th inst. and thank you for the suggestions and met. observations which it contains.

In regard to the "important atmospheric changes which appear like huge waves progressing from west to east" and which may often be traced from the Rocky mountains to the coast, and that they are identical with the northers of Mexico near the results of your inquiries agree with mine. I am led to believe however, that that these changes are as truly cyclonic in their essential character, as those of the atlantic storms, which often visit this region.

In Newyork we are made subject to both classes of these phenomena, if indeed they be different in their essential elements. But the laws which severally govern these phenomena do not appear to me as different, and capable of division. You will perceive from my last paper, a pamphlet copy of which I now send you, that the apparently wave-like progress from west to east in these latitudes, may be traced entirely across the atlantic in the principal case which is there presented:- a greater distance than from the Rocky mountains to Boston. And yet, the core or nucleus of this huge cyclone travellee undoubtedly on a course which is diagonal to this apparently eastern progression.

It appears however that the lower winds of the great cyclones which sweep over the interior of the continent are less regular or symmetrical and the winds of inversion on the left of its axis path less noticeable than on the ocean: owing to the obvious conditions of the case, and mostly to the fact that continental examinations are mostly confined to the right side of the cyclonic path.

The observations you send me, which are more thorough than my own, are of great interest, as they enable me to trace more satisfactorily the progress and character of the double cyclone or rather the two simultaneous cyclones by which the great change from the heat and dryness of summer to the temperature of Autumn was induced. The most western of these cyclones, which set in with you on the 7th and showed its nearest approximation of center early on the morning of 9th and without rain, first reached us on the 8th and its center approximated late in the afternoon of 9th, the winds on that day three points more southerly than with you on the 8th, showing that our position was even more to the right of its axis path than yours. Its near bar. max. was with you on morning of 10th, but with us was indeterminate, from a cause which follows. The sky was partially clouded here on the 9th with no rain, and with a scorching sensation of heat, from the great plains of the southwest.

On the night of ninth the left margin of the coast storm or great hurricane of the atlantic (probably not inferior to that of Sept. last year) interposed beneath the overland cyclone, bringing with it a portion of the temperature and ice-like chill of the great boreal current which washes our eastern shores. This sudden transition from the warm right limb of one vast cyclone to the chilly left limb of another which was even more fresh from the tropical latitudes, was one of the most marked and decided changes from summer heat and dryness to autumnal temperature and rains, which I have ever noticed.

The cyclone of 5th Jan. last, the center of which approximated to ~~to~~ you on that day with its western margin there at Ft. Barnnie, was with us late on the night of 5/6th. (bar. unmarked) and its near side on the 7th, bar. 30.45 therm. 17°, cloudy & fog, but no rain or snow. On the Brazos, Texas, (lat 30.30 lon 96) a strong Norther at this period, the cold setting in at 10.30 a.m. of 5th

your nearest central approximation in cyclone of Jan. 15th reaches us on the 16th. with some rain & snow. Its receding margin on morning of 18th, with therm. 31° Bar. 30.36 at sunrise.

your central approximation of Jan. 20th. reached us about midday of 21st bar. 29.60 therm. 49°. The receding margin of this cyclone left us on the ~~morning~~ afternoon of 22d, bar. at 6 p.m. 30.55, therm. 22°

On the night of 22 and during 23d the right limb of another cyclone passed over us and on the morning of 24th the therm. sunk to 10°. the barom. that morn. 30.48 It (then) was 14° at sunrise of 22 and 19° do of 23.

I enclose herewith a copy of my journal of 6th to 11th of the present month. It is roughly kept, but will suffice for comparing our phenomena with yours. If I had opportunity for effective labor in this department I would be glad to accept your kind offer of further materials. As it is I shall feel obliged for your present kindness, and still further if you can furnish me with your observations from 5th to 9th of June last, at which period I was on the upper Mississippi during the transit of a cyclone of decided strength and character, which reached this region on the day following. Any notices of this from points west of St. Louis will also be gratefully recein.

