SEA PHENOMENA DUE TO NUCLEAR EXPLOSION

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We observed SEA phenomena on the records of atmospherics at 21 and 27 kc at Toyokawa twice on 12 August, 1958 as shown in Table 1 and Fig. 1.

Corresponding to SEA No. 1 we observed outbursts on solar radio waves at Toyokawa as shown in Table 2.

As to SEA No. 2 we have been informed that observations were made in Netherlands at 200, 545 and 2980 Mc, and in Czechoslovakia at 536 Mc, and besides they observed bursts only at 200 Mc, which began at 1040.5 U.T. and continued for 1 min with intensity of 80×10^{-22} watts $m^{-2}c/s^{-1}$, and not at other frequencies. According to Mr. Hakura's observation[1], outbursts of solar radio waves at higher frequencies are accompanied by Dellinger fadeouts and those on lower frequencies by magnetic disturbaces. Therefore the burst corresponding to No. 2 observed in Netherlands is not likely correlated with Dellinger fadeouts, *i.e.* not with our SEA phenomena No. 2.

In accordance with our experience[2], when SEA phenomena are observed at 21 and 27 kc exclusively and not at 10 kc, they are always deeply correlated with Dellinger fadeout, *i.e.* occurrence of abnormal *D*-layers; while simultaneous increases of atmospherics at 10, 21 and 27 kc correspond to active meteorological phenomena such as thunderstorms, typhoons, fronts, etc.

Solar flares and nuclear explosions radiate *X* rays, ultraviolet rays, etc. and the forms of SEA phenomena on records of atmospherics are very similar with

