have been known to plant physiologists for a long time: potassium, magnesium, and iron. Potassium seems to be necessary for healthy growth of the plant's vegetative parts — leaves, stems, and roots. Plants grown on a short ration of potash may produce seeds and fruits, but they are apt to be undersized. Magnesium and iron are necessary for the proper functioning of chlorophyll, the green stuff that captures sunlight and uses its energy to form food out of water and carbon dioxide. Magnesium is a small but essential part of chlorophyll; iron, though not an actual part, seems to be necessary to keep it working right.

These ten elements have been the classics of plant physiology for many years. It used to be thought that they were the only ones necessary for healthy plant growth, and many textbooks still teach that doctrine.

However, recent research has added at least four more elements to the list. Dr. D. R. Hoagland, professor of plant nutrition at the University of California, recently told a Pacific Coast science meeting that plants must have exceedingly minute amounts of boron, manganese, copper and zinc to remain in good health.

Science has been so long finding out the necessity of these four elements to plants because so little of any of them is needed. In practically all soil waters, and in most of even the carefully purified distilled water used in laboratory experiments, traces of them are present as impurities. But when extra precautions are taken to keep them out, the plants dwindle. Add the least bit of the necessary four, and the plants come back from the very threshold of death and resume normal growth.

Science News Letter, August 15, 1936

ASTRONOMY

200-Inch Telescope Will Have Private Radiophone "Ear"

Directional Radio System Will Enable Scientists At Mt. Palomar To Talk Directly With Those At Caltech

WITH 50 workmen prepared to pour the concrete for the foundation of the world's largest 200-inch telescope on Mt. Palomar, 6,126 foot high mountain in California, an ultra short wave experimental radio station has been installed to facilitate instant communication on construction progress with scientists in charge at the California Institute of Technology in Pasadena, 100 miles away.

Operating on a wave length of seven meters, the radio station, having call letters of W6XKY, is in direct communication with station W6XKX on the roof of the Astrophysical Building at Pasadena.

Because of the directional effect of such short waves, the antennae of both stations are focused on each other. The stations are serving the double purpose of furnishing heads of the Observatory project with direct communication facilities and of permitting Caltech and Bell Telephone scientists to experiment with such short waves.

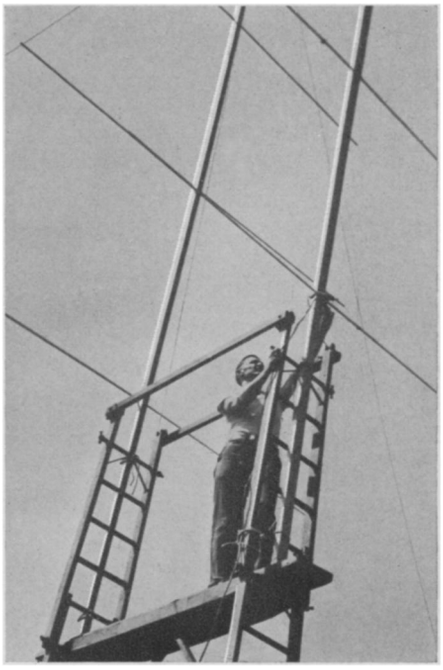
Wave lengths under 10 meters have been considered of little commercial value, and these stations, in addition to furnishing communications, also are supplying scientists with data on the behavior and nature of ultra short waves, information heretofore unavailable. Operating on 7 meters, the stations are unable to tune into any others.

As a result of this radio installation, Capt. C. S. McDowell, supervising engineer for the telescope, stationed in Pasadena, can get into instant touch with supervisors on the mountain regarding construction details.

In addition to construction of the 200-inch telescope foundation, workers are completing the machine shop and power equipment structure in which two generators driven by Diesel engines, will be installed to furnish power to the village at the site.

Experts are installing the Schmidt telescope in a dome completed some time ago. Observations with this 18-inch reflector, an auxiliary "eye" to the 200-inch mirror, will furnish astronomers with an index on seeing qualities by the time the giant telescope is completed and ready for use.

A 1,000,000 gallon water reservoir has been built, as have two Diesel oil storage tanks, in addition to bungalows to house workmen and scientists.



EARS TO SERVE EYE

The new observatory atop Mt. Palomar, California, where the great 200-inch telescope will be erected, and the California Institute of Technology at Pasadena are now connected by a shortwave directed radio telephone system just completed. The directional towers of the transmitter are shown here. Scientists may converse over the 100 miles separation merely by picking up a special telephone on their desks. Ultimately Mt. Wilson Observatory will join the radio circuit.

The contract for fabrication of the 200-inch telescope tube has been awarded Westinghouse in Philadelphia. This part of the telescope, including a giant yoke, will have a total weight of approximately 900,000 pounds.

Delivery of the tube won't start until the dome is completed. The dome itself won't be started until after a surfaced high gear road is laid down to the site, probably next spring.

No other major construction is planned for the remainder of 1936. A skeleton crew will be maintained during the winter, laying water mains, installing transmission cables, and doing additional work on the 200-inch instrument foundation which will be separate from the foundation for the dome to reduce vibration and shock on the instrument.

Science News Letter, August 15, 1936

Tombstones trace ancestry to the "false doors" of ancient Egyptian tombs, through which the spirit of the deceased might return to use articles in his tomb.