CRRI File Report 9

MODIFICATIONS TO A PORTABLE METEOROLOGICAL TOWER AND TRAILER

by

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The Chemical Control Research Institute is actively involved in the study of meteorological conditions within and above the forest canopy and the effect of these conditions on the drift and deposit of insecticide particles. To position the meteorological sensors at the correct heights the Institute has a portable high tower[1]. This tower is trailer-mounted and can be towed by a one-half ton or similar size vehicle. The tower and sensor set has been in continuous use on studies by members of CCRI and on joint projects with other Research Institutes and other Regional Laboratories. During the course of work problems arose with the handling of the unit and modifications were made to make a more compact unit which is more easily handled.

In the original equipment set-up the tower-trailer unit was towed in its factory designed configuration. The meteorology sensors were transported in the instrumentation trailer which had mounted in it the analysing and read-out equipment. Power was supplied by a portable 2 kilowatt generator which was carried in a truck and then set in position, on the ground at the work site. With development of the sensing and recording equipment and the addition of more electrical equipment a larger power source was needed. A 5 Kilowatt generator was purchased; the weight of this unit (approximately 500 lbs) meant that it could not be manhandled into position and it had to be mounted for transport and use. The generator was mounted on the trailer base and with it was mounted a 20 gallon gasoline tank. This tank holds

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[1] Armstrong, J.A. 1971. A portable high tower to support meteorological and air sampling equipment. Information Rep. CC-X-14. CCRI. Forestry Service, Environment Canada.

12 hours running time supply of fuel. Also mounted on the trailer was the tool box (original equipment with the tower) and a cable spool to hold the 150 feet of sensor cables. Other modifications consisted of the addition of foot plates to permit the work crew to stand on parts of the trailer unit, a floor to the trailer, and a bracket to enable a third wheel to be fastened to the hitch end of the trailer.

In Figure 1 is shown the tower collapsed on the trailer base in the towing position; on the base of the trailer can be seen the generator, gasoline tank, tool box and cable spool. This photograph illustrates a potential hazard when using a vehicle of the type shown to tow the tower-trailer unit. The collapsed tower extends over the cab of the vehicle and if the unit is towed over very rough roads there is a possibility of the end of the tower hitting the roof of the vehicle.

Figure 2 shows the tower in the process of being erected at a field site near Chipman, New Brunswick. Mounted on the tower, starting from the top, are the radio antenna, warning lights, and the top set of met. sensors. All guy wires are fastened to their appropriate tower sections. The cables to the met. sensors and all electrical supply cables are bundled together and run down the centre of the tower. In the picture can be seen a corner of the instrument trailer and, in temporary use, a second generator is sitting on the trailer bed.

Figure 3 is a photograph of the tower erected to a height of 80 feet at the New Brunswick work site. On the tower can be seen the sets of met. sensors at 36 and 72 feet. The cables from the

tower enter the instrument trailer via plug connectors mounted in a blocked-off portion of one of the windows.

In Figure 4 the tower is shown set up in a work area near Ottawa. In this particular location the trees averaged about 10-12 feet and the tower was not extended its full height. For the work period only the top section was extended; in this photograph the top section is collapsed. The warning lights were not mounted on the tower at the time this work was in progress. This photograph shows clearly the radio antenna, the two sets of bi-vanes which measure wind speed, wind direction, and the vertical movement of the air mass. Mounted immediately below the bi-vanes are the temperature sensors for the temperature differential system, and on the base-plate of the sensor brackets can be seen the square boxes which contain the wet and dry bulb temperature sensing units.

Figure 5 shows the tower being winched from the sensing position in Figure 4. To permit the movement of the tower-trailer as an independent unit a third wheel was mounted at the hitch end of the trailer. Figure 6 shows the third wheel in position. This wheel is mounted on a swivel; the low pressure tire makes it possible to manoeuvre the trailer unit on soft ground. This wheel unit is removed when the trailer is being towed.

