

physical sciences

OPTICS

Infrared light technique reveals old drawings

A new technique, infrared reflectography, is being used to detect the original charcoal sketches or drawings underneath oil paintings, in a way not previously effective with conventional infrared photography.

The new method uses longer infrared wavelengths than those heretofore tried by art historians. The longer wavelengths penetrate the layers of oil paint to make the original design on wooden panels visible.

Dr. J. R. J. van Asperen de Boer, affiliated with the Central Research Laboratory for Objects of Art and Science in Amsterdam, developed the infrared reflectography technique.

In the September *APPLIED OPTICS*, he says the method shows that in the famous medieval painting representing the adoration of the Magi in the Rijksmuseum in Amsterdam, a camel in the final version replaced the head of a horse in an earlier charcoal drawing.

PARTICLE PHYSICS

Electron synchrotron readied

The world's largest electron synchrotron, a 10 billion electron volt machine built with National Science Foundation support at a total cost of \$11.5 million, is now completed and will be dedicated this fall as the Robert Rathbun Wilson Synchrotron Laboratory.

The circular accelerator is located at Cornell University. The laboratory is named for the scientist who for 20 years directed Cornell's laboratory for nuclear studies. Dr. Wilson is now director of the National Accelerator Laboratory at Weston, Ill.

GEOPHYSICS

Large negative ion isolated

A negative ion believed to be the most complex yet isolated and positively identified has been investigated by Bruce Steiner and Stephen Golub of the National Bureau of Standards in Gaithersburg, Md.

The NBS scientists find that the ion, known as hydroxyl monohydrate, responds to light in a way characteristic of some negative ions in the ionosphere. Studying the characteristics of the pentatomic negative ion may help explain some of the daily changes in the ionosphere's radio-reflecting properties, of fundamental importance in long distance communications.

SOLAR ASTRONOMY

New infrared solar lines detected

Measurements of infrared radiation from the sun made on a jet plane flying 42,000 feet above earth's surface have shown several hundred new solar absorption lines in regions of the spectrum previously inaccessible.

Data on the solar infrared spectrum are difficult to obtain and interpret even from mountaintop observatories in desert regions, since the atmospheric water vapor interferes or distorts.

The new lines were recorded during nine flights in July and August just south of the Canadian border between Minnesota and Washington. Dr. Gerard P. Kuiper, director of the University of Arizona's Lunar and Planetary Laboratory, headed the joint research program with NASA.

The new lines are still under analysis.

PUBLIC POLICY

Science advisers for State

Two geophysicists, Dr. Gordon J. F. MacDonald and Dr. Thomas F. Malone, have been appointed as the first of a group of scientific advisers to the Department of State.

Dr. MacDonald, a member of the President's Science Advisory Committee, is vice president of the Institute for Defense Analyses in Arlington, Va.; Dr. Malone is chairman of the Board of Travelers Research Center, Inc., in Hartford, Conn. He will serve as adviser on weather modification to the department's International Scientific and Technological Affairs Division, directed by Herman Pollack.

ASTROPHYSICS

Explanation for alleged quasar bridge

The reality of an alleged bridge of matter between the two component stars of quasar 3C-287, reported to the American Astronomical Society meeting last December by Dr. Thomas A. Matthews of the University of Maryland, was recently questioned on theoretical grounds (SN: 7/27, p. 82). Such a bridge could be due to relativistic effects involving high energy, accelerated motions approaching the speed of light, according to a theory worked out by Drs. L. M. Ozernoy and V. N. Sazonov of the P. N. Lebedev Physical Institute of the U.S.S.R. Academy of Sciences.

One possibility, they suggest, is the cone-shaped emission of relativistic particles from a quasar, with a very uneven distribution in their energies, high energy electrons being thrown out at a smaller angle. If this is true, it should show up as circular polarization of light from the reported bridge; the Russians propose that this effect be looked for.

ASTRONOMY

Solar telescope demonstrates portability

A portable solar telescope, a prototype of those to be used for observations from manned orbiting satellites, has been successfully operated at 27 facilities during a 10,000-mile trip around the United States.

The instrument, which can be mass produced, has proved suitable for eclipse observation also. The five-inch telescope provides visual, photographic or television images of the full sun, as well as solar flare activity.

It can be operated from any relatively flat, stable terrain. The instrument was built by Spectrolab, a division of the Aerospace Group of Textron, Inc., based in Sylmar, Calif.