SECTION V.—SEISMOLOGY.

SEISMOLOGICAL REPORTS FOR AUGUST, 1915.

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[Dated: Weather Bureau, Washington, D. C., Sept. 30, 1915.]

TABLE 1.—*Noninstrumental earthquake reports, August, 1915.*

[Time used: Mean Greenwich, midnight to midnight. Nomenclature: International.]

Day.	Approximate time, Greenwich Civil.	Station.	Approximate latitude.	Approximate longitude.	Intensity Rossi-Forel.	Number of shocks.	Duration.	Sounds.	Remarks.	Observer.
	H. m.		° ′	° ′			*Sec.*			
		CALIFORNIA.								
5	16 30	Drakesbad	40 28	121 29	5	1	1	Rumbling		A. Sifford.
	18 33	Sprockles	36 32	121 38	3-4	2	2		Windows rattled	Mrs. A. Boncquet.
6	18 40	Mineral	40 21	121 32	2	1	2			Frank C. Hardin.
		NORTH DAKOTA.								
8	15 15	Williston	48 09	103 35	3	1			Awakened by shock	Miss Florence Bennett.
	15 15	Williston	48 09	103 35	4	1	3		Rattled dishes	Rev. I. G. Monson.
	15 15	Williston	48 09	103 35	3	1	5		Rattled house	W. H. Shemorry.
	15 15	Williston	48 09	103 35	3-4	1	2		Shook house	Geo. F. Carpenter.
	15 15	Williston	48 09	103 35	3	1				C. F. Anderson.
	15 15	Williston, R. F. D	48 08	103 36	3	1		Rumbling		K. C. Ike.
		UTAH.								
11	10 20	Iosepa	40 32	112 44	7	1	10	Rumbling		James K. Halemanu.
		WASHINGTON.								
18	14 04	Glacier	48 54	121 57	4	2	6	Faint	Origin in southern British Columbia.	C. C. McGuire.
	14 04	Lakeside	47 50	120 00	3	1		Faint		W. H. Van Meter.
	14 04	Laurier	48 59	118 13	4	1				Mrs. J. S. Myers.
	14 04	Marblemount	48 32	121 26	5	1	5	Loud		Henry Soll.
	14 04	Seattle	47 38	122 20	2	1	3			U. S. Weather Bureau.
18	18 00	Marblemount	48 32	121 26	3	1	1	Faint		Henry Soll.

TABLE 2.—*Instrumental reports, August, 1915.*

[Time used: Mean Greenwich, midnight to midnight. Nomenclature: International.]

[For significance of symbols see REVIEW for June, 1915, p. 289.]

Alaska. *Sitka. Magnetic Observatory.* U. S. Coast and Goedetic Survey. J. W. Green.

Lat., 57° 03′ 00″ N.; long., 135° 30′ 06″ W. Elevation, 15.2 meters.

Instruments: Two Bosch-Omori, 10 and 12 kg.

Instrumental constants: $\begin{cases} E & V\ 10 & T_0\ 17.4 \\ N & V\ 10 & T_0\ 15.6 \end{cases}$

No earthquakes recorded during August.

Arizona. *Tucson. Magnetic Observatory.* U. S. Coast and Geodetic Survey. F. P. Ulrich.

Lat., 32° 14′ 48″ N.; long., 110° 50′ 06″ W. Elevation, 769.6 meters.

Instruments: Two Bosch-Omori, 10 and 12 kg.

Instrumental constants: $\begin{cases} E & V\ 10 & T_0\ 16 \\ N & V\ 10 & T_0\ 19.6 \end{cases}$

No earthquakes recorded during August.

California. *Berkeley. University of California.*

Lat., 37° 52′ 16″ N.; long., 122° 15′ 37″ W. Elevation, 85.4 meters.

(See Bulletin of the Seismographic Stations, University of California.)

California. *Mount Hamilton. Lick Observatory.*

Lat., 37° 20′ 24″ N.; long., 121° 38′ 34″ W. Elevation, 1,281.7 meters.