Figure 7 shows a double pulley system used to guide the sensor cables up the centre of the tower. This double pulley unit is mounted on a bracket which can swivel and lift to accomodate the cable; it is fastened to the pipe extension of the tower base-plate and is removed when the tower is being towed.

Figure 8 is a general photograph of the base of the tower in a work area. In the foreground can be seen the base of the tower with the sensor cables running through the double pulley unit. One of the temperature sensors is mounted on a support arm to give a reading at about the height of the air sampling units shown in the background. The electrical control box for controlling the tower erection motor can be seen resting on the motor. This control system has been modified to put the switch unit on the end of a 25 foot extension.

Figure 1. (opposite)

Tower in towing position:

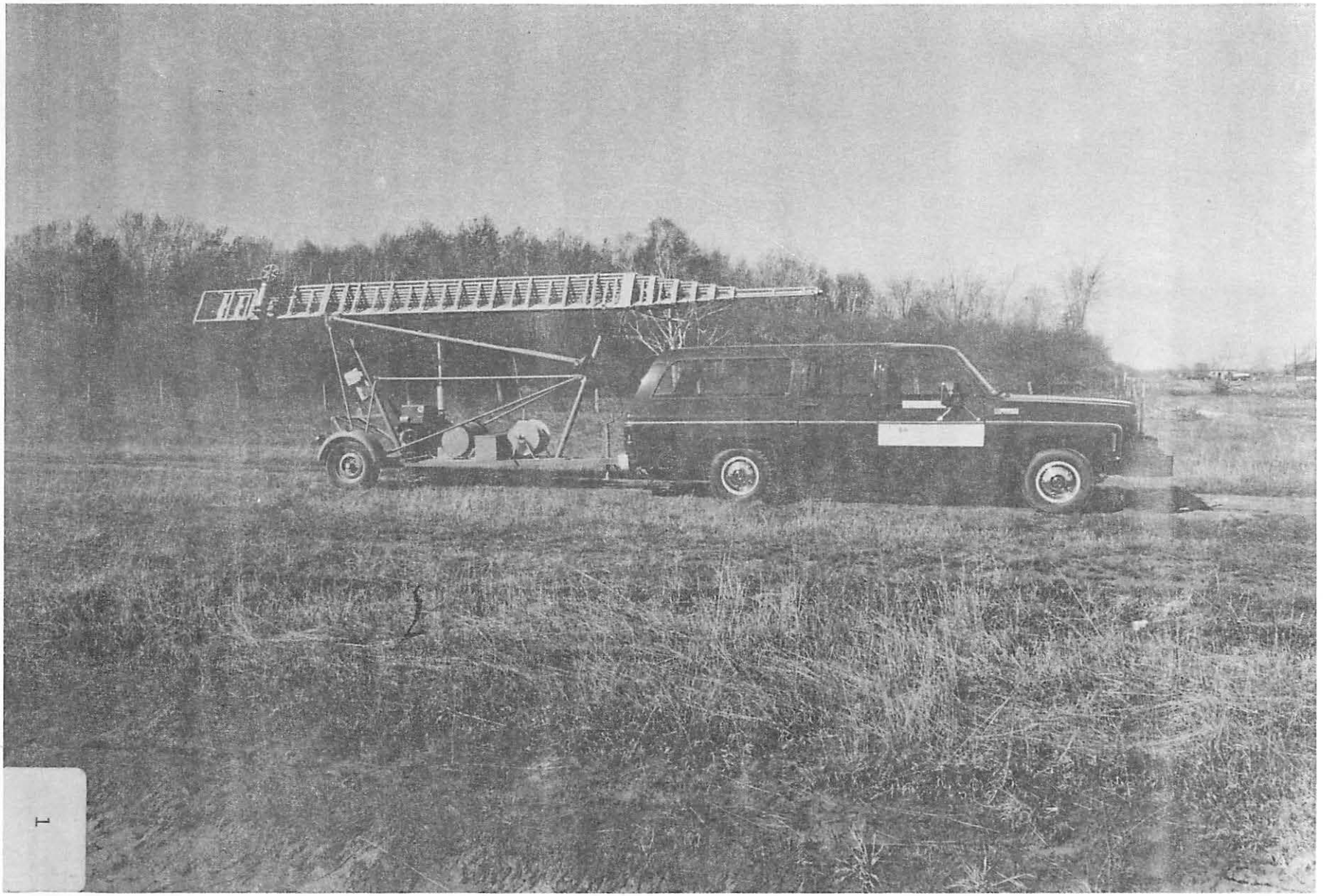
Showing - 5 kilowatt generator (approx. 500 lb.)
shock mounted to eliminate vibration
mounted on rails which run at right
angles to the trailer frame

