condition a "foreign body" reaction and it is definitely not linked to silicosis.

A virtue of using metallic aluminum dust as a silicosis preventive, suggest the Canadian scientists, is that its specific gravity is almost exactly the same as quartz itself. Thus if aluminum dust is mixed with quartz it will stay suspended in the air an equal length of time.

"We are of the opinion," conclude the scientists, "that the aluminum reacts as in the beaker, when taken into the lung with the dangerous dusts. That is, that the rapid initial rise and concentration of the solution of the silicious material is inhibited, thereby preventing degeneration of the dust cells and the production of fibrous tissue.

"Due to the remarkable results obtained in the quartz and aluminum treated rabbits in conjunction with the beaker results, it seems reasonable to assume that metallic aluminum in small quantities administered in a similar manner will prevent other forms of pneumoconiosis, such as asbestosis, etc."

Science News Letter, July 31, 1937

PHYSICS

Invisible Rays Help To Solve Molecule Structure Problems

Science's Powerful Research Tool, the Spectroscope, Applied to Research on Glands, Food Color, Even Guns

INVISIBLE light and rock salt are being used to solve one of science's most puzzling problems; the structure within the molecule of the atoms of which all matter is composed, it was indicated by a report of Dr. R. B. Barnes, of the American Cyanamid Company before the Fifth International Spectroscopy Conference at the Massachusetts Institute of Technology.

Among the vital questions science may be able to answer from knowledge gained in this research are: What happens when rubber ages, how some petroleum products differ from others, what takes place when a film of paint dries and what is the effect and action of various catalysts.

In his research, Dr. Barnes employs one of science's most powerful research tools, the spectroscope. By using it to examine the invisible light found in the infra-red range of the spectrum, he can not only tell what and how many atoms of an element are present, as can be done in all ranges of the spectrum, but how these atoms are connected with each other, as well.

Shows Linkages

The investigation is expected to be particularly valuable in determining what actually occurs during chemical reactions, for the spectroscope can reveal atomic linkages both before and after the reaction. It will also enable investigators to differentiate between isomeric structures, substances composed of the same atoms but linked differently. These isomers, Dr. Barnes explained, while difficult to differentiate by chemical analyses, reveal different sets of spectral lines as proof of their individuality.

Infra-red light cannot be seen, but is measured by its heat. A delicate thermocouple transforms this heat into electricity, so that the light can be "read" from a galvanometer.

The chief feature of the spectrograph used is that the prism employed to break the light into the familiar spectrum is merely a large single crystal of rock salt. This is used in place of the ordinary glass or quartz prism because of its superior ability to transmit infra-red rays.

Ordinarily Tedious

Infra-red spectrum research is difficult and tedious because of the delicate and specialized technique and equipment required. To make one complete measurement of a given compound, for example, often requires that the experimenter sit in one position for from five to seven hours. The most recent instrument constructed by Dr. Barnes is completely automatic, however, and has cut this time to less than an hour. An idea of the sensitivity of the experiments can be gained from the fact that temperature changes as small as one ten-millionth of a degree Centigrade must be measured.

Other new roles played by the spectroscope were described. The discovery of red color pigments that make hams turn red when cured, improved methods of detecting impurities in cast iron, vital information that should yield better rayons and applications that are telling scientists new facts about gland secretions are among the diversified uses of the spectroscope described by scientists on the program.

Study Glands

Dr. G. O. Langstroth, of McGill University, outlined his spectroscopic methods of analyzing the secretion of glands in the body under varying kinds of stimulation: how the ability of the spectroscope to study small samples of saliva, for example, has enabled him to find that in the cat a different type of protein material is liberated when the salivary glands are excited by adrenalin than when stimulated by the chorda tympani nerve, the small nerve at the base of the brain.

This discovery, said the McGill scientist, was followed up chemically by the use of large quantities of the secretion and found to be correct. The studies have enabled the scientist to formulate a mathematical theory of secretion that gives a fairly comprehensive picture of certain glandular functions and permits calculation of many features not observable in a critical experiment.

What Makes Ham Red?

Another biological application of the spectroscope, described by Dr. W. M. Urbain of the chemical laboratory of Swift & Company, is to learn more about the color changes occurring in the curing of meats. Why, for example, a fried steak or a roast of beef will turn brown while ham, corned beef and frankfurters remain red, or pink, on cooking.

The color of food, he emphasized, is important economically for there is a psychological appeal to good looking meat that makes customers want to buy it. Meat packers now add constituents to the curing stage which determine the final color of the meat. But the process is not too well known chemically.

The spectroscope, said Dr. Urbain, is now helping scientists to find out what happens when a ham or other product is cured. Already several complex, natural pigments have been isolated and some of their properties determined.

By a more accurate spectroscopic analysis of the caustic liquors that go into its manufacture, better rayon should be

developed, declared two University of Michigan scientists, Drs. O. S. Duffendack and R. A. Wolfe, before the conference. So high a standard of purity is now required of common elements used in this industry that ordinary chemical methods are not good enough. The spectrograph steps in to do the job.