(See Bulletin of the Seismographic Stations, University of California.)

California. *Point Loma. Raja Yoga Academy.* F. J. Dick.

Lat., 32° 43′ 03″ N.; long., 117° 15′ 10″ W. Elevation, 91.4 meters.

Instrument: Two-component, C. D. West seismoscope.

Report for August, 1915, not received.

California. *Santa Clara. University of.* J. S. Ricard, S. J.

Lat., 37° 26′ 36″ N.; long., 121° 57′ 03″ W. Elevation 27.43 meters.

(See Record of the Seismographic Station, University of Santa Clara.)

TABLE 2.—*Instrumental reports, August, 1915*—Continued.

Colorado. *Denver. Sacred Heart College.* Earthquake Station. A. W. Forstall, S. J.

Lat., 39° 40′ 36″ N.; long., 104° 56′ 54″ W. Elevation, 1,655 meters.

Instrument: Wiechert 80 kg., astatic, horizontal pendulum.

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915.			*H. m. s.*	*Sec.*	*μ*	*μ*	*Km.*	
Aug. 1	I_u	e	10 15 00					Irregular waves on N-S.
		F_N	10 20 00					
2		e	8 05 00					Wavelets at intervals.
		F_N	15 00 00					
5		e	21 02 00					Very irregular waves.
		F_E	21 20 00					
9	I_u	e	17 20 00					Very small sinusoidal waves.
		F_N	17 22 00					
9	I_u	eP_N	20 06 00					
		M_N	20 10 00	15				
		F_N	20 11 00					
10	I_u	e	10 50 00					Very small sinusoidal waves, irregular on E-W.
		F_N	11 00 00					
12	I_u	e	10 00 00					Sinusoidal waves at intervals—long period with very small amplitude.
		F_N	11 00 00					
18	I_u	e	13 04 00					Earthquake reported from British Columbia.
		F_N	13 08 00					
18		e	13 24 00	26				Thickening of pen marks on E-W.
		F_N	13 27 00					
20	I_u	e	7 00 00	20-35	4	7		Almost continual activity, especially on N-S.
		F_N	15 00 00					
25		e	16 00 00	20-30	4	4		
27		e	12 20 00	10-15				Very small sinusoidals at intervals on N-S. Irregular on E-W.
		F_N	15 15 00					
29		e	11 20 00					Long waves at frequent intervals.
		F_E	15 00 00					
31		e	12 40 00					Irregular long period waves on N-S. Less visible on E-W.
		F_N	15 30 00					

District of Columbia. *Washington. U. S. Weather Bureau.*

Lat., 38° 54′ N.; long., 77° 03′ W. Elevation, 21 meters.

Instrument: Marvin (vertical pendulum), undamped. Mechanical registration.

Instrumental constants.. V 110 T_0 6

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915.			*H. m. s.*	*Sec.*	*μ*	*μ*	*Km.*	
Aug. 3		P	13 26 48					
		S	13 31 48					
3		eL	14 09 00					P and S not discernible.
		eL	14 20 00					
		F	14 50 00					
6		P	13 25 14					
		PR1	13 28 28					
		eL	13 59 00					S lost while changing sheets.
		L	14 20 00	20				
		F	14 50 00					
7		P	15 24 26					Other phases not discernible.
		F	15 45 00					
16		P?	1 16 44					
		L	1 30 00					
		L	1 36 00	20				
		F	2 10 00					
19		P	0 16 50					
		L	0 32 00					
		F	0 45 00					

District of Columbia. *Washington. Georgetown University.* F. L. Tondorf, S. J.

Lat., 38° 54′ 25″ N.; long., 77° 04′ 24″ W. Elevation, 42.4 meters. Subsoil: Decayed diorite.

Instruments: Wiechert 200 kg. astatic horizontal pendulums.