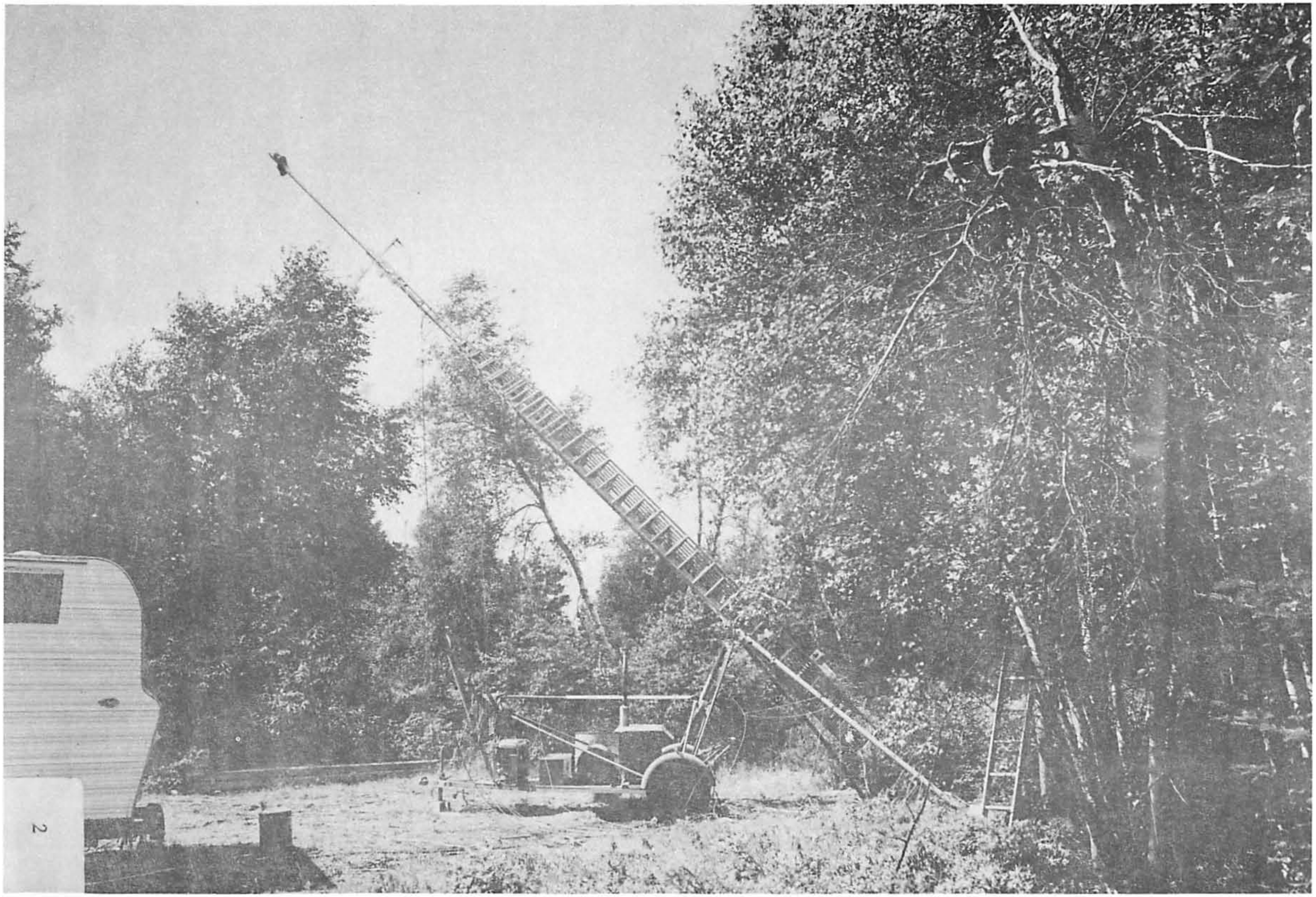
20 gallon gasoline tank

