Section 3. Radio Astronomy

Routine observations of the solar radio flux density and polarization are being conducted at four frequencies, 9400, 3750, 2000 and 1000 Mc/s (Fig. 1). The absolute calibration of solar radio flux density[1] was made, using four standard horns. The preliminary results show that the correction factors of 1.08, 0.96, 1.05 and 1.11 should be multiplied for the four frequencies cited above, respectively. Since the above results are inconsistent with the results obtained at the Heinrich-Hertz Institute, Berlin, and also at the National Research Council, Ottawa, we proposed organizing the "International Working Group on the Absolute Calibration of Solar Radio Flux Density" at the XVth General Assembly of URSI in Munich.[1] The proposal was adopted by Commission V, URSI and this Working Group with 7 members with H. Tanaka as Convener, is responsible for solving the problem of discrepancy in the near future.

The 32+2-element compound interferometer at 9400 Mc/s as shown in Fig. 1 has been in operation since July 1966. It has a resolving power of 1.1 min. arc for the 32-element adding interferometer and 21 sec. arc for the compound configuration. Some interesting results are already coming to our attention.[2] The NS elements of sixteen 1.2-meter dishes, which are to be added to form a T with the existing 32 elements, are almost completed, except for the final adjustments.

A 32+2-element compound interferometer at 3750 Mc/s, which is quite similar

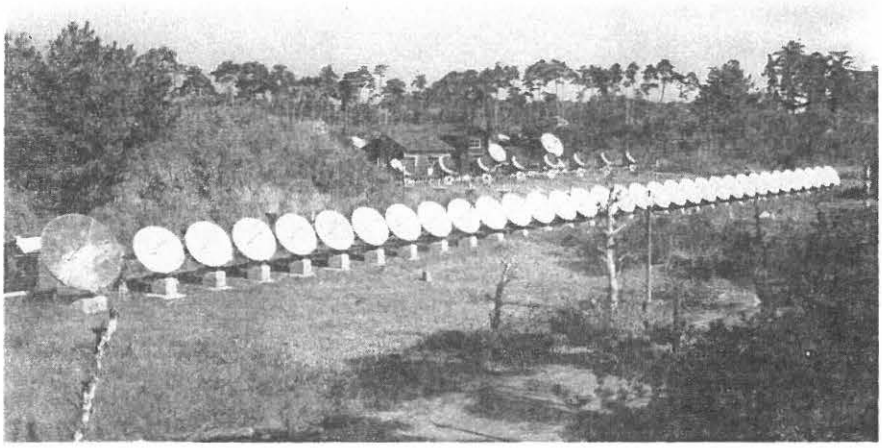

Fig. 1. Center of Toyokawa Observatory. Four dishes far back are radiometers for use at frequencies of, from left, 9400, 3750, 2000 and 1000 Mc/s. Eight dishes in front of the radio-meters are the antennas of an old 4000-Mc/s interferometer. The longest array of dishes is the main part of the 9400-Mc/s compound interferometer.

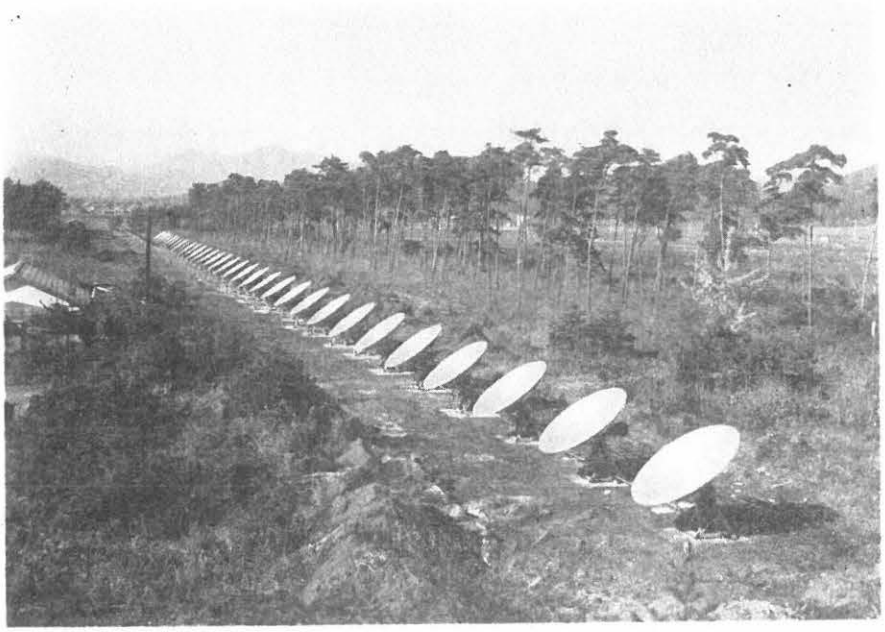

Fig. 2. A 3750-Mc/s compound interferometer under construction.