Instrumental constants: E: V 165, T_0 5.4, ϵ 2.6; N: V 143, T_0 5.2, ϵ 3.4

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915.			*H. m. s.*	*Sec.*	*μ*	*μ*	*Km.*	
Aug. 6	I_r	e	13 58 44					E-W barely discernible.
		L_N	14 06 00					No distinct maximum.
		L_E	14 06 15					
		F_N	14 49 02					

Hawaii. *Honolulu. Magnetic Observatory.* U. S. Coast and Geodetic Survey. Wm. W. Merrymon.

Lat., 21° 19′ 12″ N.; long., 158° 03′ 48″ W. Elevation, 15.2 meters.

Instrument: Milne seismograph of the Seismological Committee of the British Association.

Instrumental constant.. T_0 18.8

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915.			*H. m. s.*	*Sec.*	*μ*	*μ*	*Km.*	
Aug. 3		P	13 16 36					
		S	13 26 42					
		L	13 37 30	22				
		M	13 46 12		*3,900			
		C	14 11 30					
		F	16 31 24					
6		P	13 28 18					
		S	13 33 00					
		L	13 38 18	24				
		M	13 40 30		*2,300			
		C	13 53 48					
		F	15 06 42					
10		eP	2 59 42					
		M	3 05 24		*200			
		C	3 09 30					
		F	3 42 18					
12		P	7 59 36					
		L	8 19 24					
		M	8 24 54		*400			
		C	8 33 00					
		F	8 55 00					
12		eL	10 09 00					
		M	10 19 30		*100			
		F	10 32 00					
16		P	1 09 06					
		S	1 11 00					
		L	1 13 18	23				
		M	1 18 12		*1,200			
		C	1 28 36					
		F	2 15 30					
19		eL	1 04 24					
		M	1 10 42		*100			
		F	1 26 54					Record lost from Aug. 21, 1h 34m to Aug. 22 18h 26m.
31		eP	21 03 18					
		L	21 22 30					
		M	21 28 18		*200			
		C	21 32 42					
		F	22 02 00					

* Trace amplitude.

Kansas. *Lawrence. University of Kansas.* Department of Physics and Astronomy. F. E. Kester.

Lat., 38° 57′ 30″ N.; long., 95° 14′ 58″ W. Elevation, 304.8 meters.

Instrument: Wiechert.

Instrumental constants.. E: V 177, T_0 3.7, ϵ 4.0; N: V 205, T_0 3.7, ϵ 3.8

No earthquakes recorded during August, 1915.

TABLE 2.—*Instrument reports, August, 1915*—Continued.

Maryland. *Cheltenham. Magnetic Observatory.* U. S. Coast and Geodetic Survey. George Hartnell.

Lat., 38° 44′ 00″ N.; long., 76° 50′ 30″ W. Elevation, 71.6 meters.

Instruments: Two Bosch-Omori, 10 and 12 kg.

Instrumental constants.. E: V 10, T_0 31; N: V 10, T_0 29

No earthquakes recorded during August.

Massachusetts. *Cambridge. Harvard University Seismographic Station.* J. B. Woodworth.

Lat., 42° 22′ 36″ N.; long., 71° 06′ 59″ W. Elevation, 5.4 meters. Foundation: Glacial sand over clay.

Instruments: Two Bosch-Omori 100 kg. horizontal pendulums, undamped (mechanical registration).

Instrumental constants.. E: V 80, T_0 23; N: V 50, T_0 25

Report for August, 1915, not received.

Missouri. *St. Louis. St. Louis University.* Geophysical Observatory J. B. Goesse, S. J.

Lat., 38° 38′ 15″ N.; long., 90° 13′ 58″ W. Elevation, 160.4 meters. Foundation, 12 feet of tough clay over limestone of Mississippi System, about 300 feet thick.

Instrument: Wiechert 80 kg. astatic, horizontal pendulum.

Instrumental constants.. V 80, T_0 7, ϵ: 1 5: 1

Report for August, 1915, not received.

New York. *Buffalo. Canisius College.* John A. Curtin, S. J.

