

explanation may not be necessary, however. Dr. D. A. Osguthorpe, a veterinarian who is serving as a consultant to Utah Governor Calvin L. Rampton in the investigation, has collected a number of dead rabbits, rodents and birds, all of whom appear to have died just as the sheep did.

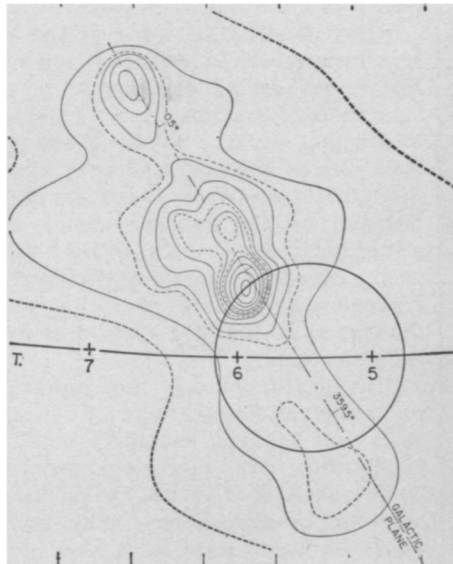
Most disturbing of all, however, are the reported comments of Dr. Kelly H. Gubler, chief of staff of Tooele Valley Hospital, which lies about 50 miles east of the proving ground. Though the Army claims that there have been no previous accidents involving Dugway's nerve chemicals, Dr. Gubler is quoted in the April 12 MEDICAL WORLD NEWS as saying, "I've treated workers in the past for an overdose of anticholinesterase agents, even though the Army denies they were contaminated at the proving ground."

The Army town of Dugway lies about halfway between the proving ground itself and the Skull Valley area where the majority of the sheep deaths occurred. Some 2,600 people live there, including 650 civilians, 450 soldiers and their 1,500 dependents. Many of the other 650 civilians who work in Dugway live in the town of Tooele. "We occasionally see patients who have gotten an anticholinesterase overdose at the proving ground," says Dr. Gubler in the NEWS article, "but will the Army admit it? Never."

**Asked** by telephone about how many such cases he had seen, Dr. Gubler said that "there was some misquotation in the story," but refused to clarify it or make any further comment.

In the article, Dr. Gubler described a particularly hair-raising case in which he treated a Dugway worker who was showing all the symptoms of anticholinesterase poisoning. "But the Army vehemently denied he had received an overdose. So vehemently, that even though I watched him go into convulsions, I referred the patient to a neurosurgeon for extensive work-ups. He suffered nervous system impairment and had to receive long-term treatment. But the Army continues to be secretive. As a result, we don't know the true incidence of human contamination at Dugway."

**The Army still** refuses to concede that its chemical has been conclusively implicated, and the nature of the chemical remains secret. All civilian and military personnel who work at the proving ground carry cards alerting health officials to contact the Army base immediately, day or night, in case of sickness. This would enable treatment to be carried out on the base if necessary, since qualified medical help is there; but it could also have the secondary purpose of enabling a tight security lid to be pulled down on accidents.



James P. Hollinger/NRL; Mt. Wilson and Palomar Observatories

*Radio map of galactic center, showing moon's path; the area in visible light.*

## THE SECRET CENTER

### Moon occultations and telescopes

The center of the earth's galaxy is a point of unique interest to astronomers; any attempt to describe or explain the structure, dynamics or evolution of the galaxy must contain information about conditions at and near the center.

**Unfortunately,** direct observation of the center by visible light is impossible. The solar system lies halfway between the center of the galaxy and the edge—about 25,000 or 30,000 light years from each. Interstellar dust limits our view in the galactic plane to only a few thousand light years. There was thus no hope of seeing the center until radio astronomy developed within the last 20 years.

Because their wavelengths are greater than the dimensions of the dust particles, radio waves are not absorbed by the dust. Radio signals from the center of the galaxy and even beyond are received.

Clouds of interstellar gas have been found near the center. Such clouds inhabit other parts of the galaxy also, and it is the sizes and motions of these clouds that gives information about galactic dynamics.

The gas clouds show up by absorbing part of the galactic background radiation, which is a mixture of signals from many sources that gives a continuous wideband spectrum. Sometimes certain sharply defined wavelengths are absorbed; these absorption lines identify the substances in the clouds. Both hydrogen and hydroxyl ions are known to be there.

From a shift of the frequencies from those measured at rest in the laboratory, the speed at which the gas moves can be measured.

Present radiotelescopes, however, do not have sufficient resolving power to obtain good enough data on position and extent of the gas clouds. To get around this problem, the technique of observing lunar occultations has been developed.

When the moon passes between the earth and a distant source it progressively cuts off the distant signal. Astronomers make a record of the times at which different signal components are extinguished. Knowing the position of the moon at those moments, they know with extremely high accuracy the direction each part of the distant signal was coming from.

