

by martial emotions and by preparations for conflict. A dictator, therefore, praises military powers, and rouses martial emotions by pointing to national insecurity or national destiny, and finally drives on to open aggression. Thus he obtains the

support of a unified people. But despotic domination lacks precisely what is required for continuance of despotic rule—provision for replacement by an equally despotic ruler.”

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## HISTORY

## Christmas Once Celebrated On Sixth of January

In Constantinople in Seventh Century, Date Was On  
What Is Now Epiphany; Candlemas Was on February 14

EVIDENCE that in the seventh century A.D., the birth of Christ was celebrated on Jan. 6, instead of the modern Christmas date of Dec. 25, has been dug out of ancient chronicles at the Catholic University of America, by Dr. Martin Higgins, a member of the University faculty. This celebration of the Feast of the Nativity on what is now known as Epiphany seems to have been the custom for some time in ancient Constantinople under the imperial successors of Constantine.

The clue to the different date was found, ironically enough, in accounts of a riot. The disturbance was caused by shortage of bread, and the angry mob threw stones at their monarch while he walked, barefoot, in a night procession commemorating the meeting of the aged

St. Simeon with the Christ-Child when he was brought to the Temple in the arms of his mother, 40 days after his birth. This riot occurred on Feb. 14, A.D. 602. Figuring backwards, this would throw the Feast of the Nativity on Jan. 6.

The same feast that caused the poor Emperor all his trouble is now celebrated as the Feast of the Purification, or Candlemas Day, on Feb. 2, when candles to be used in the church for the ensuing year are blessed. The blessing and distribution of candles in seventh-century Constantinople had a different and more direct significance, Dr. Higgins notes, since they were used immediately by the marchers in the procession as it moved through the dark streets.

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## PHYSICS

## Million-Volt X-Ray Unit Dedicated at G. E. Anniversary

See Front Cover

TAKING a picture through four inches of steel in less than two minutes, a job formerly requiring an hour exposure, is possible with the new million-volt X-ray outfit in the General Electric Company's Research Laboratory, at Schenectady.

This equipment made its debut before a group of scientists, journalists and industrialists who came to help celebrate the completion of 40 years of General Electric research.

Though three similar million-volt X-ray units are in use in hospitals, this is the largest to have an industrial application. Just as the physician or surgeon

is able by X-rays to look inside the body of his patient, so engineers can look into the casting from which, for example, a huge turbine will be made. Defects which might cause failure of the machine, possibly with fatal results, are detected before there is trouble. Up to now the largest industrial equipment in the world is a 400,000-volt unit, which the new apparatus supersedes.

With the 400,000-volt unit, three hours and a half were required to make a picture through five inches of steel. With the new one, only five minutes are required. The exposure time must be increased two and one-half times per inch of steel to be pictured.

The giant unit is housed in a special building of its own. Unique construction features are employed to make it the safest possible building for the operation of high-voltage X-ray equipment. For example, the walls of the structure are of solid concrete, 14 inches thick, plus 12 inches of brick on the interior, making a total thickness of nearly three feet or the equivalent of approximately four inches of lead.

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## ASTRONOMY

## Soviet Scientists Planning Observations of Eclipse

WHEN the tip of the moon's shadow next strokes the earth, along a path crossing Siberia and China on Sept. 21, 1941, some 200 scientists, in thirty groups at sixteen different points in Russian territory, will be making observations of the total eclipse of the sun. This is revealed in a dispatch just received from Tass, Soviet news agency.

The Soviet Academy of Sciences has set up a commission under the chairmanship of V. Fesenko, to take charge of preparations. A book in Russian and English is shortly to be published giving details of the planned observations, and a discussion of the weather probabilities in the various locations.

“The zone from which the total eclipse will be observable,” Dr. Fesenko is quoted as saying, “stretches from the shores of the Caspian Sea across that sea and the Aral Sea, through the cities of Kzyl-Orda and Alma-Ata, and then on to Chinese territory. The maximum duration of the total phase of the eclipse will be about 2½ minutes.

“The mountains of Kazakhstan through which the zone of total eclipse passes offer excellent points of observation.”

Among the subjects which will be studied, he said, are the Einstein theory of relativity; the sun's corona; its innermost atmospheric layer, the chromosphere; the sudden explosions in the sun that seem to cause electrical and magnetic disturbances on earth, and the zodiacal light, a glowing band sometimes observed near the sun.

To supplement the ground observations, it was announced, some astronomers will ascend high above the earth in airplanes and stratosphere balloons. These should be especially useful if clouds hamper the work of the ground parties.

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