Lat., 42° 53′ 02″ N.; long., 78° 52′ 40″ W. Elevation, 190.5 meters.

Instrument: Wiechert 80 kg. horizontal.

Instrumental constants.. V 80, T_0 7, ϵ: 1 5: 1

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915			*H. m. s.*	*Sec.*	μ	μ	*Km.*	
Aug. 8			19 15 00					
			23 45 00					Microseisms E-W.
11	I_r	P_E	10 06 30					
		S_E	11 11 15					
		M_E	10 14 45	10	19		3,450	
		C_E	10 21 30					
		P_N	10 11 15					Not discernible.
		S_N	10 14 45	8				
14		M_N	8 48 00					Intermittent microseisms E-W.
			18 00 00					

New York. *Fordham. Fordham University.* W. C. Repetti, S. J.

Lat., 40° 57′ 47″ N.; long., 73° 53′ 08″ W. Elevation, 23.9 meters.

Instrument: Wiechert 80 kg.

Instrumental constants.. E: T_0 6.6; N: T_0 7.1

Report for August, 1915, not received.

Panama Canal Zone. *Balboa Heights.* Isthmian Canal Commission.

Lat., 8° 57′ 39″ N.; long., 79° 33′ 29″ W. Elevation, ——.

Instruments: Two Bosch-Omori 100 kg.

Instrumental constants.. V 10, T_0 20

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915			*H. m. s.*	*Sec.*	μ	μ	*Km.*	
Aug. 31		P	21 33 40					
		L	21 35 00					
		M	21 35 35		200		620	
		F	21 36 25					

Porto Rico. *Vieques. Magnetic Observatory.* U. S. Coast and Geodetic Survey. H. M. Pease.

Lat. 18° 09′ N.; long., 65° 27′ W. Elevation, 19.8 meters.

Instruments: Two Bosch-Omori.

Instrumental constants.. E: V 10, T_0 21.4; N: V 10, T_0 21.1

No earthquake recorded during August.

Vermont. *Northfield. U. S. Weather Bureau.* Wm. A. Shaw.

Lat., 44° 10′ N.; long., 72° 41′ W. Elevation, 256 meters.

Instruments: Two Bosch-Omori, mechanical registration.

Instrumental constants.. E: V 10, T_0 15; N: V 10, T_0 16

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915			*H. m. s.*	*Sec.*	μ	μ	*Km.*	
Aug. 3		P?	13 26 33					
		S?	13 31 33					
		L	13 36 30					
		F	14 00 00					
6		P	13 24 56					S not discernible.
		F	14 00 00					
7		P	15 23 52					
		S	15 31 10					
		L	15 45 30	18				
		F	16 00 00					
16		P	1 16 23					
		S?	1 21 09					
		L	1 40 00	16				
		F	2 00 00					
19		P?	0 17 15					Mere trace, all phases doubtful.

TABLE 2.—*Instrumental reports, August, 1915*—Continued.

Canada. *Ottawa. Dominion Astronomical Observatory.* Earthquake Station. Otto Klotz.

Lat., 42° 23′ 38″ N.; long., 75° 42′ 57″ W. Elevation, 83 meters.

Instruments: Two Bosch photographic horizontal pendulums, one Spindler & Hoyer 80 kg. vertical seismograph.