**The technique** can be used only in the narrow band of the sky to which the motion of the moon and other bodies of the solar system is confined. Fortunately the galactic center is also there—in the constellation Sagittarius. Occultation studies are possible for about two years out of every 19; during that period the moon makes a monthly pass through Sagittarius.

We are now in such a period—it began last fall and will continue until 1970—and more than a dozen observatories all over the world are taking advantage of the opportunity, including Parkes, Australia; Berkeley, Calif.; the National Radio Astronomy Observatory in West Virginia; Jodrell Bank, England; Nancy, France, and Pulkovo, U.S.S.R. Each will be watching the occultations it can observe, and since the moon takes a slightly different path on each pass and each path looks different to widely spaced observers, the result of the effort should be information about a sizable area around the

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when I wound up  
my shaver...”**



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center of the Milky Way galaxy.

Representatives of some of the observatories involved informally reported first results during the meeting of the International Scientific Radio Union in Washington, D.C. Some of the gas clouds have angular diameters around 5 or 10 minutes of arc; if they are at the distance of the galactic center this would mean they are tens of light years wide. Speeds range from one to 130 kilometers per second; slow clouds are thought to be near the earth, fast ones near the center.

This may be the only time in history such observations will be made. Twenty years ago existing telescopes couldn't handle them; 20 years from now, says Dr. Frank J. Kerr of the University of Maryland, radiotelescopes may be so good they won't need to rely on lunar occultations.

ASTRONOMY

**Visible nova in Vulpecula**

A nova is a small hot star—a subdwarf—that suddenly flares up to thousands or tens of thousands times its normal luminosity. Detectable novae are few—on the average two or three a year are recorded telescopically.

A nova visible to the naked eye is quite rare, but the discovery of such a one on the morning of April 15, by an English amateur astronomer, has been confirmed.

The reported nova has a visual magnitude of 5.1 (a little brighter than the planet Uranus at its brightest) and is located in the constellation Vulpecula, which is south of Cygnus. It was discovered by G. E. D. Alcock, a high school history teacher in Peterborough, England.

Novas rise to maximum brightness in only a few days. Astronomers like to catch them on the way up if they can, and quick notification by telegram enables all interested parties to go to work as quickly as possible.

After they pass maximum, novae fade away slowly, taking years or decades to return to normal.

“A nova this bright is rather unusual,” says Dr. Brian G. Marsden of the Smithsonian Astrophysical Observatory, Cambridge, Mass. The nova should, in principle, be visible to the naked eye but the bright artificial lights of most modern environments might wash it out. Therefore, Dr. Marsden suggests, binoculars should be used. The coordinates are right ascension, 19 hours, 45.9 minutes and declination, plus 27 degrees, 4 minutes.

The coordinates of Alcock's nova agree, to within eight minutes of arc, with those of a nova seen in 1670 and it is possible that the present nova is a

repetition of the old one. But the uncertainties in Alcock's coordinates, together with the uncertainties in those of the old nova, which were calculated in the 19th century from data found in 17th century records, make the agreement questionable. Even if the coincidence persists under the narrowest possible determination of coordinates, it still may never be known for sure whether the new nova is a repetition of the old.

One of the newly discovered pulsars (see p. 399) is located in Vulpecula, but the pulsar is too far away from the nova for any connection to be suspected.

OCCULT VIRUSES

**Diseases lie hidden**

Not long ago the concept of a virus invasion was fairly straightforward. The organisms were supposed to enter the host's blood stream where they caused acute infection. The severity of the symptoms depended on the degree of immunity already possessed by the host. The viruses then were met and neutralized by the host's antibodies, after which they disappeared from the blood stream.

This picture is changing lately as it is recognized that many viruses can achieve an entente with the host and lie hidden in the tissues, to be reactivated by some circumstance perhaps years later. These occult viruses, which may be exceedingly difficult to detect, now are implicated in some serious diseases.

The mechanism and the detection of chronic virus infections was the subject of a symposium and several reports at last week's meeting in Atlantic City of the Federation of American Associations for Experimental Biology.

Dr. F. J. Dixon Jr. of the Scripps Clinic and Research Foundation of La Jolla, Calif., says researchers conceivably may have to look to occult viruses to explain diseases such as rheumatoid arthritis, now thought to be due to an immune reaction by the victim to his own tissues.

Some cancers and some other diseases also may be due to viruses that live for years in a kind of balance between their own reproductive rate and the host's antibodies. Something happens—stress or other illness—to tip the balance, and the disease develops.

Dr. E. H. Lennette of the Department of Public Health, Berkeley, Calif., reports that one common virus, measles, has been linked in this way with the fatal disease called subacute sclerosing panencephalitis (SSPE).

It had been noted that children afflicted with SSPE possessed a very high level of measles antibodies in their blood.