I have lying on hand some unfinished labor on the storm which occurred between Oct 11th and 14th 1846, regarding which your observations at St Louis would be of interest.

yours truly

Wm C. Redfield

1854

Sept.	Hr.	Th.	Air Th.	Barom.	Winds	Strength	Clouds from	Cloudiness 0 to 10	Remarks
Wednes. 6	6	78			SW	Moderate	NW cir. st. / W. SW. cirro cum	5	
	10	79	78	30.16	"	"		5	
	2				"	"			
	6	88		.04	"	"		3	
	10	81	79	.06	"	"			
Thurs. 7	6	76	78	.08	SW.	"	SW cir. st. / S to SW cum	2	
	10	78	79	11	WSW – NW	"	" / "	3	
	2		80		NW	"		6–	
	6	85	80	09	NNW	light			A strong & dry cyclone commences to night. At 10 p.m. a thin & low storm scud flying from SSW at the estimated rate of 60 or 70 miles per hour: over this is a "mackerelled" stratum of loose cirro cumulus moving moderately from W. by S. estimated 3000 or 3500 ft from the earth. From 10 p.m. to 6 a.m. heat increased one degree in my sleeping room with open windows 4 deg. out of doors. This will not be ascribed to solar influence.
	10	76	78	19	"	"		0	
Fried 8	6	69	76	22	"	"	WSW cum. st.	0	
	10	73	76	23	" – SW	"	" "	1	
	2				S – SSE	Mod.	"	3	
	6	78	78	12	"	"	"	5	
	10	76	77	07	"	fresh	W by S cum. st. / SSW (swift scud)	5	
Sat. 9	6	79	78	29.96	SW by W	"	W by S. cir. st. / SW by W (swift stm. scud)	6–10 – 4	
	10	82	79	95	"	Strong	" / "	1 to 5	
	2		80	88	"	" – Mod	" / WSW	6–10	
	6	84	79	87	"	"	" / "	10	
	10	81			NE.	— Strong gale in night	— / W.	10	— Copious rain.
Sun. 10	6	63	77	94	"	Gale	/ E. N.E. scuds	10	Rainy – Rain
	10	61 / 64	75	95	"	"	/ " "	10	Rain
	2	60 / 59	74	88	" – NNE.	Strong	/ NNE to N (storm scuds)	10	"
	6	58	73	92	NNE to N	"	/ N.	10	
	10	57	72	30.02		Mod.	"	10 (Clear in night)	
Mon 11	6	52	71	16	NNE	"	S cir st	3	
	10	60	71	22	variable		" scud stratus	4–8	

Sept. 10. A cold NE rain-storm and gale set in during last night, which apparently is a new and distinct cyclone from that of yesterday.

By M. B. Redfield N.Y. city.

Rec'd March 10
Redfield

New York March ~~February~~ 5 1855

My dear Sir,

I thank you for your kind letter of Feb. 22. and for the met. records which it contains; and greatly wish that you would pursue the inquiry in relation to the two cases thus presented. I regret to say that I even omitted to preserve the extensive telegraphic comparisons which were printed in the "Tribune" & "Times" of this city, (for the most part) and until they were unfortunately destroyed.

I send you my imperfectly kept records for the same periods; and will here notice that the bar. max. which immediately precede the first cyclonic period occurred at New York on the morning of Jan. 17th. This overland cyclone appears well worthy of further investigation. The report from San Antonio is interesting and I suppose must refer to the post minimum bar. period of the cyclone. The time, if correctly reported as the beginning of the "norther," would seem to be later, in proportion to St Louis, than is common.

Our severe cold of Feb 6–7 was probably connected with the cold ending of one cyclone & the beginning of another, progressing in the track of our coast storms which do not reach the western states. But the immediate source & the local progression in this particular case of the cold is doubtless found in the N.W. & N.E. winds (principally the former) which brought the intensely cold air to us direct from

Canada and the basin of the St. Lawrence. This seemingly natural progression of the cold appears rather to be the exception than the rule, in the severe winter weather of N. & New England, and occurs in marked distinctness two or three times in a winter: but more often the regular cyclonic progression of reduced temperature is decidedly from the westward & southwestward: sometimes passing to the Atlantic without fairly getting so far north as Boston.

The cyclones which pass over Arkansas & Missouri must probably have Mexican rather than Californian relations, and I am glad that you so fully recognize the distinctions and obstructions pertaining to aerial currents or horizontal movements, necessarily of but limited vertical dimensions or thickness. But as the cyclones which are found on the West coast of N. America, north of lat. 25°, strike perpendicularly to the line of coast, I see not how they can avoid affecting the temperatures & changes which occur east of the Coast Range and of the Sierra Nevada and even the Rocky Mountains. Indeed it is probable that the most common overland cyclones, in the far west, enter the basin of the Colorado by the Californian gulf and thus mainly or partially avoid the obstruction afforded by the two ranges first mentioned. The hygrometric

conditions and visible phenomena of any cyclone passing from the Pacific Ocean over the interior of the Am. continent would doubtless be greatly modified; and their features in the interior of the continent would hardly be recognized by our nautical friends.