Instrumental constants.. V 120 T_0 26

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915.			*H. m. s.*	*Sec.*	*μ*	*μ*	*Km.*	
Aug. 3		P	13 26 22				3,240	
		S	13 31 22					
		L	13 36 01	20				
		L	14 02 00	24				
		L	14 20 00	20				
		L	14 32 00	18				
		F	15 35 00					
6		P	13 24 48	3			9,150	
		PR1	13 28 06					
		S	13 35 07					
		L	13 55 02	28				
		L	14 07 00	18–16				
		L	14 13 00	16				
		F	15 00 00					
7		P	15 23 58				5,600	
		S_N	15 31 12					
		L	15 37 00	30				
		L	15 38 00	28				
		L	15 43 00	18				
		L	15 53 00	14				
		F	16 10 00					
11		L	9 45 00	40				Very distant, inferred from deformation instrument.*
16		e_N	1 15 44				3,500?	
		e_E	1 15 48					
		S?	1 21 00					
		L	1 26 00	20				
		L	1 30 00	24–22				
		L	1 37 00	15–14				
		L	1 51 00	14–13				
		L	2 00 00	15–13				
		F	2 20 00					
19		P?	0 16 32				5,550?	
		S_E?	0 23 42					
		S_N?	0 23 44					
		L_N	0 33 02	20				
		L	0 52 00	40				
		L	0 56 00	30				
		L	0 58 00	28				
		L	1 00 00	20				
		L	1 06 00	18				
		F	1 20 00					
22		L	9 36 00	40				
		F	9 55 00					
22		L	11 31 00	28				
		F	11 50 00					

* Instrument just mounted in special vault for study of deformation of the earth by moon and sun; hence expression "deformation" instrument.

Canada. *Toronto. Dominion Meteorological Service.*

Lat., 43° 40′ 01″ N.; long, 79° 23′ 54″ W. Elevation, 113.7 meters. Subsoil: Sand and clay.

Instrument: Milne horizontal pendulum, North. In the meridian.

Instrument constant: T_0 18. Pillar deviation, 1 mm. swing of boom=0.59″.

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915.			*H. m. s.*	*Sec.*	*μ*	*μ*	*Km.*	
Aug. 3		P	13 27 18					
		S	13 33 18		*200			
		L	13 43 30					
3		P	?14 00 12					Possibly dual earthquakes. P may be mixed up with trailers.
		S	14 02 18					
		iL	14 13 06					
		iL	14 18 54					
		M	14 24 30		*2,200			
		Repeat	15 19 12					
		F	15 46 54					

*Trace amplitude.

Canada. *Toronto. Dominion Meteorological Service*—Continued.

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915.			*H. m. s.*	*Sec.*	*μ*	*μ*	*Km.*	
Aug. 6		P	13 44 48					
		S	13 51 00					
		L	13 58 54					
		M	14 08 24		*800			
		F	14 55 06					
7		P	?15 31 42					P doubtful.
		S	15 39 54					
		iL	15 46 42					
		M	15 49 30		*800			
		F	16 11 24					
10		P	?2 40 00					
		S	2 44 18					Beginning not well defined.
		L	2 45 36					
		M	2 47 18		*800			
		F	2 59 24					
11		L	9 52 18					Minute thickening.
		F	9 59 30					
16		P	1 15 06					
		L	1 30 12					
		iL	1 31 54					
		M	1 33 48		*300			
		L	1 37 06					
		L	1 49 30					
		M	1 50 24		*300			
		F	2 42 00					
19		P?	?0 21 24					
		L?	0 45 54					
		L	1 07 06		*200			Watch hand touching boom interfered with some phases.
		F	1 45 30					

*Trace amplitude.

Canada. *Victoria, B. C. Dominion Meteorological Service.*

Lat., 48° 24′ N.; long., 123° 19′ W. Elevation, 67.7 meters. Subsoil: Rock.

Instrument: Milne horizontal pendulum, North. In the meridian.

Instrumental constant: T_0 18. Pillar deviation, 1 mm. swing of boom=0.54″.