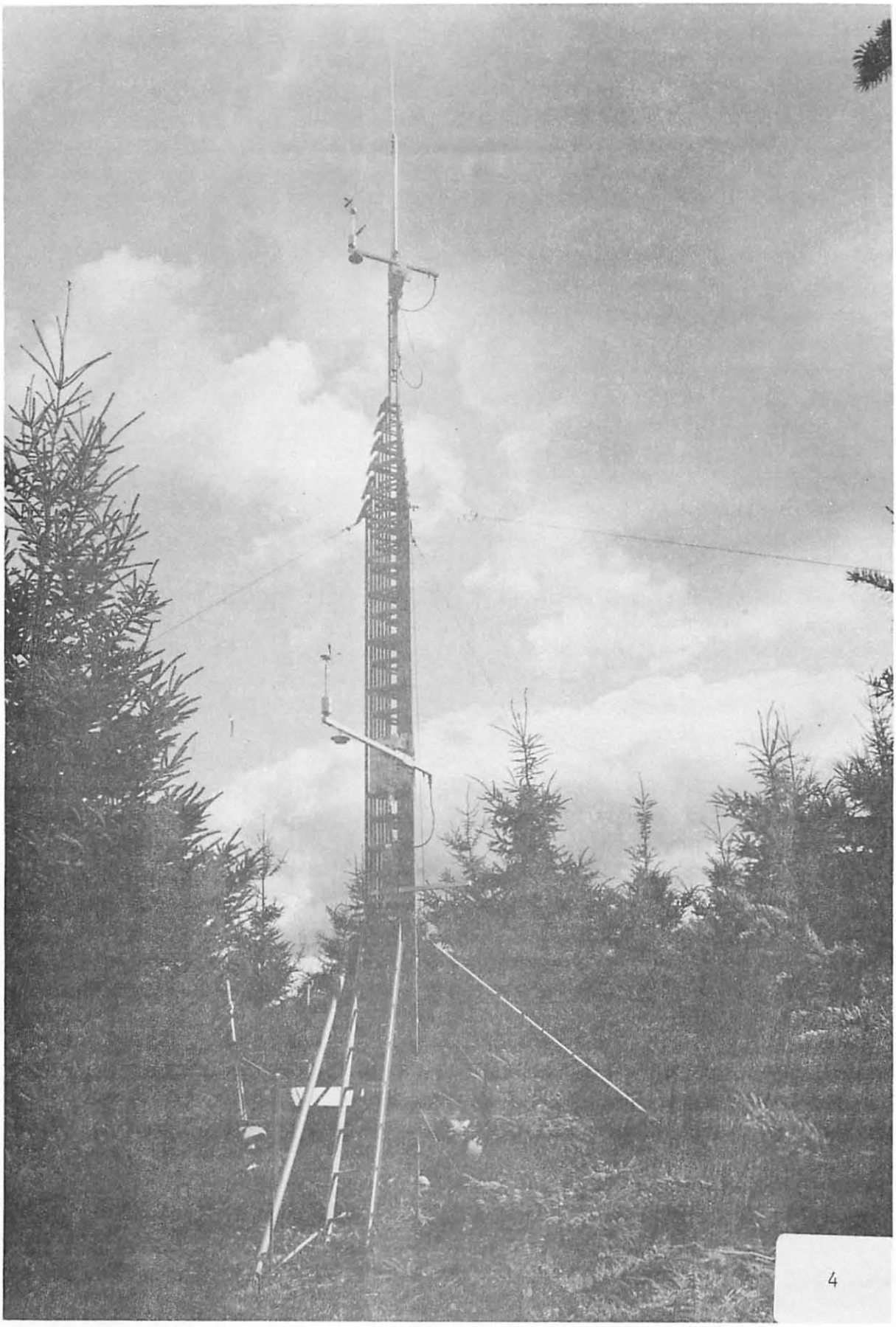
Tool box

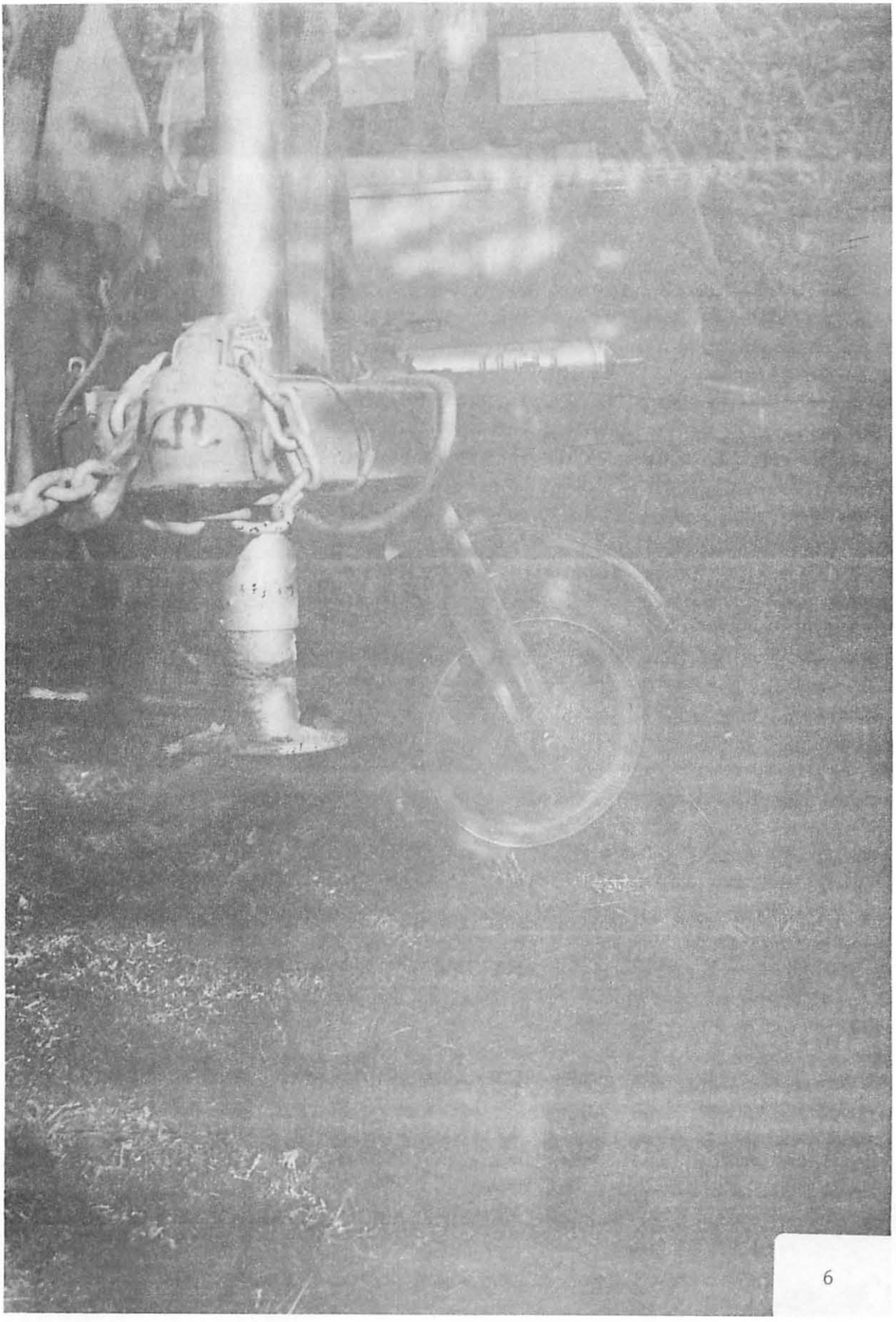