Wishing you health and zeal for an extensive prosecution of these important inquiries I am dear Sir

truly yours

Wm C. Redfield

Dr George Engelman.

1855	Hrs	Therm.	Att Th	Barom	Winds	Strength	Clouds from	Cloudiness 0 to 10	Remarks
January									
Wednes. 17	6	29	56	30.25	E N E	Moderate	W S W	10	
+	10			25	Max. E by N	"	"	10	
	2			21	E N E	"	"	10	
	6				"	"	"	10	
		35	67	13					
	10	35	65	09	"	"		10	
Thurs 18	6	38	58	29.87	S W	light	S W	10	misty
	10				W S W	"	" cu. st.	9	
	2				" – N W	Mod.	" "	2	
	6	38	65	76	"	"	"	2	
	10	34	63	77	"	"		0	
Fri. 19	6				"	"	N W W.	0.	
	10	32	63	68	N N W	Fresh - Strong	"	3	
	2				"	Strong	"	6	
	6	32	65	73	"	"	"	2	
	10	30	65	76	"	fresh - Mod.	"	0	
Sat 20	6	25	57	80	W by S.	Mod	W S W / W by N	2	
	10	29	64	83	W S W	fresh	" / W N W	10	
	2		63	86	S W	"	" / "	9	
	6	32	63	85	"	"	" / "	10 –	
	10	30	64	93		"		0	
Sun. 21	6	31	50	30.00	N E	Mod.		10	
	10		62	03	"	"		10	Rainy
	2				"	fresh		10	"
	6	34½	62	29 86	"	"		10	Rain
	10	36	66	74	– S E or S S E	Gale		10	"
Mon. 22	6	52	57	33 Mean	S. – S S W	Strong	S / S S W	10	
	10	48	65	40	S W –	"	S. cu. st. / S W. cu.	8 – 5	
	2				W S W	"	W S W cu	7	
	6	29	64	88	W	"		2	
	10	27	68	30.00	"	"		4	
Tues 23	6	20	55	16	"	fresh		0	
	10	22	62	27	"	Strong	W N W	-1	
	2				"	"		0	
	6	24		26	"	fresh		0	
+	10	23	62	29 Max.		"		0	wind changed to W. S.

Jan 26th A cyclone with wind from E N E to E during its access & bar. falling to 29.22 at 4 p.m., when within a fearful gale W by N is reported on the Illinois prairies.

1855.	Hour	Therm	att. the	Bar	Wind	strength	Clouds	Clouds	
Feb. 4	6	10	48	29.97	West	fresh		0-3	
	10	14	57	30.00	"	"		5	
	2				"	"		6	
	6	17	60	29 94	"	"		7	
	10	18	61	90		Mod.		10	Snow
Mond 5	6	18½	49	65	NNE	"		10	"
	10	20	58	70	NNW	fresh		10-4	
	2				NW	"		0	
	6	20			"	"		0	
	10	13	59	82	"	"		0	
Tues. 6	6	3	44	98	NNW	"		0	
	10	6		30(?)	"	"		0	
	2				"	"		1	
	6	0	54	30.18	"	"		0	
	10	-4 -6	54	24	"	"		0	
Wednes 7	6	-6	38	30	NE	Mod.-fresh	W NW and	9-10	
	10	-2	50	35	"	Strong		10	
	2	+8	50	20	"	Gale		10	
	6	9	52	11	"	"		10	
	10	13	52	00	"	Strong		10	
Thurs 8	6	18	44	29 80	"	"		10	Snow
	10			76	"	"		10	"
	2	24	56		"	"		10	"
	6	26			"	fresh		10	
	10	25	50	70		"		10	
Frid 9	6	22				Mod		10	
	10		55	80		"		10	
	2					"		10	
	6	27	55	86		"		10	
	10	23	53	30 00		"		10	
Sat 10	6	15	48	12		"		10	
	10	18	57	22		light		0	
	2		59	19		"		0	
	6	22	58	21		"		0	
	10	17	57	24		"		0	