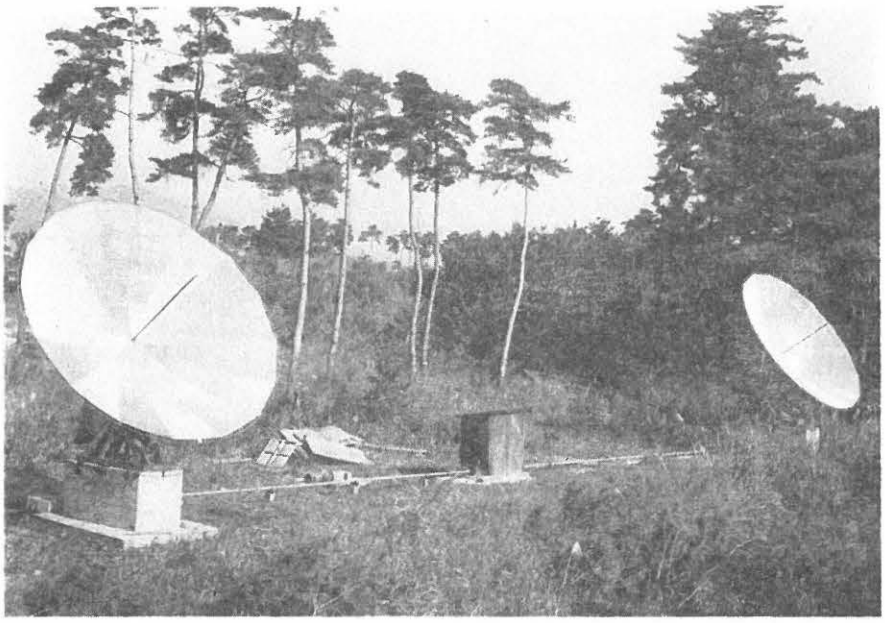

Fig. 3. Two antennas of a 3-element interferometer for 1000 Mc/s.

to that of 9400 Mc/s, is now under construction (Fig. 2) and is expected to be completed in early summer 1967. The dishes are 3 meters in diameter, having a unit spacing of 6.88 meters. The base line, about 437 meters in length, is placed at the northern part of the main observatory site at Toyokawa. This is the modernization of the 4000-Mc/s interferometer (Fig. 1) constructed in 1953. The simultaneous high-resolution scans of the brightness and polarized component across the sun at two frequencies will be a powerful tool for the study of active regions.

Two dishes of the 3-element interferometer (Fig. 3) to locate the sources of decimeter bursts are almost completed. The antennas are 5-meter paraboloids on the equatorial mounts.

The relation between the 27-day recurrence tendency of $\sum K_p$ and solar radio emission was investigated, using interferometric observations made at 4000 Mc/s.[3] It has made clear thas there is a significant correlation between the intensity of the radio active region and $\sum K_p$, and that the geomagnetic disturbance precedes C. M. P. of the radio active region by about one day. This result seems to support the suggestion made by Dessler and Fejer.

The observation of HII regions are being made at a frequency of 9400 Mc/s using a 10-m dish with a maser amplifier.

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Publications (1966-1967)

(1) Tanaka, H. and T. Kakinuma, : Absolute Calibration on the Flux Density of Solar Radio Emission, Presented to URSI XVth General Assembly, Munich (1966) : Inf. Bull. Solar Radio Obs., Utrecht, 21 (1966)

(2) Tanaka, H., T. Kakinuma and S. Enome : High Resolution Observations of the Sources of Solar Radio Burst at 9.4 Gc/s, in this volume.

(3) Tanaka, H. and T. Kakinuma : Relation Between 27-day Recurrence Tendency of $\sum K_p$ and Solar Radio Emission Derived from Interferometric Observations, Rep. Ionos. Space Res. Japan, **20**, 1, 22 (1966)