

SHORTER CONTRIBUTION
REPORTS OF DISTANT THUNDER

The following information has been received from Mr. G.W. Mackey, Deputy Director, Divisional Office, Perth.-

Some interesting comment appeared in a report of thunderstorm observations supplied to the S.E.C. by Mr. Clark of the State Public Works Department at Onslow, from which the following have been extracted:

"(1) 22.12.59 at 5.30p.m. W.S.T. Thunderstorm 5p.m. - 8p.m. approximately 80 miles east.

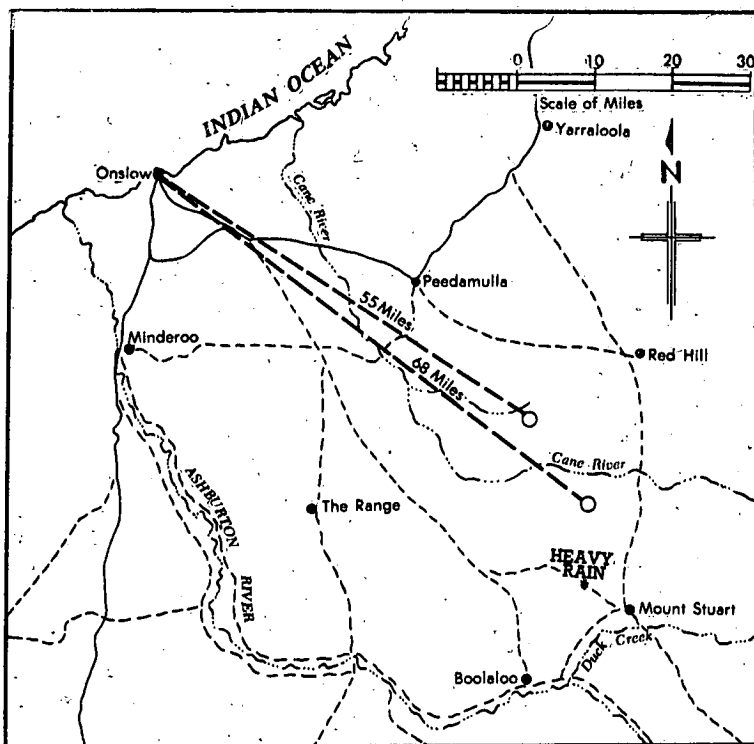
Faint thunder heard at Onslow and lightning seen. Storm with rain reported Mount Stuart and Duck Creek, approximately 100 miles east of Onslow (Mount Stuart is about 80 miles and Duck Creek 110 miles in direct lines southeast of Onslow). Stations 50 miles east of Onslow report that the storms were east of them. This indicates that thunder can be heard at least 60 miles under favourable conditions. Wind at Onslow at the time was southwest.

(2) 26.12.59 8p.m, lightning approximately 200 miles southeast"

Further inquiries revealed that on 22nd December 1959, Mr. Clark heard thunder when in Onslow township and he discussed this with other residents who also heard it. At the time he could observe Cb tops to the far east; there was no Cb visible in any other direction.

At the time when the thunder was heard another Public Works Department employee was at the site from whence the town water supply was drawn (Cane River) approximately 15 miles due east of Onslow. This gentleman experienced no rain either at Cane River or on his return journey, but stated that this storm was well to the east of him.

A telephone call to Peedamulla Station, 35 miles ESE of Onslow, revealed that the storm was inland southeast of them. A second call to Yarraloola Station, 50 miles due east of Onslow, resulted in the information that the storm was to the south of Yarraloola.



At this time a Public Works Department foreman, en route from Duck Creek to Onslow and approximately 80 miles southeast of Onslow, experienced heavy rain which he said was coming from the southern edge of a severe thunderstorm which appeared to him to be mainly to the north of him and in the vicinity of Red Hill Station which is 70 miles from Onslow. Having cleared the storm he experienced no further thunderstorm.

It will be seen from the foregoing that every effort was made to substantiate the location of the storm and that the report clearly indicates that thunder was heard from a storm 60 miles or more east of Onslow.

The sketch shows the area east and southeast of Onslow. It would appear that this thunderstorm was not less than 55 miles or more than 68 miles ESE of Onslow and allowing for approximations I would incline to the view that it was probably about 62 miles ESE of Onslow.

(Editor's Note: This letter is of interest as an abnormal case of audibility.

The British Observer's Handbook (1956, p.52) states "thunder is audible at distances up to about 10 miles from the source".

Napier Shaw in Manual of Meteorology, Vol. III p.43, says thunder has been recognised as audible two minutes after the lightning, which would imply a distance of 40 kilometres, but this is unusual. Twenty or thirty seconds, which correspond with a distance of 7 km or 10 km, is a more normal figure for the limit of audibility.

Shaw quotes from Meteorological Magazine, June 1928, p.113, reports of thunder heard 200, 255, 310 and even 600 seconds after lightning. He also mentions that 75 seconds is quoted by the editor as a limit rarely exceeded.

Robert G. Fleagle in an article on the audibility of thunder in the Journal of the Acoustical Society of America (Vol. 21, No. 4, p.411) states that it has been pointed out by Humphreys (Physics of the Air) and frequently verified, that thunder is seldom heard at distances greater than 25 km from the lightning flash. Modifying the theory given by T.W.S. Rayleigh in his book "The Theory of Sound", he shows that the relatively short range of audibility of thunder is due to the refraction of the sound waves caused by the temperature gradient and wind shear which generally prevail in the neighbourhood of thunderstorms. The Port Hedland radiosonde observations (the nearest available) show comparative stability between 600 and 400 mb at 2300 GMT on 21.12.59 and 22.12.59 which might have contributed to the abnormal range of audibility).