cable spool

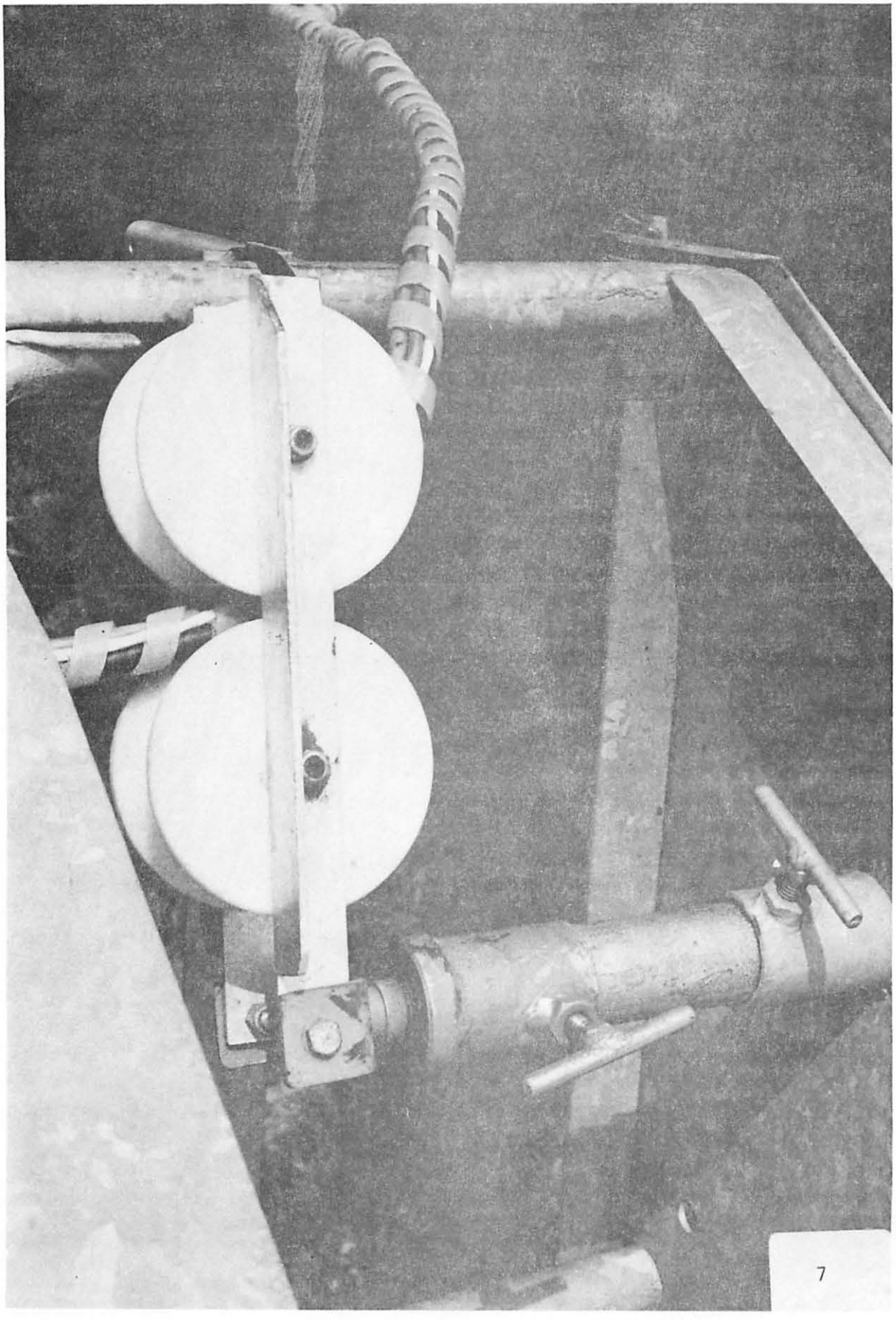
*Note - Top section of tower not fully collapsed
Do not tow in this position

