

## • RADIO

Saturday, Sept. 12, 1953, 3:15-3:30 p.m. EDT  
 "Adventures in Science" with Watson Davis,  
 director of Science Service, over the CBS Radio  
 Network. Check your local CBS station.

Dr. Howard Meyerhoff, president, Scientific  
 Manpower Commission; Dr. Karl Lark-Horowitz,  
 head, department of physics, Purdue University;  
 President F. L. Hovde, Purdue University; Ivan  
 Rhode and Rebecca Hutto, previous winners of  
 the National Science Fair, will discuss "Science  
 for Youth."

### ASTRONOMY

## Sun Picked Up Comets 7,500,000 Years Ago

► THE SUN picked up, from outside the solar system some 7,500,000 years ago, the masses of materials that are now seen as comets, Dr. L. V. Robinson of the Wright-Patterson Air Force Base reported to the American Astronomical Society meeting in Boulder, Colo.

He bases his suggestion on the comet's slow disintegration, that is, their loss of tails and the development from them of the swarms of flying "gravel banks" that form meteor showers and that we sometimes see as "shooting stars."

Science News Letter, September 5, 1953

### ASTRONOMY

## Cosmic Rays Come From Outside Solar System

► PART, IF not all, of the cosmic radiation continuously bombarding the earth comes from outside of the solar system, Dr. Marcel Schein of the University of Chicago believes.

His conclusion, reported to the American Astronomical Society's meeting in Boulder, Colo., is based on the extremely high energy of the onrushing particles as they have been caught in photographic emulsions sent many miles above the earth's surface. It would be most unlikely, Dr. Schein stated, that the sun's magnetic field could accelerate the charged particles to such very high energies, greater than 10,000,000,000,000 electron volts.

The theory of extra-solar origin is also supported by some new experiments at the University of Chicago. By using two photographic plates sliding slowly past each other, cosmic radiation scientists are, for the first time, able to pin down the time at which the particle left its track.

With this new method, Dr. Schein and his associates have found that the variation between the numbers of tracks of heavy charged particles during the day and at night is not very great. This, he said, in a symposium on the origin of cosmic rays, argues for a cosmic ray source outside of our own solar system.

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The most spectacular comet of the 18th century was visible in 1744 for about four months, could be seen in the daytime and had six tails.

### ASTRONOMY

## Space View Extended

Ultrasensitive photometer that counts photons has doubled volume of space the giant 200-inch telescope can probe. Preliminary results hint at another distance revision.

► A NEW ultrasensitive photometer that literally counts individual photons, or packets, of light was described to the American Astronomical Society meeting in Boulder, Colo.

Use of the photometer has already doubled the volume of space that Mount Palomar's giant 200-inch telescope can view. It can now search out stars of magnitude 23, hundreds of millions times fainter than Sirius, the brightest star we see.

The device is being used to measure the very faint light received from galaxies far distant from our own Milky Way. Although it has already increased the seeing power of the world's largest telescope, eventually, Dr. W. A. Baum of Mount Wilson and Palomar Observatories foresees, it may even further enlarge the amount of space the telescope can penetrate.

The photometer is used to measure, simultaneously, the luminosities and diameters of galaxies lying beyond those in our own neighborhood of the universe. Astronomers have been continually devising new techniques for measuring the very faint light received from such objects, and the ultrasensitive photometer is their most recent development.

The combined results of the luminosity and diameter measurements are fitted to Einstein's general relativity equations. This enables Dr. Baum and his associates to sepa-

rate those differences that are due to the distance of the galaxy and its motion away from us from those that are caused by obscuring clouds and the life history of the object.

Preliminary results, Dr. Baum reported, seem to show that the change undergone by such objects as they go through their life cycles may materially alter the present ideas of how far away these galaxies actually are. These distances until now have been based on luminosity alone, without taking the evolutionary change into account.

The photometer, for the first time, makes it possible for astronomers to take photoelectric measurements with the 200-inch telescope down to the limit of photographic plate sensitivity. Thus Dr. Baum and his associates were able to get the first real measure of the giant's photographic range, which turned out to be half a magnitude beyond previous estimates.

The photometer, Dr. Baum explained, can "actually detect objects considerably beyond the photographic limits." Experiments in the subphotographic range, however, should wait until possibilities of electronic image receivers have been more thoroughly investigated. Dr. Baum reported details on how the photometer works at a conference on photoelectric astronomy at Flagstaff, Ariz., on Sept. 1.

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### ASTRONOMY

## Spiral Arms Traced

► THE FORM of the spiral arms of the great pinwheel galaxy to which the earth belongs has been traced, using two elements found in interstellar gas.

Both sodium and calcium helped Dr. Guido Munch of the Mount Wilson and Palomar Observatories draw a picture of the spiral arms that trail our Milky Way galaxy of stars. He spotted two sections of the spiral arms, separated by about 5,000 light years, of our watch-shaped star system.

His model, Dr. Munch reported to the American Astronomical Society meeting in Boulder, Colo., confirms the one proposed by Dr. W. W. Morgan and his collaborators at Yerkes Observatory from their study of interstellar hydrogen.

Hydrogen as well as the sodium and calcium in interstellar gas are signposts of spiral structure. Dr. Munch found that the interstellar gas clouds are concentrated along two paths in the Milky Way. Over

the region of space that he observed, they run roughly parallel to each other at a distance of about 30,000 million million miles (30 followed by 15 zeroes), or 5,000 light years.

The interstellar lines of sodium and calcium, Dr. Munch reported, appear separated when the stars are farther than 7,000 light years away. A light year is the distance traversed by light at 186,000 miles per second in one year, or nearly six million million miles. However, they always show as single lines when they are relatively "nearby," or less than 3,000 light years.

Dr. Munch believes that the separation found in the interstellar lines when the stars are more distant is due to the rotation of the galaxy. Dr. Munch is currently working at the National Astrophysical Observatory in Tonantzintla, Mexico.

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