THE FOCAL POINT

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CLUB CALENDAR

Next Meeting: January 19, 8:00 p.m. at Bradley Observatory.
Program: Club member Howard Landis will present a talk on "Solar Observation with VLF Radiation.".

Editor: ..... Steve Gilbreath
Contributing Editors: ..... Dr. Ralph Buice, Hal Crawford, Richard Jakiel, Mark Lancaster

The Focal Point is published monthly during the academic year by the Atlanta Astronomy Club, Inc. The AAC is a non-profit organization dedicated to the advancement of amateur astronomy. Meetings are held the third Friday of each month (except the second Friday in December) at the Bradley Observatory on the Agnes Scott campus. Dues are $35 annually for a family membership and $25 for a student membership and include a subscription to **Sky & Telescope** magazine and use of the club observatory in Villa Rica.

Submissions: Article submissions are welcome, and may be delivered to the editor for consideration. Articles on computer floppy disk are encouraged.

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PIONEERS MAKE FIRST MEASUREMENTS OF INTERSTELLAR LIGHT

by Dave Garrett, NASA Headquarters

Using extensive light measurements made by the Pioneer 10 and 11 spacecraft, a NASA scientist has produced "celestial constants" that will be highly useful to astronomers and physicists. The new constants are the first "pure" measurements of the various kinds of background light in our solar system, galaxy and universe.

Work conducted by Dr. Gary Toller, Goddard Space Flight Center, Greenbelt, Md., and General Sciences Corp., Laurel, Md., indicates that background light from beyond the solar system is made up of approximately 82 percent light from faint stars. Most of the remainder is galactic light diffused by dust; the final proportion, less than 0.6 percent of background light, originates beyond the galaxy.

Since much of the knowledge of the universe comes from visible light, the data will provide a benchmark in many fields of astronomy and physics. The Pioneer 10 and 11 photopolarimeter measurements have provided the first observations of incoming light without interference of solar system light. The Pioneers are managed by NASA's Ames Research Center, Mountain View, Calif., for the agency's Office of Space Science and Applications.

The new work, combined with other measurements, also provides a clue to chemical composition of solar, galactic and cosmic dust. It gives an accurate measure of the Sun's position above the plane of the galaxy (about 12 parsecs). It describes how cosmic dust scatters light. For the entire celestial sphere, 60 percent of light is scattered, not absorbed, predominantly in the same direction it had been travelling in.

Toller has used his data as another way to calculate total amounts of visible matter in the universe. These calculations confirm other estimates that 90 percent of matter in the universe is "missing" or unseen dark matter.

Toller and others used a variety of observations from Earth for the analyses, combining data on the quantities of stars and types of stars with computer models of light scattering in the galaxy, amounts of dust and gas and size of particles. Then he compared these models to measurements made by the Pioneers as the two spacecraft moved out of the solar system.

The new data will help investigators study diffuse celestial light sources such as zodiacal light, which reaches Earth after being reflected by nearby dust. For an astronomer on Earth, looking in a random direction in space, 40 percent of incoming light is zodiacal light.

Once the Pioneers were beyond 300 million miles, the zodiacal light diminished to a negligible level and scientists were able to make the first pure measurements of background light from beyond the solar system in the mid-1970s. Since then, the long flight paths of the Pioneers have made it possible to make very exact measurements of this "outside" light.

Background light from beyond the solar system breaks

down into integrated starlight from stars too faint to be seen by the eye, diffused galactic light reflected by dust particles in the galaxy and light coming from outside the galaxy.

Toller, who reported his work at an international conference on galactic and extragalactic background radiation in Germany earlier this year, is continuing to refine and apply the data. Dr. Jerry Weinberg of the Institute for Space Science and Technology, Gainesville, Fla., and Dr. Ana Nash, U.S. Naval Research Laboratory, Washington, D.C., also have worked on the analysis.

Both Pioneers are still returning data. Pioneer 10 has left the Solar System and is 4.4 billion miles from the Sun. Pioneer 11 has almost reached the orbit of Neptune. Both spacecraft were built by TRW Inc., Redondo Beach, Calif.

SELLING STAR NAMES

Courtesy of the International Planetarium Society

The star names recognized and used by scientists are those that have been established through long-time usage or published by astronomers at credible scientific institutions. The International Astronomical Union, the worldwide federation of astronomical societies, accepts and uses **only** those names. Such names are **never** sold.

Private groups in business to make money may claim to "name a star for you or a loved one, providing the perfect gift for many occasions." One organization offers to register that name in a Geneva, Switzerland, vault and to place that name in their beautiful copyrighted catalog. However official-sounding this procedure may seem, the name and the catalog are not recognized or used by any scientific institution. Furthermore, the official-looking star charts that commonly accompany a "purchased star name" are the Becvar charts excerpted from the Atlas Coeli 1950.o. While these are legitimate star charts, published by Sky Publishing Corporation, they have been modified by the private "star name" business unofficially. Unfortunately, there are instances of news media describing the purchase of a star name, apparently not realizing that they are promoting a money-making business only, and not science. Advertising and media promotion both seem to increase during holiday periods.