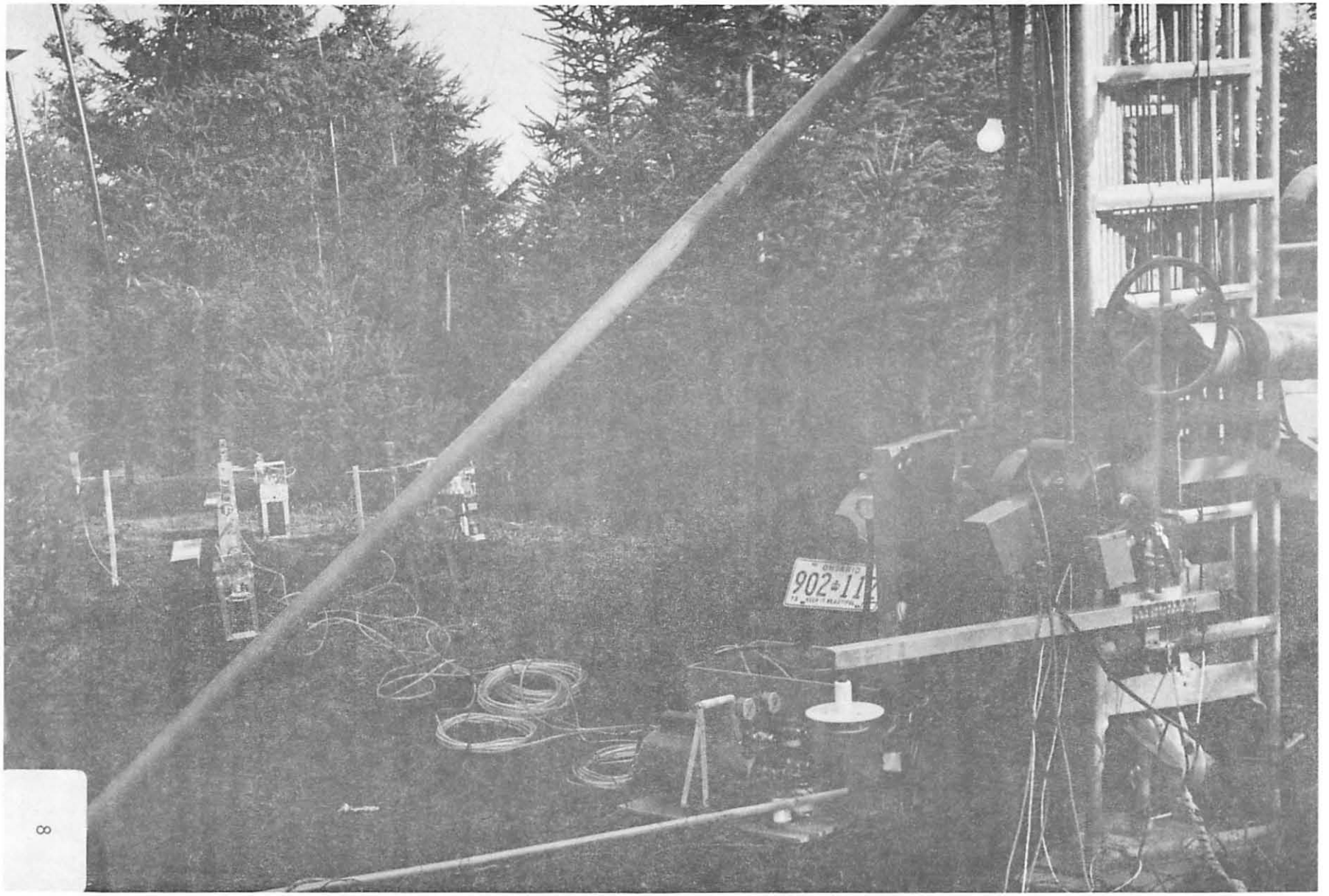








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