

PHYSICS

Spectroscope Puts Rainbow to Work For Industry and Science

Multitude of Jobs Done by Powerful Research Tool in Many Fields Discussed by Scientists and Industrialists

METHODS of putting the rainbow to work by means of the spectroscope were discussed at the Industrial Conference on Spectroscopy at Massachusetts Institute of Technology.

Over 100 scientists and industrialists by attending showed great interest in the spectroscope which is one of the most powerful tools for research. It has innumerable uses and in various applications serves as a watch, detective, balance, speedometer, microscope, camera, tape measure, transit and forgery detector.

Spectroscopists From Abroad

In addition to spectroscopists from this country and abroad, those attending included industrialists and research scientists working in textiles, chemical engineering, explosive manufacturing, metallurgical engineering, astronomy, medicine, biology, coal mining, automotive engineering, paper manufacturing, and wire making.

Many uses of the spectroscope were reported.

One engineer had trouble with automobile radiator caps buckling. The spectroscope revealed impurities in the material undetectable by other means. Another told of a white paint which turned black on exposure to sun. Spectroscopy revealed minute impurities.

The importance of the spectroscope in metallurgical engineering was indicated by the fact that one company has made more than 33,000 spectroscopic photographs during research.

Slight Impurities Detected

In crime detection the spectroscope has enabled investigators to identify materials on clothing.

A coal operator said that it can be told by spectroscopic examination from what seam coal comes. Mining engineers are using spectroscopes to detect minute impurities, which in some cases aid in finding larger amounts.

Because even small amounts of impurities may affect the life of rubber,

manufacturers are greatly interested in spectroscopic methods of detecting them. These methods are also of great use in controlling the manufacture of optical glass.

In food industries, the spectroscope is valuable in checking ultraviolet irradiation and in analysis of materials. Dental researchers have found by spectroscope that mottled enamel is due to small impurities in certain drinking waters. In the case of an appendix operation where glass was found, the spectroscope revealed fragments did not come from a suspected catsup bottle in a restaurant.

Cranberries to Raincoats

Other instances of the use of spectroscopy ranging from examination of cranberries to raincoats, cable sheathing, gasoline and transformer oil were cited. One company suspected second hand oil was being sold for use in transfor-

METEOROLOGY

They Are Certainly Dog Days And This Explains the Name

THE PORTION of the summer through which the year is now passing, known as "Dog Days," beginning July 3 and ending August 11, has nothing to do with the extremely hot appearance of dogs these days or the reputedly greater prevalence of "mad dogs" during the period.

It derives its name from Sirius, the Dog star, most brilliant of the fixed stars. Since the early days of antiquity this particular period of the year has been associated with the greatest heat of the year.

In Greek mythology the heliacal rising of Sirius was associated with the coming of the dry, hot and sultry season. The evil effects of this period on vegetation led to a belief in the baleful

influence of Sirius on human affairs in general.

There is no truth in this superstition, of course, but the belief was adopted by the Romans and by them transmitted over the greater part of Europe, whence it came to America.

A muggy atmosphere, thunderstorms and vacations are associated with the Dog Days. Sirius rises with the sun about July 23 and the Dog Days include the period from 20 days before to 20 days after this simultaneous rising.

While this rising of the Dog star with the sun has no influence upon the weather it does provide an excellent sign for the time of year when disagreeable, hot weather is apt to prevail, particularly heat accompanied by dampness.

Science News Letter, July 29, 1933

MEDICINE

New Type of Silicosis Found in Wales

A CONDITION corresponding to silicosis among metal miners has recently been found in coal miners of South Wales, Prof. S. Lyle Cummins of Cardiff, Wales, reported at the symposium on this important industrial disease held by the National Tuberculosis Association. Silicosis is a lung disease resulting from inhalation of particles of silica. These get into the air in the course of certain mining occupations and stone cutting. Persons who suffer from silicosis are very liable to develop tuberculosis. The (*Turn Page*)

South Wales coal miner's silicosis, however, apparently does not make its victims liable to fatal tuberculosis, as does the other type of silicosis.

The mixture of stone and coal dusts that the South Wales colliers inhale into their lungs may contain substances that add to the harmful effects of silica particles, Prof. Cummins suggested. Other substances in this mixture may tend to neutralize the effect of the silica. He emphasized the need for further study of this disease.

Silicosis is probably on the increase. It affects to an appreciable extent the tuberculosis death rate among industrial workers exposed. These conclusions were presented to the National Tuberculosis Association by Dr. A. J. Lanza of New York City.