Planetariums and museums occasionally "sell" stars as a way to raise funds for their non-profit institutions. Normally these institutions are extremely careful to explain that they are not officially naming stars and that the "naming" done for a donation is for amusement only.

Official Star Naming Procedures

Bright stars from first to third magnitude have proper names that have been in use for hundreds of years. Most of these names are Arabic. Examples are Betelgeuse, the bright orange star in the constellation Orion, and Dubhe, the second-magnitude star at the edge of the Big Dipper's cup (Ursa Major). A few proper star names are not Arabic. One is Polaris, the second-magnitude star at the end of the handle of the Little Dipper (Ursa Minor). Polaris also carries the popular name, the North Star.

A second system for naming bright stars was introduced in 1603 by J. Bayer of Bavaria. In his constellation atlas, Bayer assigned successive letters of the Greek alphabet to the brighter stars of each constellation. Each Bayer designation is the Greek letter with the genitive form of the constellation name. Thus Polaris is Alpha Ursae Minoris. Occasionally, Bayer switched brightness order for serial order in assigning Greek letters. An example of this is Dubhe as Alpha Ursae Majoris, with each star along the Big Dipper from the cup to handle having the next Greek letter.

Faint stars are designated in different ways in catalogs prepared and used by astronomers. One is the Bonner Durchmusterung, compiled at Bonn Observatory starting in 1837. A third of a million stars are listed by "BD numbers." The Smithsonian Astrophysical Observatory (SAO) Catalogue, the Yale Star Catalog, and The Henry Draper Catalog published by Harvard College Observatory are all widely used by astronomers. The Supernova of 1987 (Supernova 1987a), one of the major astronomical events of this century, was identified with the star named SK -69 degrees 202 in the very specialized catalog, the Deep Objective Prism Survey of the Large Magellanic Cloud, published by the Warner and Swasey Observatory.

These procedures and catalogs accepted by the International Astronomical Union are the only means by which stars receive long-lasting names. Be aware that no one can buy immortality for anyone in the form of a star name.

PROGRAM PREVIEW

This month's meeting topic is **Solar Observation with VLF (Very Low Frequency) Radiation**, presented by Howard Landis. VLF is invisible, being in the radio portion of the electromagnetic spectrum. This is a relatively unknown observational method for amateurs. Nevertheless, valuable data can be gathered using relatively inexpensive equipment. Scientists at NASA and elsewhere rely on a growing number on amateurs to monitor solar activity using VLF. As sunspot activity approaches its 11-year peak in the next couple of years, VLF activity will increase as well, making observation even more interesting and important.

Howard Landis is a long-time AAC member specializing in variable star observation. As an active participant in the American Association of Variable Star Observers. He has earned the respect of amateurs and professionals alike, contributing to numerous amateur/professional long-term studies. You won't want to miss this exciting program from one of our most accomplished members!

THE HISTORY OF ROCKETRY

by Frank Narmer

In this twentyfirst-anniversary year of the first (but not last, we hope!) moon landing, it is in order to ask just how we came to develop this amazing capability.

The earliest solid rocket fuel was gunpowder, and the earliest recorded mention of this compound comes from early China. Bamboo tubes filled with saltpeter, sulphur and charcoal were tossed into ceremonial fires during religious festivals in hopes the noise of the explosion would frighten evil spirits.

It's probable that more than a few of these bamboo tubes were imperfectly sealed and, instead of bursting with an explosion, simply went skittering out of the fire, propelled by the rapidly burning gunpowder. Some clever observer whose name is lost to history may have then begun experiments to deliberately produce the same effect as the bamboo tubes which leaked fire.

Certainly by the year 1045 the use of gunpowder and rockets formed an integral aspect of Chinese military tactics.

The rockets were huge and apparently quite powerful. According to a report: "When the rocket was lit, it made a noise that resembled thunder that could be heard for five leagues (about 15 miles). When it fell to Earth, the point of impact was devastated for 2,000 feet in all directions." Apparently these large military rockets carried incendiary material and iron shrapnel.

The rocket seems to have arrived in Europe around 1241. Contemporary accounts describe rocket-like weapons being used by the Mongols against Magyar forces at the battle of Sejo which preceded their capture of Budapest in 1241.

Rockets appear in Arab literature in 1258 A.D., describing Mongol invaders' use of them to capture the city of Baghdad.

Quick to learn, the Arabs adopted the rocket into their own arms inventory and, during the Seventh Crusade, used them against the French Army of King Louis IX in 1268.