Dr. R. A. Sawyer, also of the University of Michigan, described new and speedier methods of studying impurities in cast iron and in steel which can detect the presence of chromium in one part in 10,000.

Better Guns

Uncle Sam is using the keen eye of the spectroscope, science's powerful research tool, to make sure he gets the best grade steel for his guns. This was told to the Conference by Major J. L. Guion, who explained how the instrument has replaced chemical analyses in the Army's efforts to detect impurities.

Particularly, the spectroscope has been used to test steel for molybdenum and vanadium, metals often found associated with steel. The best steel for guns or armor-plate has from four to six parts in 1,000 of molybdenum and one or two parts in 1,000 of vanadium. More than this, or even less, makes the steel brittle and liable to crack under pressure of repeated explosions.

Tin can also be spectroscopically detected in steel, as was explained by Miss Mary E. Warga of the University of Pittsburgh. Tin, she said, is becoming more and more common as an impurity in steel largely because industry is using more scrap metal. The only accurate chemical methods of detecting it are long and tedious, she said, but the spectroscope has proved capable of keeping it within the desired limits, from two to nine parts in ten thousand.

Outside these limits, tin, like molybdenum and vanadium, causes the steel to crack. In this respect, Miss Warga said, the spectroscope was valuable not only in routine analyses of this type but for finding the cause of defects in steel, once they become apparent.

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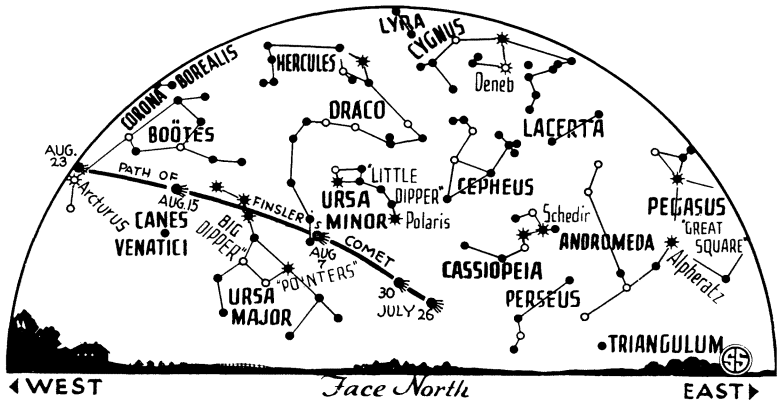
If man's voice were as powerful for his size as that of the tree frog, he could be heard from eastern Washington State to New York City.

A statue recognized as Tutankhamen, because of its likeness to others, was found at Luxor with names of the kings who succeeded him carved on the figure, in place of his.



HOW TO FIND NEW COMET

Use this map to find the Finsler comet discovered on July 4 in Switzerland. Your unaided eye should see it, but a small opera glass will help. At the end of July, the Finsler comet will be seen almost due north and about half way between the Pole star and the horizon. About August 6 or 7 it will be almost on the line between the "pointers" of the big dipper and the Pole star. As it passes through the "handle" of the big dipper it will reach its greatest brilliance and be as bright as the star Megrez, the star in the dipper where the handle joins. The map shows the appearance of the stars in the northern sky at 10:00 p. m. on August 1 and at 9:00 p. m. on August 15.

ANTHROPOLOGY

America's First Humans May Have Become Extinct

Novel Theory Suggests Great Prehistoric Dust Storm May Have Wiped Out Ancient American Hunter of Sloth

AMERICA'S first human population may have become totally extinct, like the mammoths, giant ground sloths, camels and wild horses they hunted with the stone weapons now known to scientists as Folsom and Yuma points.

Dust storms may have been a cause of their disappearance.

These two novel points of view are offered for discussion by Dr. C. Bertrand Schultz of the Nebraska State Museum.

The idea of an extinct race of human beings in America is not new. Extinct races were credited with having built the famous mounds of the Mississippi valley and the Southeast, until research showed that the moundbuilders were Indians, and not necessarily the most ancient Indians, at that.

But the extinct race postulated by Dr. Schultz might well be as old as the cave-man peoples of the Old World—30,000 years or more. The Indians, or their ancestors, may be a much later arriving second wave of immigration from Asia by way of Bering Strait.

Says Dr. Schultz:

"Much new evidence strongly suggests that the 'people,' who lived at the same time as so many of these now-extinct mammals, disappeared from the central North American region at the same time as these mammals. Some great catastrophe must have overtaken the animals in that locality at that time."

Many entire families, such as the American horses, camels, ground sloths, and elephants were wiped out, as well as many genera, Dr. Schultz suggests. The cause of this extinction is not definitely known. Inasmuch as artifacts are often found with now-extinct mammals, it is possible man was a contributing factor in their extermination. Disease is often suggested as a cause.

"Dust storms are recognized as a very important element since twice before in the Pleistocene (early Sangomon and early Peorian) great dust storms apparently caused the extinction of some of the mammalian population and drove others to more liveable climates, perhaps to the Southwest or East," Dr. Schultz contin-