No accurate estimate of the number of cases of silicosis in the general population can be made because there are no mortality statistics and the U. S. Census Bureau does not list it in its reports, Dr. Lanza said.

Science News Letter, July 29, 1933

PHYSICS

Two Kinds of Particles In Cosmic Rays

COSMIC RAYS entering the earth must consist in part of both negative and positive charged particles. For if the particles were only electrons or only positives, mathematical computations show there would exist electric potential differences of thousands of billions of volts between points that are relatively close together as astronomy counts distances, such as the distance light travels in a year.

This suggestion is made by Dr. W. F. G. Swann, director of the Franklin Institute's Bartol Research Foundation in a communication to the American Physical Society.

Some investigators have suggested that the cosmic rays consist of a mixture of electromagnetic radiation or photons and negatively charged particles or electrons. Recent experiments by Dr. Swann's associates have produced evidence that some of the particles may be speeding hearts of light atoms, positively charged.

Dr. Swann renews his theory that the cosmic rays may originate in the heavenly bodies and sees no theoretical reasons why both negative and positive particles should not be emitted with high energy from them.

Science News Letter, July 29, 1933

ASTRONOMY

Philadelphia to See Stars Shining From Sheet Metal Sky

ON A SHEET METAL dome, 65 feet in diameter and perforated with millions of small holes, one will soon be able to see reproduced the starry skies as they appear from any part of the earth at any time.

This will be possible when America's second optical planetarium opens about the middle of October as part of the Benjamin Franklin Memorial and The Franklin Institute, whose \$4,000,000 building is nearing completion at a location close to the city's center. The planetarium, made by the Carl Zeiss optical works in Jena, Germany, is the donation of Samuel S. Fels, and will be known as the Fels Planetarium. The building will house also a technical museum similar in scope to the famous Deutsches Museum in Munich. The museum will open at a later date, probably in December.

Eighteen planetaria are now in operation in European cities. The Adler Planetarium, opened in Chicago three years ago, was the first in the United States. Planetaria have also been assured for Los Angeles and New York.

The projection device, the part of the apparatus imported from Germany, is a glorified stereopticon, and stands in the center of the hemispherical dome. Through 119 separate lenses, images of all the naked eye stars and planets, as well as the sun and moon, are projected on the dome's white inner surface, where they are seen by the audience, seated below around the instrument. The entire machine is controlled by the lecturer through a complicated switchboard. A number of motors cause the various objects to move in their proper orbits, but at greatly accelerated speeds. It is also possible to show the sky of the southern hemisphere, picturing stars which never can be seen from the United States.

The Fels Planetarium will be the first to have a truly hemispherical dome. Previous planetaria projection surfaces were made of stretched cloth, forming a series of flat figures. In Chicago's Adler Planetarium the cloth is stretched from a series of wooden rings, so that the dome consists of zones, one above another, and each forming the frustum

of a cone. The Philadelphia dome is made of sheets of stainless steel, each one formed to the proper curvature.

As a solid metal dome would produce objectionable echoes, the steel sheets are perforated with millions of holes, one-sixteenth of an inch in diameter, and an eighth of an inch apart. Tests made by acoustic experts have shown that sound passes through such perforated metal as readily as through stretched cloth. The walls behind the dome are covered with sound absorbing pads, so that the voice of the lecturer will not be reflected, and the effect will be the same as if he were speaking on an open plain at night. In most of the other planetaria, echoes are avoided by a series of steel baffle plates hung behind the cloth dome. These reflect the sound but do not absorb it.

The astronomical section of the Franklin Institute Museum will include a public observatory, with two large telescopes, a reflector with a mirror 24 inches in diameter and a refractor with a lens 10 inches in diameter, as well as numerous models, astronomical photographs shown as transparencies, and historic instruments.

Science News Letter, July 29, 1933

ARCHAEOLOGY

New Type of Prehistoric Pottery Found in Mexico

POTTERY made by prehistoric Indian inhabitants of America, unlike any pottery known to archaeologists has been found by Dr. E. B. Sayles, archaeologist of Globe, Arizona, in the Mexican state of Chihuahua.

Dr. Sayles, who is collecting ancient pottery remains from Chihuahua with permission of the Mexican government, discovered some buff potsherds with red designs. These are unlike any of the well-known kinds of pottery made by prehistoric Indians in the Southwest. Nor have they a resemblance to anything known in central and southern Mexico, according to Eduardo Noguera, Mexican government archaeologist who has just visited Chihuahua to view Dr. Sayles' collection.

Science News Letter, July 29, 1933