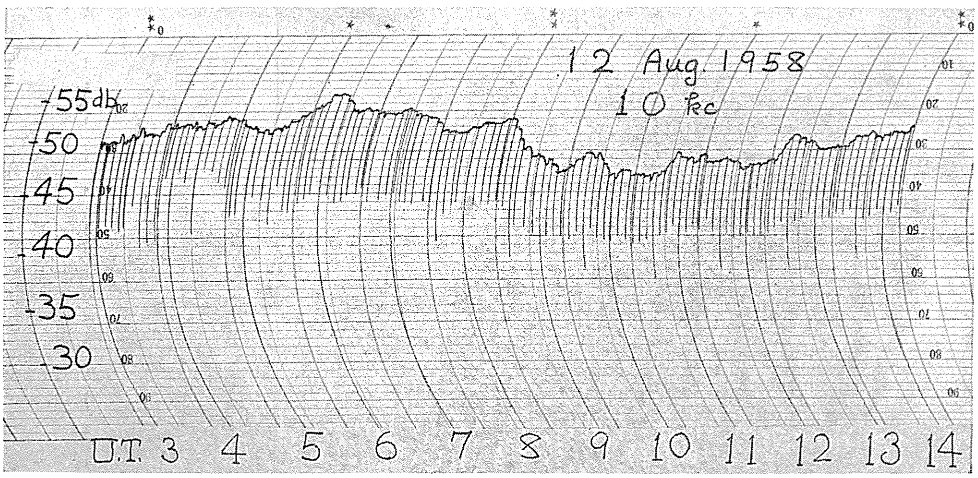

FIG. 1a

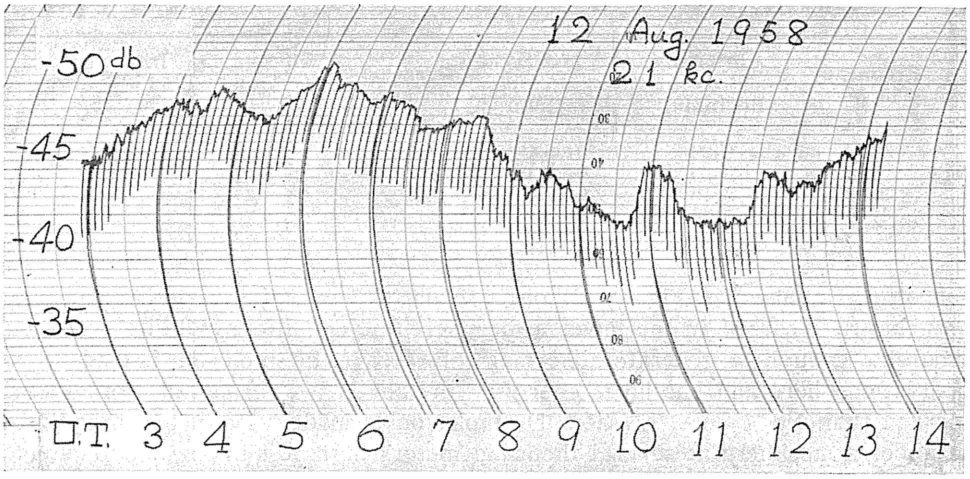

FIG. 1 b

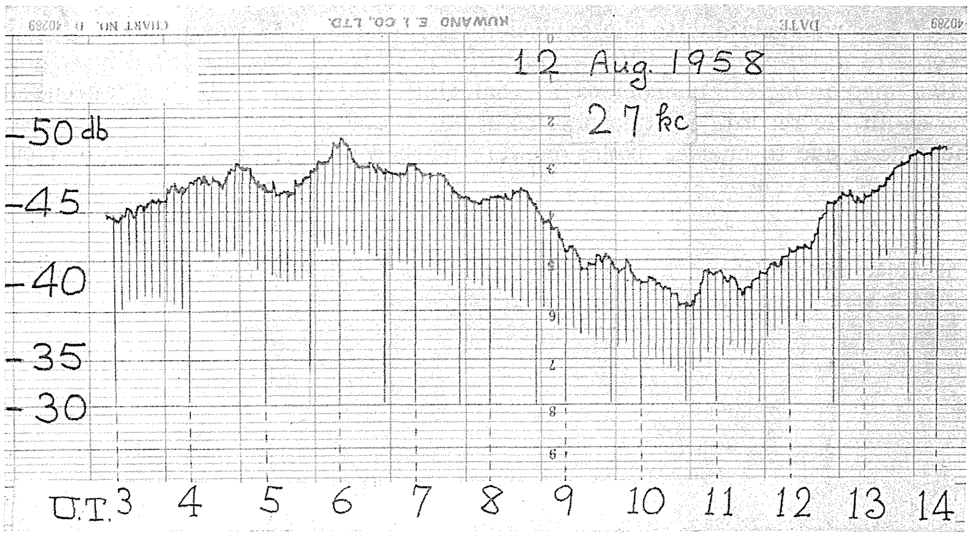

FIG. 1 c

TABLE 1

No. of observations	Frequency in kc.	Observed Time in U.T.		
		Beginning	Maximum	End
No. 1	10 21 27	non 0428 0427	non 0436 0436	non 0506 0500
No. 2	10 21 27	non 1045 1044	non 1051 1051	non 1127 1120

TABLE 2

Frequency in Mc.	Observed Time in U.T.		Duration in min	Type	Intensity in 10^{-22} watt m^{-2} c/s^{-1}
	Beginning	Maximum			
9400	0420	0435.4	23	CD	49
3750	0420	0426.0	21	〃	72
2000	0419	0426.4	22	〃	31
1000	0422	0422.6	1.5	〃	13

each other as shown in Fig. 1; although the latter have small scales and radiated energies are absorbed in the lower atmosphere, the conditions will be sometimes favourable enough to generate abnormal *D*-layers, if the explosion is made in the upper atmosphere and has large energy. In fact No. 2 SEA was more clearly recorded than No. 1 SEA. When the explosion is made at very low pressure in the upper atmosphere at several thousand meters high, it is impossible to detect it by measuring pressure difference due to a blast from explosion; while SEA phenomena due to explosion will be easily found due to small absorption in the upper atmosphere.

SEA phenomena due to the explosion on 1 August 1958 was not found in the records of atmospherics. The neighbourhood of Japan was disturbed heavily by active meteorological phenomena at that time, and we found simultaneous increases in the records of atmospherics at 10, 21 and 27 kc. It seems that SEA phenomena due to nuclear explosion were masked by meteorological phenomena.

References

1) K. Shino and Y. Hakura: Rep. Ionosphere Res. Japan, Vol. XII. No. 3, 1958, p. 285.
2) A. Kimpara: Proc. Res. Inst. Atm. Vol. 2, 1954, p. 40.