



**CYCLOTRON MAGNET**—Giant steel blocks, forged by the United States Steel Corp., are assembled to form the magnet for the University of Rochester's cyclotron, second largest cyclotron in existence. Finished, the four forgings making the base and top weigh 157 tons each, the side columns 125 tons each, and the round pole pieces 90 tons each.

RADIO

## Long Distance Radio Aided

➤ LONG DISTANCE radio communications, always plagued by changing conditions in a temperamental ionosphere, may look to some improvement from a new development in the technique of bouncing radio waves off that ionized layer of the atmosphere.

Dr. M. G. Morgan, working in the Navy Electronics Research Laboratory at the University of California, has found that by rotating a transmitting antenna to a certain position he can obtain a clearer signal reflected from the ionosphere.

He explained that radio waves traveling within the ionosphere are split into two distinct components by the action of the earth's magnetic field. One of these waves is generally stronger than the other, and both register on a receiver, often resulting in garbling.

Further, the polarizations of these two signals rotate in opposite directions, and there are random changes in the strength of the two signals caused by variations in the ionosphere. These factors contribute to fading.

By rotating the antenna to a most favorable position, Dr. Morgan has found it should be possible to obtain one very strong reflected signal and one very

weak one, rather than two of nearly equal volume.

The most favorable position of the antenna would vary with the conditions prevailing in the ionosphere, but it should be possible to determine this by test signals.

Thus it may be possible to build a rotating antenna which can be adjusted to prevailing conditions, Dr. Morgan says, achieving a uniformly strong signal and reducing fading and garbling which now handicap long distance radio transmission.

Dr. Morgan's finding is a result of research now being done in the Berkeley laboratory under contract with the Navy's Bureau of Ships to improve Naval communications.

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CHEMISTRY

## Lignin Used to Purify Beet, Cane-Sugar Juices

➤ USE OF THAT Cinderella of the plant-products world, lignin, as a means for purifying beet and sugar-cane juices before concentration was developed by W. D. Nelson of Reserve, La., for patent

2,415,439. Lignin, dissolved out of bagasse or other wastes with alkali, is added to the crude juice, then coagulated with lime and heat, trapping trash and impurities.

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PHYSICS

## Seismographs Cannot Detect Secret Atom Bomb Tests

➤ HOPES that seismographs could be used as robot detectives of unauthorized atom bomb tests have been dashed as soon as raised. Dr. B. Gutenberg of the California Institute of Technology, whose study of the seismic wave started by "Baker" explosion at Bikini last summer is cited in news dispatches as basis for such expectations, stated flatly in response to a telegraphic inquiry from Science Service, "No such use of seismographs is possible."

It is true that the far-off explosion registered itself on instruments as far east as Tucson, Ariz.; but the record is an exceedingly minute "squiggle", like hundreds of others in slightly wavy lines traced by the instruments during intervals between "earthshaker" quakes, and would have been overlooked if the exact time and distance of the explosion had not been known in advance. It is like reading a "whodunit" backwards.

A smaller-scale, shorter-range use of seismic methods for detection of military explosions was proposed early in the recent war, when ordnance men thought it might be possible to locate the positions of heavy guns by using seismograms. Seismologists, however, pointed out that all the enemy would have to do would be to fire a number of pieces in a ragged salvo, and the record would be so blurred that interpretation would be impossible.

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CHEMISTRY

## Copper-Nicotine Compound Joins Fight Against Insects

➤ AN OIL-SOLUBLE compound of copper and nicotine, suitable for dissolving in hydrocarbons to enhance their insecticidal properties, is the chemical invention of Claude R. Smith of the Eastern Regional Research Laboratory, U. S. Department of Agriculture. Rights in his patent, No. 2,414,213, have been assigned, royalty-free, to the government.

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