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915.			*H. m. s.*	*Sec.*	*μ*	*μ*	*Km.*	
Aug. 3		P	13 34 26				9,600	
		S	13 51 46					
		L	13 59 26					
		M	14 08 56		*1,500			
		F?	16 49 56					
6		P	13 40 18					
		L	13 49 18					
		M	13 52 18		*500			
		F	14 54 18					
7		P	15 27 21				10,600?	
		S	15 46 51					
		L	15 52 21					
		M	15 56 21		*500			
		F	16 20 21					
10		P?	2 45 30					P. Doubtful. Not recorded on vertical seismograph.
		L	2 51 30					
		M	2 59 30		*300			
		F	3 23 00					
16		S?	1 09 25					
		L	1 15 25					
		M	1 16 25		*400			
		F	2 48 55					
18		P	14 05 00				80	Eq. felt in Victoria, vibration of 1 sec., also along Fraser Valley and Puget Sound.
		S	14 05 20		*100			
		L						
		M						
		F	14 08 00					
19		P	1 03 01				13,000	
		S	1 16 01					
		L	1 22 01					
		M	1 23 01		*100			
		F	1 43 01					

*Trace amplitude.

TABLE 3.—*Late seismological reports. (Instrumental.)*

Porto Rico. *Vieques. Magnetic Observatory.* U. S. Coast and Geodetic Survey. H. M. Pease.

Lat., 18° 09′ N.; long., 65° 27′ W. Elevation, 19.8 meters.

Instruments: Two Bosch-Omori.

Instrumental constants.. V / T_0: E 10 / 21.4; N 10 / 21.1

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915.			*H. m. s.*	*Sec.*	μ	μ	*Km.*	
July 31		L_E	2 20 00					
		L_N	2 22 24	26				
		M_E	2 26 10	20	10			
		M_N	2 29 10	20		50		
		C	2 38 00					

Canada. *Toronto. Dominion Meteorological Service.*

Lat., 43° 40′ 01″ N.; long., 79° 23′ 54″ W. Elevation, 113.7 meters. Subsoil: Sand and clay.

Instrument: Milne horizontal pendulum, North. In the meridian.

Instrumental constant.. T_0 18. Pillar deviation, 1 mm. swing of boom=0.59″.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915.			*H. m. s.*	*Sec.*	μ	μ	*Km.*	
July 20		P?	16 04 54					
		L	16 09 48		* 100			
		F	16 15 00					
22		L	4 30 24		* 100			Air currents going on before L begin.
		F	4 40 42					
25		P	21 04 18					
		S?	21 08 48					
		L	21 16 36					
		L	21 19 48					
		M	21 22 30		* 400			
		M	21 47 42					
		F	21 51 12					
31		P	1 41 48				8,325	A marked disturbance. Long waves continued for a long time. Four distinct maximums recorded. Origin near Kurile Islands.

* Trace amplitude.

Canada. *Toronto. Dominion Meteorological Service*—Continued.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915.			*H.m.s.*	*Sec.*	μ	μ	*Km.*	
July 31		S	1 51 48					
		L	2 01 00					
		L	2 05 30	30-18				
		L	2 10 36					
		M	2 11 42	18-24	*3,400			
		L	2 13 54					
		M	2 15 06	18	*3,800			
		M	2 17 24		*3,200			
		L	2 20 42					
		M	2 22 06	12-18	*2,800			
		L	2 39 36					
		L	3 43 48					
		F	5 20 48					

* Trace amplitude.

Canada. *Victoria, B. C. Dominion Meteorological Service.*

Lat., 48° 24′ N.; long., 123° 19′ W. Elevation, 67.7 meters. Subsoil: Rock.

Instrument: Milne horizontal pendulum, North. In the meridian.

Instrumental constant.. T_0 18. Pillar deviation: 1 mm. swing of boom=0.54″.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915.			*H. m. s.*	*Sec.*	μ	μ	*Km.*	
July 20		P	16 07 48					
		L	(?)					
		M	16 07 54		* 100			
		F	16 12 54					
22		P	4 25 54					
		S	4 29 54					
		L	4 36 24					
		M	4 40 54		* 300			
		F	4 55 24					
25		P	20 59 48					
		S	21 01 48					
		L	21 02 48					
		M	21 31 48		* 500			
		F	21 18 18					
31		P	1 39 48				3,800	Origin near Kurile Islands.
		S	1 46 24					
		L	1 50 36					
		M	1 57 48		*3,800			
		F	5 11 48					

* Trace amplitude