It is certain that, not later than the year 1300, rockets had found their way into European arsenals, reaching Italy by the year 1500.

As the 18th Century dawned, European military experts began to take a serious interest in rockets -- if only because they, like the Magyars 500 years earlier, found themselves on the receiving end of rocket warfare.

Both the French and the British, during the Eighteenth Century, began wrestling for control of the riches of India. In addition to fighting one another, they also found themselves frequently engaged against Mogol forces.

Profiting from their Indian experience, the British, led by Sir William Congrieve, began development of a series of barrage rockets ranging in weight from 300 to 18 pounds. Congrieve-design rockets were used against Napoleon.

It is surprising that Napoleon seems to have made no use of rockets in the French Army but it must be remembered Napoleon was an artillery officer and may have simply been too hide-bound a traditionalist to favor new-fangled rockets over more familiar cannons.

The scope of the British use of the Congrieve rocket can be ascertained from the 1807 attack on Copenhagen. The Danes were subjected to a barrage of 25,000 rockets which burnt many houses and warehouses.

Rockets came to the New World during the War of 1812.

During the Battle of Bladensburg, August 24, 1814, the British 85th Light Infantry used rockets against an American rifle battalion commanded by U.S. Attorney General William Pickney. Lieutenant George R. Gleig witnessed the Americans' response to the new threat -- "Never did men with arms in their hands make better use of their legs," he wrote.

On December 4, 1846, a brigade of rocketeers was authorized to accompany Maj. Gen. Winfield Scott's expedition against Mexico. The Army's first battalion of rocketeers -- consisting of about 150 men and armed with about 50 rockets -- was placed under the command of First Lieutenant George H. Talcott.

The rocket battery was used March 24, 1847 against Mexican forces at the siege of Veracruz.

On April 8 the rocketeers moved inland, being placed in their firing position by Captain Robert E. Lee (later to command the Confederate Army of Northern Virginia in the War Between the States). About 30 rockets were fired during the battle for Telegraph Hill. Later, the rockets were used in the capture of the fortress of Chapultepec, which forced the surrender of Mexico City.

With typical foresight, as soon as the fighting in Mexico was over, the rocketeer battalion was disbanded and the remaining rockets were placed in storage.

They remained in mothballs for about 13 years -- until 1861 when they were hauled out for use in the Civil War. The rockets were found to have deteriorated, however, so new ones were made.

The first recorded use of rockets in the Civil War came on July 3, 1862, when Maj. Gen. J.E.B. Stuart's Confederate cavalry fired rockets at Maj. Gen. George B. McClellan's Union troops at Harrison's Landing, Va. No record exists of the Northerners' opinion of this premature "Fourth of July" fireworks demonstration.

Later in 1862, an attempt was made by the Union Army's New York Rocket Battalion to use rockets against Confederates defending Richmond and Yorktown, Virginia. It wasn't an overwhelming success. When ignited, the rockets skittered wildly across the ground, passing between the legs of a number of mules. One detonated harmlessly under a mule, lifting the animal several feet off the ground and precipitating its immediate desertion to the Confederate Army.

The only other documented use of rockets is at Charleston, S.C., in 1864. Union troops under Maj. Gen. Alexander Schimmelfennig found rockets "especially practical in driving off Confederate picket boats, especially at night."

As an interesting sidelight, the author Burke Davis, in his book "Our Incredible Civil War," tells a tale of a Confederate attempt to fire a ballistic missile at Washington, D.C., from a point outside Richmond, Va. According to the author, Jefferson Davis witnessed the event at which a 12-foot-long, solid-fueled rocket, carrying a 10-pound gunpowder warhead in a brass case engraved with the letters C.S.A., was ignited and seen to roar rapidly up and out of sight. No one ever saw the rocket

land. It's interesting to speculate whether, almost 100 years before Sputnik, a satellite marked with the initials of the Confederate States of America might have been launched into orbit!

The military appears to have remained underwhelmed with the potential of rockets. They were employed in fits and starts in many of the brushfire wars which punctuated the otherwise calm closing days of the late Victorian Era.

During the First World War, rockets were first fired from aircraft attempting to shoot down enemy hydrogen gas-filled observation balloons. Successes were rare and pilots resisted being asked to fire rockets from the highly flammable, cloth and varnish covered wings of their biplanes. The French were the principal users of aerial rockets, using a model developed by a Naval lieutenant, Y.P.G. LePrieur.

The principal drawback to rockets throughout this period of development was the type of fuel. Both here and abroad, experiments were under way to develop a more powerful, liquid-propelled rocket. Two young men stand out in this effort -- one an American, Robert H. Goddard -- the other a German, Wernher von Braun.

CLASSIFIED ADS

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Dual Axis Motor Drive; 8x50 finder; Meade eyepiece; dew cap and case
$850 firm

Contact Paul Dyches at 621-9694

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First Class Delivery

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